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Low Barugh, Barnsley

Ecology Report

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1 Introduction

Site Description

1.1 The site is the proposed location of new residential housing occupying an area of approximately 10ha which is located to the southeast of Dearne Hall Road in Low Barugh, Barnsley, centred at OS gird reference SE 317 087. Residential housing and Dearne Hall Road form the northwestern site boundary. Industrial premises are located to the south of the site, and the eastern site boundary is formed by a live railway line.

1.2 The site is composed of two arable fields, with hedgerows and fencing located at the southern, eastern and northern boundaries. Two ponds are located at the eastern side of the fields, which are linked and surrounded by marshy grassland and swamp vegetation. A wet ditch is located to the east of these ponds. Semi-mature broadleaved woodland is located on the railway embankment, and semi-mature broadleaved woodland with areas of neutral grassland is located on a section of disused railway located at the southeastern site boundary. Two residential properties are situated at the southwestern corner of the site.

Description of Project

1.3 Commercial Estates Projects and Hallam Land Management propose to develop the site for housing use. The extent of the proposed works is based on the current illustrative land use plan (NLP, 2013).

Background to Commission

1.4 BSG Ecology was originally commissioned in 2008 by Commercial Estates Projects to undertake an Extended Phase 1 Habitat Survey (JNCC, 2010) of the site, in order to identify habitats or species that may be affected by the proposed works, and provide a preliminary ecological assessment.

1.5 BSG Ecology was subsequently commissioned in February 2012 by Commercial Estates Projects and Hallam Land Management to update the Extended Phase 1 Habitat Survey, and to undertake further bat activity surveys, bat roost surveys, great crested newt *Triturus cristatus* presence/absence surveys and breeding bird surveys.

2 Scope of Study

Aims of Study

2.1 The objectives of the surveys were to:

- Identify the existing habitats within and adjoining the site;
- Document the breeding bird community using the site;
- Establish presence or absence of bat roosts within the trees and buildings on site and the bat species using the site for foraging and commuting;
- Establish presence or absence of amphibians including great crested newt within the two ponds;
- Check for evidence of badger *Meles meles* within and adjoining the site;
- Check for evidence of water vole *Arvicola amphibius* within the ponds and wet ditch within the site;
- Establish presence of invasive species, such as Japanese knotweed *Fallopia japonica* within the site.

2.2 This report combines the results of all ecological survey work undertaken by BSG in 2012, and sets out the following:

- The approach to the survey work and methods used;
- The results and an evaluation of them to determine the likely importance of the site in terms of its habitats and for protected and notable species;
- The legislative and planning policy protection applicable to the habitats and species present within the site;
- Recommendations to avoid or reduce ecological impacts.

3 Methods

Desk Study

3.1 A desk study was carried out in April 2012 to determine the presence of any protected species records or designated statutory or non-statutory sites of conservation value (such as Sites of Special Scientific Interest or Local Wildlife Sites) within a 1.5km radius of the centre of the site.

3.2 Barnsley Biological Records Centre was contacted to supply this information.

Field Survey

Phase 1 Habitat Survey

3.3 Senior Ecologist Liz Rose-Jeffreys MIEEM undertook the field survey on 29 March 2012 between 1430 and 1600 hours. The weather was slightly overcast, still and dry. The site was walked over and the habitats were described using the Phase 1 Habitat Survey methodology (JNCC, 2010).

Breeding Bird Survey

3.4 The survey methodology broadly followed the "Common Bird Census" (CBC) devised by the British Trust for Ornithology (BTO, 1983). This technique records the location and movements of every bird present within a defined survey area, recording each individual only once.

3.5 Principal Ecologist Guy Miller MIEEM undertook three visits during the 2012 breeding bird season between 0700 and 0900 hours, in the early part of the day when birds are most active. The dates and weather conditions during these surveys are detailed in Table 1 below.

3.6 A transect was used to walk around the survey area and records were made of birds singing or calling, repeated territorial calls, territorial aggression, displaying, adults carrying food or nesting material, juvenile birds and family groups.

Table 1: Breeding bird survey dates and weather conditions

Survey date	Weather conditions
11/05/12	10˚C, sunny, moderate breeze, dry
01/06/12	14˚C, overcast, light breeze, dry
26/06/12	15˚C, sunny, still, dry

3.7 The breeding status of birds encountered within the site was classified in three categories: confirmed, probable and possible breeders (European Ornithology Atlas Committee, 1979). The survey evidence required to allow the assignment of these categories is explained below:

Confirmed breeding (B): Distraction display or injury feigning;
Used nests or eggshells found (occupied or laid within the survey period);

Recently fledged young or downy young;

Adults entering or leaving a nest site in circumstances indicating occupied nest or an adult sitting on nest;

Adults carrying food for young or faecal sacs;

Nest containing eggs;

Nest with young seen or heard

Probable breeding (Pr): Pairs observed in suitable nesting habitat in breeding season;
Permanent territory presumed through registration or territorial behaviour (song etc.) on at least two different days, a week apart, at the same place;

Display and courtship;

Visiting probable nest site;

Agitated behaviour or anxiety calls from adults;

Building nest or excavating nest hole.

Possible breeding (Po): Species observed in breeding season in possible nesting habitat. Singing male(s) present or breeding calls heard in breeding season.

Not breeding (N): None of the above behaviour recorded

Bats

Roosts

Trees

3.8 During the Phase 1 Habitat Survey on 29 March 2012, the trees within the site were inspected from the ground, to assess their potential to support roosting bats and to search for signs of bat activity such as droppings. This survey identified the presence of three trees with potential to support roosting bats and a detailed daytime survey was subsequently undertaken of these trees on 10 April 2012. Any features with potential to support roosting bats (for example cavities and splits) were subject to detailed visual checks for signs of bats (such as droppings, feeding remains, staining and scratch marks) using an endoscope. The survey was undertaken by Senior Ecologist Liz Rose-Jeffreys MIEEM, who holds a Natural England scientific survey bat licence (number 20120872) and Ecologist Ruth Walker AIEEM. For location of trees refer to Figure 1: Extended Phase 1 Habitat Survey Plan, in Appendix 2.

Buildings

3.9 The two buildings located within the site, Properties 1 and 3 Claycliffe Road, were subject to detailed survey work in July 2012. This comprised a detailed external and internal inspection of both buildings on 3 July 2012, followed by an evening emergence survey. A dawn re-entry survey was subsequently undertaken on 5 July 2012.

3.10 The evening emergence survey was undertaken on 3 July 2012 between 2115 and 2250 hours by Senior Ecologists Liz Rose-Jeffreys MIEEM and Katy Stiles MIEEM, both of whom hold a Natural England scientific survey bat licence, with assistance from Debbie Worland. Sunset was at 2137 hours. The weather was overcast, still and humid, with occasional light rain from 2236 hours. The temperature was approximately 17°C throughout the survey. The dawn re-entry survey was undertaken on 5 July 2012 between 0300 and 0450 hours by Liz Rose-Jeffreys with assistance from Debbie Worland and Nev Davey (who holds a Natural England scientific survey bat licence). Sunrise was at 0445 hours. The weather was overcast, dry, still and humid and the temperature was between 15 and 16°C throughout the survey.

3.11 The three surveyors were positioned at strategic points around Properties 1 and 3, in order to give the best possible coverage of the features identified as having potential to support roosting bats (refer to Figure 2: Bat Survey Plan, in Appendix 2, for location of surveyors). The surveyors each used a heterodyne hand-held bat detector and an Anabat frequency division bat detector in order to help identify bat species by their echolocation calls.

Walked Transects

3.12 The survey methods used were designed with reference to the Good Practice Guidance produced by the Bat Conservation Trust (Hundt, L., 2012).

3.13 Three walked transect surveys were undertaken between May and July 2012 by Senior Ecologist Liz Rose-Jeffreys MIEEM and Field Assistant Grant Bramall, both of whom hold Natural England survey licences[1], with assistance from Rachel Hall. Each survey visit started 10-15 minutes before sunset and lasted between 1.5 and 2 hours. The timing of the surveys covered the bat emergence

[1] 20120872 and 20113280 respectively.

period and the period of most intense foraging activity when invertebrate prey is most abundant (Altringham, 2003). Each route was walked at a steady speed.

3.14 Electronic bat detecting/recording equipment (see below) was used to continuously survey for bats along the entire transect route. In addition, the transect route included 12 stopping points; each was surveyed for four minutes before moving onto the next point (refer to Figure 2: Bat Survey Plan for details of stopping points, in Appendix 2). The survey routes were walked in opposite directions and starting at different points between visits to ensure different areas of the site were sampled at different times. The routes were chosen to incorporate a range of habitat types representative of different habitats within the site. The same stopping points along the route were used for each survey visit. Details of the survey visits are set out in Table 2 below.

3.15 All transect surveys were undertaken using two detectors simultaneously: a "Batbox Duet" frequency division bat detector and an "Anabat" frequency division bat detector to increase the chance of detecting and recording calls. Calls picked up by the Anabat detector were recorded on an internal compact flash card. All bat calls recorded were analysed using "Analook" software to confirm the species of bats encountered during the surveys. Wherever possible the calls were identified to species level.

3.16 Where bat activity was recorded on walked transects, the time and species recorded were noted on a map of the site. In addition, the flight direction and behaviour of the bat(s) was also recorded where this could be determined (e.g. foraging, commuting or social calling).

Table 2: Summary of walked transects

Date	Survey Times	Sunset Time	Surveyors	Weather	Temperature	Starting Point
24/05/12	20:58 – 22:37	21:15	Liz Rose-Jeffreys, Rachel Hall	Clear, dry and still	Start: 21°C Finish: 20°C	1
12/06/12	21:23 – 23:12	21:36	Liz Rose-Jeffreys, Grant Bramall	Overcast, dry, light breeze	Start: 13°C Finish: 11°C	12
16/07/12	21:09 – 22:57	21:26	Liz Rose-Jeffreys, Grant Bramall	Partially overcast, dry, light breeze	Start: 17°C Finish: 16°C	8

Remote Surveys

3.17 An Anabat detector was used to assess bat activity at a fixed point within the site. The use of remote detectors can help to identify the presence of different species, provide additional data to support the findings of the walked transects, and to provide data which would otherwise be difficult to obtain (for example, data throughout the night on consecutive nights). The level of Anabat use has not been intended to provide a detailed statistically robust analysis of the levels of bat activity across every part of the site.

3.18 The detector was left *in-situ* for three nights on three separate occasions during the survey period (May-July 2012), for a total of nine nights. This equates to 81 hours of remote survey time. The Anabat detector was programmed to begin recording approximately one hour before sunset and end recording approximately one hour after dawn. Table 3 below provides details of the dates and weather conditions during which the Anabat detector was deployed.

3.19 The remote detector was positioned at the edge of the marshy grassland habitat within the southeastern part of the site. Its position was chosen to provide information particularly relating to the marshy grassland to be directly affected as part of the proposals and the adjacent woodland edge habitat. The detector was placed in a camouflaged water-proof box, and the detectors' microphone was tilted at an upwards angle towards the broadleaved woodland. The remote detector location is shown on Figure 2: Bat Survey Plan, in Appendix 2.

3.20

Table 3: Summary of weather conditions during remote bat detector surveys

Date	Sunrise time	Weather at sunrise	Sunset Time	Weather at sunset
Period 1				
24/05/12	-	-	21:15	20°C, clear, light breeze, dry
25/05/12	04:50	13°C, clear, light breeze, dry	21:17	19°C, clear, moderate breeze, dry
26/05/12	04:49	12°C, clear, dry, moderate breeze	21:18	18°C, clear, dry, moderate breeze
27/05/12	04:48	12°C, clear, dry, light breeze	-	-
Period 2				
12/06/12	-	-	21:36	12°C, overcast, light breeze, dry
13/06/12	04:36	10°C, overcast, dry, light breeze	21:36	13°C, partially overcast, dry, light breeze
14/06/12	04:36	10°C, dry, overcast, still	21:37	12°C, dry, overcast, still
15/06/12	04:36	9°C, moderate breeze, overcast, dry	-	-
Period 3				
12/07/12	-	-	21:30	14°C, partially overcast, light breeze, dry
13/07/12	04:54	10°C, overcast, light breeze, light rain	21:29	11°C, overcast, light breeze, light rain
14/07/12	04:55	9°C, partially overcast, dry, light breeze	21:28	10°C, dry, moderate breeze, clear
15/07/12	04:56	10°C, partially overcast, intermittent light rain, moderate breeze	-	-

3.21 Whilst the analysis of Anabat sound files can make it possible to estimate the number of bats recorded on each individual sound file (for example, it is possible to visually distinguish separate calls of two or more bats if they have been recorded simultaneously), it is not possible to determine whether consecutive sound files have recorded either a number of separate individual bats passing the detector as they move from one area (e.g. a roost) to another (e.g. a foraging area), or one bat calling repeatedly as it forages in close proximity to the detector. For this reason, recordings of bats calls are counted as single bat passes.

3.22 The number of bat passes does, however, help to reflect the relative importance of a feature/area to bats by assigning a level of bat activity that is associated with that feature, regardless of the type of activity. In addition, the results of transect survey work provide further context and allow bat activity recorded on remote detectors to be evaluated with reference to field observations.

3.23 Studying the time of night at which bat passes are recorded helps to determine how bats are using a site. Key periods of bat foraging activity are often the periods soon after sunset and before sunrise. Different bat species emerge and re-enter roosts at different times. If a bat species is recorded close to a typical roost emergence or re-entry time, this increases the likelihood of a roost of that species being present within or close to the site. Table 4 sets out the typical bat emergence times (Jones, K. and Walsh, A., 2001) for those species identified (or possibly identified) on site. Species will typically re-enter roosts during a similar time period before sunrise.

Table 4: Bat emergence times

Species	Time After Sunset
Noctule *Nyctalus noctula*	5-10 minutes (occasionally before sunset)
Leisler's *Nyctalus leisleri*	10-15 minutes (occasionally before sunset)
Common pipistrelle *Pipistrellus pipistrellus*	Within 20 minutes (occasionally before sunset)
Soprano pipistrelle *Pipistrellus pygmaeus*	Within 20 minutes (occasionally before sunset)
Daubenton's bat *Myotis daubentonii*	40-50 minutes

Great Crested Newt

3.24 During the Phase 1 Habitat Survey on 29 March 2012, the site was assessed for its potential to support great crested newt and an assessment was also undertaken of the two ponds located within the site for their potential to support amphibians including great crested newt. One further waterbody, the disused Barnsley canal, is located 210m to the east of the site; an assessment was also undertaken in July 2012 of this waterbody for its potential to support great crested newt. For location of the ponds, refer to Figure 1: Extended Phase 1 Habitat Survey Plan, in Appendix 2.

3.25 The ponds were assessed using the Habitat Suitability Index (HSI, Oldham *et al.*, 2000) scoring method, which is a quantitative means of evaluating habitat quality for great crested newt measured over ten suitability indices. The HSI provides a numerical index between 0 and 1 where 0 indicates very poor habitat with minimal probability of great crested newt occurrence, and 1 represents optimal habitat with a high probability of occurrence:

Table 5: Pond suitability to support great crested newts according to HSI score

HSI score	Pond suitability for great crested newts (ARG UK, 2012)
<0.5	Poor
0.5-0.59	Below average
0.6-0.69	Average
0.7-0.79	Good
>0.8	Excellent

3.26 The survey methodology followed the methods set out in the Natural England (formerly English Nature) Guidelines (2001) and included searches for great crested newt, smooth newt *Lissotriton vulgaris*, palmate newt *Lissotriton helveticus*, common frog *Rana temporaria* and common toad *Bufo bufo*.

3.27 These guidelines state that, to determine presence/absence within ponds, four survey visits using three methods per visit, including torch survey, bottle-trapping, terrestrial searches and egg searching, should be used. Surveys should be undertaken between mid-March and mid-June, with at least two survey visits during mid-April to mid-May. Since great crested newt was located within Pond A, two further surveys of this pond were undertaken, in order to undertake a population size class assessment. Table 6 below details the survey dates, surveyors and weather conditions during each survey visit. Tables 7 and 8 detail the survey methodologies used during each survey visit.

3.28 Four survey visits were initially made to Ponds A and B during April 2012, with two further visits to Pond A undertaken during June 2012. The surveys were conducted by Senior Ecologists Liz Rose-Jeffreys MIEEM, Kate Vincent MIEEM and David Stiles, Ecologist Ruth Walker AIEEM, and field assistant Grant Bramall, each of whom holds a Natural England great crested newt scientific survey licence. Field assistance was provided by Debbie Worland.

3.29 Each survey comprised an evening visit in which torch searches of aquatic habitats were conducted and a search for great crested newt eggs carried out. Bottle traps were set and the following morning the bottle traps were checked and removed.

Table 6: Great crested newt survey dates and weather conditions

Date	Surveyors	Weather
10/04/12	Liz Rose-Jeffreys MIEEM (Class Survey Licence holder) and Ruth Walker AIEEM (Licence Number: 20113834)	Partially overcast, dry and still. Air temperature: 8˚C
17/04/12	Kate Vincent MIEEM (Class Survey Licence holder) and Ruth Walker	Overcast and dry with a low-moderate breeze. Air temperature: 8 ˚C
24/04/12	Liz Rose-Jeffreys and David Stiles (Class Survey Licence holder)	Mostly clear, dry with a low breeze. Air temperature: 6˚C
30/04/12	Liz Rose-Jeffreys and Debbie Worland	Overcast, dry and still. Air temperature: 11˚C
11/06/12	Liz Rose-Jeffreys and Grant Bramall (Class Survey Licence holder)	Overcast, dry and still. Air temperature: 11˚C
18/06/12	Liz Rose-Jeffreys and Grant Bramall	Overcast, dry and still. Air temperature: 13˚C

Table 7: Great crested newt survey methodologies for Pond A

Date	Methods			
	Bottle trap (number of bottles)	Egg search	Terrestrial search	Torch
10/04/12	✔ (15)	x	✔	✔
17/04/12	✔ (25)	x	✔	✔
24/04/12	✔ (25)	✔	x	✔
30/04/12	✔ (45)	✔	x	✔
11/06/12	✔ (45)	✔	x	✔
18/06/12	✔ (45)	✔	x	✔

3.30 Persistent high levels of rainfall in spring meant that Pond A, which was subject to targeted great crested newt surveys, breached its banks and its size increased significantly from approximately 80m by 30m (late March 2012) to 120m by 40m (late April 2012). The depth of open water meant that it was only possible to set 15 bottle traps within the pond during the initial survey (10 April 2012), although an increase in water levels meant that it was possible to set 25 traps during the second and third visits (17 April and 24 April 2012). Further increase in water level meant that for the fourth, fifth and sixth visits (30 April, 11 June and 12 June 2012) it was possible to set 45 traps within the pond. Despite the fluctuation in numbers of bottle traps used this is not considered to provide a significant constraint to the findings, since it was possible to thoroughly survey the pond using three survey methods during each visit.

Table 8: Great crested newt survey methodologies for Pond B

Date	Methods			
	Bottle trap (number of bottles)	Egg search	Terrestrial search	Torch
10/04/12	✔ (5)	✔	✔	✔
17/04/12	✔ (5)	✔	✔	✔
24/04/12	✔ (5)	✔	✔	✔
30/04/12	✔ (5)	✔	✔	✔

Water Vole

3.31 During the course of the survey work undertaken during 2012 the wet ditch and two ponds were searched for any signs indicating the presence of water vole such as burrows, droppings, latrines, feeding stations, footprints and runways through bankside vegetation, and were assessed for their potential to support this species.

Reptiles

3.32 During the Phase 1 Habitat Survey on 29 March 2012, the site was also assessed for its potential to support reptiles.

Badger

3.33 During the course of the survey work undertaken during 2012 searches were made across the site for evidence of badger *Meles meles* (such as setts, feeding remains, dung pits, hairs and tracks).

Invasive Species

3.34 During the course of the survey work undertaken during 2012 searches were made across the site for any invasive non-native species, such as Japanese knotweed.

Limitations to Methods

3.35 There was a brief light rain shower during the evening emergence bat survey (3 July 2012). Although this presents sub-optimal conditions for undertaking a bat survey, the majority of the survey was undertaken in optimal conditions this is not considered to provide a significant constraint to the overall findings of the survey.

3.36 The breeding bird survey was not commissioned until May 2012. As a result, survey visits were only carried out in May and June, whereas, ideally, breeding bird surveys should be undertaken in April, May and June. As a result, it is possible that some species that breed early in the season, or those whose territorial behaviour becomes less obvious once breeding has commenced, were not recorded during the breeding bird surveys. The lack of data from early survey visits is not considered to be a major constraint since the habitats of highest value to breeding birds (woodland and marshy grassland) will be retained within the proposed site layout and it is unlikely that additional information from early surveys would have made a significant difference to the assessment made of the site.

3.37 As a general guide, many species, including some which are protected by law, are highly mobile and may colonise a site at any time. Natural environments may change and the survey results reported here will therefore become less reliable as time progresses.

4 Results and Interpretation

Designated Sites

4.1 There are no statutory designated sites of nature conservation interest located within 1.5km of the centre of the site. Three non-statutory Natural Herirage Sites are situated within 1.5km of the centre of the site. The nearest, Daking Brook, is situated 120m to the northwest of the site at its nearest point (OS grid reference SE 316 090). This site is designated for its "*value to a range of wildlife including water vole and bats.*"

Habitats

4.2 The site was mapped during the Phase 1 Habitat Survey and the habitats within the survey area are described as Target Notes (TNs) below. Appendix 1 contains photographs of the habitats located within the survey area. The photographs are referred to in the text below. The location of the habitats and Target Note numbers are shown on Figure 1: Extended Phase 1 Habitat Survey Plan (refer to Appendix 2).

4.3 The site is composed of two arable fields with hedgerows and fencing located at the boundaries. Two ponds are located within an area of marshy grassland at the eastern side of the field. A wet ditch is located to the east of these ponds, at the eastern field boundary. A disused railway is located in the southeastern section of the site, supporting semi-mature broadleaved woodland and areas of neutral grassland.

4.4 A line of mature Lombardy poplar *Populus nigra* var. *Italica* trees bisect the two fields and there are two residential houses located within the site boundary at the southwestern corner of the site. There is a small area of amenity-managed grassland, dominated by perennial rye-grass *Lolium perenne*, located at the southwestern corner of the site, separated from the main arable field by a fence.

TN1. Arable fields (Photograph 1)

4.5 Arable fields planted with oilseed rape occupy the majority of the site. The field margins, where present, are narrow and are composed of semi-improved rank neutral grassland and tall ruderal vegetation. Species present in the field margins include false oat-grass *Arrhenatherum elatius*, Yorkshire fog *Holcus lanatus*, perennial rye-grass, creeping thistle *Cirsium arvense*, spear thistle *Cirsium vulgare*, cleavers *Galium aparine*, creeping buttercup *Ranunculus repens*, hogweed *Heracleum sphondyllium*, common chickweed *Stellaria media*, sow-thistle *Sonchus* sp. and ragwort *Senecio jacobaea*.

TN2. Pond A (Photographs 2 and 3)

4.6 This is the largest of the two ponds, and is located at the eastern boundary of the larger arable field. The pond and its margins were approximately 80m by 30m in size at the time of the Phase 1 Habitat Survey (29 March 2012, Photograph 2). However, persistent rainfall throughout the spring meant that the pond breached its margins and standing water encroached into the adjacent fields, meaning that the pond had increased in area to approximately 120m by 40m by late April 2012 (Photograph 3).

4.7 The northern, western and southern banks are shallow, the eastern margin of the pond is formed by hawthorn *Crataegus monogyna* scrub, located at the base of the railway embankment, and the southern pond margin joins to the wet ditch (TN4).

4.8 The water is clear, with New Zealand stonecrop *Crassula helmsii* forming a dense mat beneath the surface of the water. Other aquatic species include water-crowfoot *Ranunculus* sp., water-cress *Nasturtium officinale* and water-starwort *Callitriche* sp.. Marginal vegetation includes stands of common reedmace *Typha latifolia*, greater willowherb *Epilobium hirsutum*, soft rush *Juncus effusus*, hard rush *Juncus inflexus* and spike-rush *Eleocharis* sp..

TN3. Pond B (Photograph 4)

4.9 This pond is located towards the southeastern end of the site, and is approximately 6m by 4m. The water is shallow, to 30cm deep, and the margins are densely vegetated with common reedmace.

4.10 Swamp habitat with scattered goat willow *Salix caprea* scrub (Photograph 5) surrounds Pond B, and extends north towards Pond A (TN2). This habitat forms a dense, tall cover, supporting frequent compact rush *Juncus conglomeratus*, soft rush, creeping thistle *Cirsium arvense*, greater willowherb and Yorkshire fog, with occasional stands of common reedmace. A strip of shorter marshy grassland (Photograph 6) separates the swamp habitat from the broadleaved woodland (TN5) and neutral grassland (TN6). Species present include Timothy *Phleum pratense*, Yorkshire fog, bent-grass *Agrostis* sp., hard rush, creeping thistle, greater willowherb and creeping buttercup *Ranunculus repens*, with occasional young silver birch *Betula pendula* encroaching.

TN4. Wet ditch (Photograph 7)

4.11 A wet ditch which adjoins the southern end of Pond A (TN2) is located along the eastern boundary of the larger arable field (TN1). The ditch is between 0.5m and 1.5m wide, shallow (to 10cm deep), and densely shaded along the majority of its length by trees on both banks, including ash *Fraxinus excelsior*, silver birch and hawthorn.

TN5. Broadleaved woodland (Photograph 8)

4.12 A disused railway is located in the southeastern section of the site. This area supports semi-mature broadleaved woodland and areas of neutral grassland. The woodland is generally quite open, comprising predominantly of silver birch. The ground flora is formed of rank neutral grassland, including false oat-grass, bent-grass, Yorkshire fog, common knapweed *Centaurea nigra* and cleavers with occasional bramble *Rubus fruticosus* agg.. The slope forming the western boundary of the woodland is mostly comprised of bare ground and stones with frequent hawthorn and occasional mature sessile oak *Quercus petraea* trees.

TN6. Semi-improved neutral grassland (Photograph 9)

4.13 This grassland forms the transition between the woodland (TN5), arable field and marshy grassland habitats and is located along the southern boundary of the site. The grassland is rank with encroaching hawthorn, bramble and oak. Species present include false oat-grass, red clover *Trifolium pratense*, common knapweed, curled dock *Rumex crispus*, hogweed *Heracleum sphondyllium*, common nettle *Urtica dioica*, yarrow *Achillea millefolium* and rosebay willowherb *Chamerion angustifolium*. A small footpath is present along the eastern site boundary. The habitat adjacent to this footpath is of similar composition to the remainder of the grassland, with additional species including perennial rye-grass, annual meadow-grass *Poa annua*, white clover *Trifolium repens* and bird's-foot trefoil *Lotus corniculatus*.

Protected Species

Breeding Bird Survey

4.14 All bird species recorded during the surveys are shown in Table 9 below. This table also provides an assessment of breeding status within the site, species habitat associations, and, where relevant, the conservation status of species recorded. Conservation status categories include species of High and Medium conservation concern (defined by Eaton *et al.*, 2009), species listed on the UK Biodiversity Action Plan (UK BAP) and Species of Principal Importance (listed under the provisions of the Natural Environment and Rural Communities (NERC) Act 2006).

4.15 The results of the data trawl provided records for 34 species of high or medium conservation concern within 1.5km of the centre of the site. None of these records appears to relate to the site itself. A total of 34 bird species were recorded during the breeding bird surveys. The location of birds recorded is shown on the Breeding Bird Survey Results Plan (Figure 3, Appendix 2), with an indication of their likely breeding status (confirmed, probable or possible breeding).

4.16 The results of the three breeding bird surveys have been combined to create a single map. This shows all bird registrations. Where a bird was observed in the same location during more than one survey visit, and this is judged to be the same individual bird, only one registration of that bird is

shown on the map. Where the map shows more than one individual of the same species in close proximity, these are individual birds seen simultaneously during a single survey. Where appropriate, the behaviour of individual birds is also recorded e.g. if a bird was seen carrying food or nesting material, or if a bird was singing or alarm calling, this is recorded. Confirmed nest sites are also indicated on the map.

Table 9: Breeding Bird Survey Results

Species	Scientific Name	Habitat Association	Breeding Status within site	Conservation Status
Blackbird (B.)	*Turdus merula*	Hedgerows, woodland, scrub	Pr	
Black-headed gull (BH)	*Chroicocephalus ridibundus*	Flying over	N	Medium
Blue tit (BT)	*Cyanistes caeruleus*	Hedgerows, woodland, scrub	Po	
Buzzard (BZ)	*Buteo buteo*	Flying over	N	
Canada goose (CG)	*Branta canadensis*	Foraging at pond edge	N	
Carrion crow (C.)	*Corvus corone*	Arable / flying over	Po	
Chaffinch (CH)	*Fringilla coelebs*	Hedgerows, woodland, scrub	Po	
Chiffchaff (CC)	*Phylloscopus collybita*	Hedgerows, woodland, scrub	Po	
Dunnock (D.)	*Prunella modularis*	Hedgerows, woodland, scrub	Po	Medium / UK BAP / Species of Principal Importance
Goldfinch (GO)	*Carduelis carduelis*	Hedgerows, scrub, feeding in arable field	Pr	
Great spotted woodpecker (G.)	*Dendrocopos major*	Woodland	N	
Greenfinch (GR)	*Carduelis chloris*	Hedgerows, woodland, scrub	Pr	
Grey wagtail (GL)	*Motacilla cinerea*	Flying over	N	
House sparrow (HS)	*Passer domesticus*	Gardens, buildings, scrub	Pr	High / UK BAP / Species of Principal Importance
Jackdaw (JD)	*Corvus monedula*	Buildings, scrub Woodland	N	
Jay (J.)	*Garrulus glandarius*	Woodland	N	
Kestrel (K.)	*Falco tinnunculus*	Flying above woodland	N	Medium
Linnet (LI)	*Carduelis cannabina*	Hedgerows , scrub arable	Po	High / UK BAP / Species of Principal Importance
Magpie (MG)	*Pica pica*	Woodland, trees, buildings	Po	
Mallard (MA)	*Anas platyrhynchos*	Drain and pond	B	Medium
Moorhen (MH)	*Gallinula chloropus*	Ponds	B	
Pheasant (PH)	*Phasianus colchicus*	Arable, hedgerow	B	
Pied wagtail (PW)	*Motacilla alba*	Arable, scrub	N	
Reed bunting (RB)	*Emberiza schoeniclus*	Wetland, drains and arable	B	Medium / UK BAP / Species of Principal Importance
Robin (R.)	*Erithacus rubecula*	Hedgerows, scrub, woodland and gardens	Po	

Species	Scientific Name	Habitat Association	Breeding Status within site	Conservation Status
Sedge warbler (SW)	*Acrocephalus schoenobaenus*	Wetland, drains	B	
Snipe (SN)	*Gallinago gallinago*	Pond	N	Medium
Song thrush (ST)	*Turdus philomelos*	Woodland, gardens	Po	High / UK BAP / Species of Principal Importance
Starling (SG)	*Sturnus vulgaris*	Buildings, gardens, flying over	N	High / UK BAP / Species of Principal Importance
Swallow (SL)	*Hirundo rustica*	Flying over	N	Medium
Whitethroat (WH)	*Sylvia communis*	Hedgerows, scrub, woodland	Pr	Medium
Willow warbler (WW)	*Phylloscopus trochilus*	Woodland	Pr	Medium
Woodpigeon (WP)	*Columba palumbus*	Arable	Po	
Wren (WR)	*Troglodytes troglodytes*	Hedgerows, gardens, woodland	Pr	

Breeding status: B = Confirmed breeding, Pr = Probable breeding, Po = Possible breeding, N = Not breeding

4.17 The site comprises two arable fields, an area of swamp habitat dominated by rushes with patches of common reedmace and willowherbs and occasional patches of scrub, and a small area of marshy grassland which adjoins the wetland area. To the south of the wetland area and arable field is a disused railway embankment which now supports secondary woodland, scrub and small patches of grassland and herbaceous vegetation. Industrial units are present to the south of this embankment, separated from the site by metal fencing.

4.18 A line of Lombardy poplars separates the small arable field from the large arable field. The majority of the northern and western boundary of the site is formed by garden fences which separate the site from an area of residential housing to the north. A sparsely vegetated railway embankment is immediately to the east of the site, separated from the site by a wire fence.

4.19 The bird community is closely reflects the habitats present within the site. Small numbers of sedge warbler *Acrocephalus schoenobaenus* and reed bunting *Emberiza schoeniclus* breed within the wetland area. A pair of moorhen *Gallinula chloropus* nest within the pond and snipe *Gallinago gallinago* was recorded at the edge of the pond.

4.20 House sparrow *Passer domesticus* was recorded from the garden edges and are most likely to nest within the houses or gardens to the immediately to the north of the site. Two house sparrow were also noted nesting within the eaves of Property 1 Claycliffe Road during the bat survey work (3 July 2012). Wren *Troglodytes troglodytes*, robin *Erithacus rubecula*, blackbird *Turdus merula*, greenfinch *Carduelis chloris* and dunnock *Prunella modularis* were also recorded calling from the site boundary area, which separates the site from these gardens. These species are most likely to nest within the gardens, although could possibly nest just inside the site boundary.

4.21 Generally very few birds species were recorded from the arable fields, which supported oilseed rape at the time of the survey. Blackbird *Turdus merula* was recorded foraging within the fields. Reed bunting was recorded calling in the crop, but in areas close to the wetland area, which is the most suitable breeding habitat for this species. A large flock of goldfinch *Carduelis carduelis* (c.40 birds), including immature birds was recorded foraging in the crop in late June, although these birds are considered unlikely to all have bred within the site. Swallow *Hirundo rustica* was occasionally recorded foraging over the crop.

4.22 The majority of other species were recorded from the woodland and scrub habitats along the disused railway embankment, including whitethroat *Sylvia communis*, willow warbler *Phylloscopus trochilus*, chiffchaff *Phylloscopus collybita*, chaffinch *Fringilla coelebs* and robin, most of which are

breed or are likely to breed within the site. The line of Lombardy poplars is likely to support some similar species including whitethroat and dunnock.

4.23 Kestrel *Falco tinnunculus* and buzzard *Buteo buteo* were recorded hunting within or close to the site. Other incidental sightings of species included great spotted woodpecker *Dendrocopos major*, a pair of Canada geese *Branta canadensis*, carrion crow *Corvus corone*, jackdaw *Corvus monedula* and jay *Garrulus glandarius*. These species were recorded foraging or flying over the site.

4.24 In summary, the site supports a typical assemblage of woodland, garden and farmland species. The species of conservation concern recorded are all remain widespread species although they have undergone general declines throughout the UK over the last few decades (partly as a result of changing farming practices) but are still frequently encountered. The wetland area supports two more specialist wetland species: reed bunting and sedge warbler.

Bats

4.25 The data trawl provided ten records for bats within 1.5km of the centre of the site dating from 1981-2011, none of which relates to the site itself. The nearest record is from a location approximately 210m to the east of the site.

Roost Survey - Trees

4.26 During the survey all trees situated within the site were assessed from the ground for any suitable bat roosting features and those considered to have potential to support roosting bats were subject to more detailed inspections using an endoscope. Table 10 below sets out a summary of three Lombardy poplar trees identified as having bat potential. For location of these trees refer to Figure 1: Extended Phase 1 Habitat Survey Plan in Appendix 2.

Table 10: Trees with potential to support roosting bats

Tree number	Location of potential
1 (Photograph 10)	Rotten cavity approximately 1.5m above ground level; on close inspection this is considered to be too shallow to provide opportunities for roosting bats and no evidence of use by roosting bats was identified anywhere on the tree.
2 (Photograph 11)	Long cavity running vertically from approximately 2.5m above ground level. Closer inspection showed no evidence of use by bats.
3 (Photograph 12)	Vertical crack approximately 3m above ground level; on close inspection this crack is superficial and does not lead to any cavities therefore not providing opportunities for roosting bats. No evidence of use by roosting bats was identified anywhere on the tree.

Roost Survey – Buildings

Building Description

4.27 Two buildings (Properties 1 and 3 Claycliffe Road) are located within the site and are described below in terms of their potential to support roosting bats. For location of buildings refer to Figure 2: Bat Survey Plan in Appendix 2. It should be noted that observations relating to the structural condition of the buildings have been made purely from an ecological point of view and do not constitute the views of a structural engineer.

Property 1 (Photographs 13-15)

4.28 This is an end-of-terrace two-storey brick building with a hipped, slate-tiled roof and timber soffits beneath the eaves. The majority of the roof void has been converted to living space. The eastern elevation of this building is joined to Property 3.

4.29 There are frequent gaps in the eaves between the brickwork and the timber soffits on the northern, southern and western elevations (Photograph 13) and there is a gap at the apex of the roof on both the northern and southern elevations of the building (Photograph 14). These gaps provide a potential roosting opportunity for bats, between the tiles and the lining of the roof, behind the timber soffits and potentially within the roofspace itself. There is a small gap in the brickwork where mortar is missing on the southern elevation, providing a further potential roosting feature for bats. The majority of the roof and brickwork are, however, well-sealed. No signs to indicate the presence of bats were located on the exterior of the building.

4.30 Internally, the roof is unlined and uninsulated and there are timber rafters (Photograph 15). Re-roofing works were undertaken within the last two years[2], the roof is well-sealed and there are no visible access points for bats to enter the roofspace. No signs to indicate the presence of bats were located.

Property 3 (Photograph 16)

4.31 This is a mid-terrace two-storey brick building with a pitched, slate-tiled roof, brick chimney and timber soffits beneath the eaves. There is a dormer window on the southern elevation of the roof and the majority of the roof void has been converted to living space. The section of roof which has not been converted is completely sealed and therefore inaccessible to the surveyors. The western elevation of this building is joined to Property 1.

4.32 There are frequent gaps in the eaves between the brickwork and the timber soffits on the northern and southern elevations and there is a gap in the brickwork of the chimney where mortar is missing. These gaps all provide a potential roosting opportunity for bats.

4.33 No signs to indicate the presence of bats were located in association with any of these gaps although a single dropping consistent with pipistrelle was located on the ground floor windowsill on the northern elevation of the building (Photograph 16). Since this dropping was not located in close proximity to any gaps it is considered likely to have been produced by a passing bat rather than indicating the presence of a roost.

Evening Emergence Survey 03 July 2012

4.34 The buildings were surveyed by three surveyors. For location of surveyors refer to Figure 2: Bat Survey Plan, in Appendix 2.

4.35 No bats were recorded emerging from Properties 1 and 3 during the evening emergence survey.

4.36 The first bat was a common pipistrelle *Pipistrellus pipistrellus* recorded by Surveyor 1 at 2137 hours. This bat appeared to emerge from the eaves of one of the buildings further along the same row of terraced houses. Individual common pipistrelle bats were recorded in close proximity to Properties 1 and 3 during the course of the survey by all three surveyors. Individual common pipistrelle bats were recorded by Surveyors 1 and 2 foraging adjacent to hedgerows and gardens just outside the site boundary between 2230 and 2241 hours. In addition, Surveyor 2 recorded three separate common pipistrelle bats commuting from the southern side of Claycliffe Road, past Property 1 and along the gardens of the houses located just outside the western boundary of the site between 2145 and 2149 hours.

Dawn Re-Entry Survey 05 July 2012

4.37 The buildings were surveyed by three surveyors. For location of surveyors refer to Figure 2: Bat Survey Plan, in Appendix 2.

4.38 No bats were recorded re-entering Properties 1 and 3 during the dawn re-entry survey.

4.39 Individual common pipistrelle bats were recorded by all three surveyors. Surveyors 1 and 2 recorded common pipistrelle repeatedly foraging between 0347 and 0409 hours within the garden of Property 1, along the edge of the arable field just outside the southern site boundary, and along the gardens of the houses located just outside the western boundary of the site. In addition, these surveyors also noted two separate common pipistrelle bats commuting along the southern boundary of the site, past Property 1 and across Claycliffe Road in a southern direction. Surveyor 3

[2] Pers. comm. Resident 03/07/12.

did not record any common pipistrelle passes in close proximity to Properties 1 and 3 during the survey.

4.40 Two noctule *Nyctalus noctula* passes were recorded by Surveyor 1 (0346 and 0435 hours), the latter of which was noted commuting across the open arable field within the site and in a southerly direction across Claycliffe Road. This was also the last bat recorded during the dawn survey.

Bat Activity Surveys

Walked Transect

4.41 Bat species encountered during the three walked transects and the level of bat activity recorded across the whole site are summarised in Table 11 below. Table 11 shows the number of passes of each species within the site as a whole for each month of survey. Common pipistrelle bats represent the majority (94%) of passes. The only other bat species encountered during the walked transect were noctule *Nyctalus noctula* and Daubenton's bat *Myotis daubentonii*, representing 3% and 1% of all passes respectively.

Table 11: Summary of bat species and number of bat passes recorded within the site during the walked transects

Species	Number of passes				Percentage of all passes
	May	June	July	Total	
Common pipistrelle *Pipistrellus pipistrellus*	25	54	31	110	**94%**
Noctule *Nyctalus noctula*	3	0	0	3	**3%**
Daubenton's bat *Myotis daubentonii*	0	1	0	1	**1%**
Possible common pipistrelle	0	2	0	2	**2%**
Total	**28**	**57**	**31**	**116**	

4.42 Common pipistrelle was the first bat recorded during each transect, with registrations occurring between 24 and 30 minutes after sunset. Each of these records falls close to the typical emergence time for common pipistrelle (generally within 20 minutes of sunset), indicating the presence of a roost in the local area. May was the only month in which noctule was recorded, with its first pass recorded 27 minutes after sunset. Daubenton's bat was recorded once during the June transect, 74 minutes after sunset. These records both fall outside the typical emergence time for each species (5-10 minutes and 40-50 minutes after sunset respectively), although given their proximity to sunset indicates the presence of roosts in the local area.

4.43 The level of bat activity varies across the site, generally being restricted to boundary features such as the broadleaved woodland within the eastern part of the site, the line of Lombardy poplars separating the two arable fields and the private gardens just outside the southern and western site boundaries. Very little bat activity was noted within the arable fields. The highest levels of activity recorded were in the following areas:

- Southeastern areas: Bats were most frequently recorded within the southeastern part of the site, in particular foraging within the broadleaved woodland (TN5), over Pond A (TN2) and along the hedge line just outside the southern boundary of the site. 55% of all bat passes recorded originate from this location.
- Lombardy poplars in northern part of the site: Up to two common pipistrelles were recorded repeatedly foraging adjacent to these trees during the May and June transects and an

individual common pipistrelle was recorded in this location during the July transect. 23% of all bat passes recorded originate from this location.

- Private gardens outside western site boundary: Up to two common pipistrelles were recorded foraging at the western boundary of the site and over the gardens during the May and June transects. No bats were recorded along this boundary during the July transect. 23% of all bat passes recorded originate from this location.

Figure 4: Areas of Key Bat Activity (in Appendix 2) shows these three areas, and divides the whole site into three categories of bat activity:

- *Area of key bat foraging activity*: Bats recorded either repeatedly foraging around a feature, or recorded in a similar location during at least two of the three transects.
- *Area of lower bat activity*: Low level of bat activity noted in a given area during one or two of the three transect visits.
- *Area of little/no recorded bat activity*.

4.44 The level of bat use within the open arable fields across the site is very low compared to the more sheltered areas of the site associated with the boundary features. No bats were recorded within the open field habitat during the walked transect surveys. The only instance in which a bat was recorded within the open field habitat was during the dawn re-entry survey of Properties 1 and 3 on 5 July 2012, where a noctule was recorded at 0435 hours commuting in a southwesterly direction from the open arable field and away from the site.

Remote Survey

4.1 Bat species recorded during the remote surveys and the total number of bat passes for each species are summarised in Table 12 below. In total 330 passes were recorded during the remote survey work. Common pipistrelle bats were recorded most frequently throughout the entire survey period, representing 41% of all passes. Noctule-Leisler's calls represented the highest proportion of passes (48%) although these passes all originate from the May survey period. Given the similarity in call characteristics between noctule and Leisler's bats, it was not possible to definitively state from which of these two species 48% of the calls originate from as there was a high proportion of overlap in call characteristics.

4.2 Noctule and soprano pipistrelle *Pipistrellus pygmaeus* were the other confirmed bat species recorded, accounting for 7% and 1% of all passes respectively. In addition, possible passes were recorded from the following species: common pipistrelle (3%), soprano pipistrelle (<1%), pipistrelle sp. (<1%) and noctule (<1%). Given the quality of these recordings it was not possible to definitively state from which species they originate; it is normal for a small proportion of calls to be unidentifiable, if poorly recorded or atypical in shape.

Table 12: Summary of bat species and number of bat passes recorded within the site during the remote surveys

Species	Number of passes				Percentage of all passes
	May	June	July	Total	
Noctule-Leisler's	159	0	0	159	**48%**
Common pipistrelle *Pipistrellus pipistrellus*	25	6	103	134	**41%**
Noctule *Nyctalus noctula*	6	3	13	22	**7%**
Soprano pipistrelle *Pipistrellus pygmaeus*	0	0	2	2	**1%**
Possible common pipistrelle	2	4	4	10	**3%**
Possible soprano pipistrelle	0	0	1	1	**<1%**
Possible pipistrelle sp.	0	1	0	1	**<1%**
Possible noctule	0	0	1	1	**<1%**
Total	**192**	**14**	**124**	**330**	

4.3 Noctule and noctule-Leisler's bats were the first species recorded on five of the nine nights of remote survey, four of which occurred between 20 and 26 minutes after sunset. Both species tend to emerge within 15 minutes of sunset (and occasionally before) (Jones, K. and Walsh, A., 2001). Since these passes occur just outside the time period that these species would be expected to emerge from their roosts they suggest the presence of a roost relatively close to the site in the local area. Common pipistrelle was the first bat species recorded on four of the nine nights of remote survey between 39 and 70 minutes after sunset. This species tends to emerge within 20 minutes of sunset (and occasionally before). Since these passes occur after this species would be expected to emerge from its roost they do not therefore indicate the presence of a common pipistrelle roost within or immediately adjacent to the site.

4.4 Analysis of the bat calls suggests that bat activity levels are generally low with up to four bat species using the swamp habitat/woodland edge for foraging. There are higher peaks of activity where individual bats were recorded repeatedly foraging close to the detector. For example, analysis of the bat calls shows that noctule-Leisler's bat was repeatedly foraging throughout the May survey period, with all registrations of noctule-Leisler's bats occurring in this month. Although noctule was also recorded during June and July, the levels of activity were significantly lower: a total of 165 noctule and noctule-Leisler's passes were recorded during May, compared to only three noctule passes in June and 13 in July. Throughout the survey period only one individual bat was recorded at any one time.

Summary of Bat Activity

4.5 The targeted surveys show that up to five species of bats use the site for foraging and commuting, two of which (noctule and soprano pipistrelle) are UK BAP Priority Species and Species of Principal Importance under the provisions of the NERC Act 2006. Only two soprano pipistrelle passes were recorded throughout the bat activity surveys which does not suggest the presence of a significant roost nearby. The majority of all bat passes (55%) are from noctule or noctule-Leisler's bats, accounting for a total of 181 passes during the remote activity surveys. The results of the bat call

analysis suggest that this high number of passes, in particular during the May survey, originate from only a small number of individual bats repeatedly foraging in close proximity to the detector, and therefore repeatedly triggering the Anabat recorders. This is also supported by the results of the walked transects, evening emergence and dawn re-entry surveys of Properties 1 and 3, where only one noctule was recorded at any given time.

4.6 The majority of bats recorded were noted well after sunset and therefore outside the emergence periods for each species. Noctule bats typically emerge soon after sunset and soprano pipistrelle tend to emerge early, occasionally before sunset (Jones, K. and Walsh, A. 2001). The earliest noctule pass was recorded 20 minutes after sunset, shortly after this species would be expected to emerge from its roost. This does not therefore indicate the presence of a noctule roost within or immediately adjacent to the site. Both soprano pipistrelle passes were recorded well after sunset, indicating that the roost is likely to be situated further away from the site. Given that only one noctule or noctule-Leisler's bat was recorded at any one time and that during the period of greatest activity (May) the Anabat recorder could have been repeatedly triggered by a single foraging bat at any one time, it is quite possible that all the passes recorded during the surveys originate from occasional use by as few as one or two noctule bats. The results of the surveys do not, therefore, indicate the presence of any significant nearby roosts.

4.7 The earliest common pipistrelle pass was recorded 39 minutes after sunset. Since this species tends to emerge from its roost within 20 minutes of sunset (and occasionally before) this registration suggests the presence of a roost in relatively close proximity to the site. Given that a maximum of two common pipistrelle were recorded at any one time, it is quite possible that all the passes recorded during the surveys originate from occasional use by only a small number of bats and are therefore unlikely to represent significant (i.e. maternity) nearby roosts.

4.8 The results show that bat activity is generally positively correlated to boundary features, in particular the broadleaved woodland (TN5) and Pond A (TN2) within the eastern part of the site, the line of Lombardy poplars separating the two arable fields and the hedge line located just outside the southern part of the site. In addition, moderate levels of activity were also recorded within the private gardens just outside the western site boundary. The surveys showed very little bat activity in the open arable habitat. The wooded areas, hedge lines and gardens can provide a sheltered area and suitable foraging habitat for bats. The woodland also provides connections between surrounding habitats which are also of suitability for foraging bats (such as residential properties and gardens).

4.9 Bat activity can vary significantly between different habitats. In general, bat abundance is positively related to the amount of woodland, vegetation corridors such as dense hedgerows, waterbodies and riparian habitats, and is negatively related to the availability of arable land (Walsh et al, 1996). The majority of the site is composed of arable land, which is very open in character. This open character of the fields means that these parts of the site are likely to be exposed to any wind and poor weather conditions, and as a result, these areas are likely to offer sub-optimal foraging habitat for bats.

Great Crested Newt

4.10 The data trawl provided one record for great crested newt on the Barnsley Canal in 1983, situated approximately 210m to the east of the site at OS grid reference SE 321 088. A study of OS plans and aerial photographs shows that this record relates to the disused section of the Barnsley Canal, separated from the site by a live main railway line. The two on-site ponds (Pond A and Pond B) are described below and are mapped on Figure 1: Extended Phase 1 Habitat Survey Plan, in Appendix 2. Details of the disused section of the Barnsley Canal are also set out below. The results of the targeted great crested newt surveys of Pond A and Pond B are also set out below.

Pond A

4.11 This pond is situated within the site at OS grid reference SE 3188 0884 (Photographs 2 and 3). The size of the pond varied significantly throughout the 2012 survey season due to persistent high levels of precipitation, 80m by 30m (late March 2012) and 120m by 40m (late April 2012). The water is clear, and vegetation occupies approximately 70% of the pond surface, with submerged aquatic vegetation (New Zealand stonecrop) forming a dense mat beneath the surface of the water. Other aquatic species include water-crowfoot, water-cress and water-starwort. Marginal vegetation includes stands of common reedmace, greater willowherb, soft rush, hard rush and spike-rush.

4.12 The HSI score for Pond A is 0.87, indicating that the pond contains features that are of excellent suitability to support a breeding population of great crested newts (ARG UK, 2012). The open water within Pond A provides opportunities for great crested newt to undertake mating displays, and the presence of a variety of aquatic vegetation also provide suitable egg-laying material for newts.

4.13 A range of habitats within the site are considered to provide suitable terrestrial habitats for newts, in particular the marshy grassland and swamp vegetation located to the south of Pond A, rubble piles and bricks located within the semi-mature broadleaved woodland to the southeast of the pond. Features such as rubble piles within 100 metres of a pond can provide suitable hibernacula for great crested newts. In addition, the presence of woodland within close proximity to the pond is considered to provide further valuable terrestrial habitat for great crested newts.

4.14 Table 13, in Appendix 3, sets out the full results of the six survey visits to Pond A. In summary, great crested newts were recorded on every visit with a maximum of 161 adult great crested newts recorded during the torchlight survey on 24 April 2012. Smooth newts were also recorded on each of the survey visits, with a maximum count of 95 on 24 April 2012 and common toad was recorded on four of the six visits.

Pond B

4.15 This pond is situated within the site at OS grid reference SE 3175 0860 (Photograph 4). The pond is approximately 6m by 4m, surrounded by swamp habitat and marshy grassland with occasional scattered willow scrub. The water is shallow and relatively clear, and the pond margins are densely vegetated with common reedmace.

4.16 The HSI score for Pond B is 0.57, indicating that the pond contains features that are of below average suitability to support a breeding population of great crested newts (ARG UK, 2012). The open water within the pond, albeit limited, provides some opportunity for great crested newts to undertake mating displays.

4.17 No great crested newts were located during any of the surveys of Pond B, although individual common toads were located on two separate occasions during the torchlight surveys.

Disused Barnsley Canal

4.18 This waterbody is situated approximately 210m to the east of the site at its nearest point (OS grid reference SE 3210 0878, Photograph 17)). The disused canal is densely vegetated with open water accounting for less than 1% of its surface. The water is shallow and relatively turbid. A cattle-grazed field and woodland are situated adjacent to the canal, and small sections of the margins appeared to be poached by cattle. The HSI score for the disused canal is 0.79, indicating that the waterbody contains features that are of good suitability to support a breeding population of great crested newts (ARG UK, 2012). The lack of open water within the pond limits the opportunity for great crested newts to undertake mating displays, although the marginal vegetation provides suitability as egg-laying material.

4.19 The presence of great crested newt within the disused canal is confirmed by the presence of a record from 1983. The waterbody is suitable for breeding great crested newts and they are considered likely to be present within the pond and the surrounding optimal habitat.

4.20 The disused canal is separated from the site by a live railway, which is considered to provide a physical barrier to the movement of newts between the site and this waterbody. A small culvert passes beneath the railway 60m to the east of the site at OS grid reference SE 3197 0869 (Photograph 18) potentially linking the site with the disused canal.

4.21 Water flows in an easterly direction from the site, through the culvert and towards the disused canal. The entrance to the culvert is approximately 50cm wide, covered with a grill, and there is a vertical drop of approximately 20cm into the mouth of the culvert at its western end before it passes beneath the railway. Whilst this does not provide a complete barrier to the movement of newts travelling from the site towards the disused canal, it is unlikely that newts would pass back from the disused canal towards the site, given the abundance of suitable terrestrial habitat (broadleaved woodland and rank grassland) in close proximity to the disused canal.

Summary

4.22 The larger on-site pond (Pond A) supports a breeding population of great crested newts, although no newts were recorded within the smaller on-site pond (Pond B). Individual common toads were recorded on two separate occasions within this pond. The great crested newt mitigation guidelines explain the difficulty of establishing the true size of a population of great crested newts due to a range of factors, notably the variable sampling efficiency attained, even by the best methods, and the complex (meta) population dynamics involved. Research suggests that surveys may reveal between 2% and 30% of a population, but there is likely to be even greater variation. Natural England (formerly English Nature) therefore recommends that, where development projects are concerned, an approximate indication of population size class is used in survey reports (Great Crested Newt Mitigation Guidelines, 2001).

4.23 Natural England (Great Crested Newt Mitigation Guidelines, 2001) recommend that survey results should be expressed as the maximum adult count per pond per night gained through torch survey or bottle trapping and that population size should be estimated from the peak count per pond. Populations can be classed as follows:

- Small – maximum count up to 10
- Medium – maximum count between 11 and 100
- Large – maximum count over 100.

4.24 The peak count of great crested newts (by torchlight survey) in Pond A was 161 on 24 April 2012 equating to the presence of a large-sized population.

4.25 Although no newts were located within Pond B, the mosaic of swamp habitat and marshy grassland surrounding this pond and the rubble piles and bricks located within the semi-mature broadleaved woodland (TN5) within the site provide suitable terrestrial habitat for amphibians including great crested newt. Natural England guidelines broadly classify terrestrial habitats into three categories according to distance from a great crested newt breeding pond:

- Immediate – within 50m
- Intermediate – between 50m and 250m
- Distant – Between 250m and 500m

4.26 Approximately 0.81ha of the site falls within the 'immediate' terrestrial habitat (i.e. within 50m of the pond), of which 0.20ha is considered to present optimal habitat (broadleaved woodland and rank neutral grassland)). Approximately 6.87ha of the site falls within the 'intermediate' terrestrial habitat (i.e. between 50m and 250m of the great crested newt breeding pond), of which 1.63ha is considered to present optimal habitat, and is connected to the pond by suitable terrestrial habitat (broadleaved woodland, marshy grassland, swamp habitat and rank neutral grassland). Approximately 2.82ha of the site falls within the 'distant' terrestrial habitat (i.e. between 250m and 500m of the pond), of which 0.35ha is considered to present optimal habitat (marshy grassland and swamp habitat). It is considered highly likely that great crested newts will be present within the suitable terrestrial habitats within the site.

4.27 In addition, common toad, a UK BAP Priority Species and Species of Principal Importance under the provisions of the NERC Act 2006, was recorded on two separate occasions within the smaller pond (Pond B).

Water Vole

4.28 The data trawl did not provide any records for water vole within the site although two records for this species were provided along the disused canal, 210m to the east of the site at their nearest point, dating from 1981 and 1983. No evidence of water vole was located along the wet ditch (TN4) situated along the eastern boundary of the arable field or within either of the two ponds, although these features are considered to provide some suitability to support this species due to the presence of suitable soft banks and suitable feeding material.

Reptiles

4.29 The data trawl did not provide any records for reptiles within 1.5km of the centre of site and no reptiles or evidence of reptiles was found during the survey period, although no targeted survey work was undertaken. In addition, the majority of the site comprises arable fields, considered to present sub-optimal reptile habitat. The mosaic of habitats within the eastern part of the site, in particular the large pond (Pond A) broadleaved woodland and marshy grassland are considered to provide some suitability for reptiles in particular grass snake *Natrix natrix*. The swamp habitat is considered to be less suitable for common lizard *Zootoca vivipara* and slow-worm *Anguis fragilis*, given the density and height of vegetation within this habitat.

Badger

4.30 The data trawl did not provide any records for badger within 1.5km of the centre of site and no evidence to suggest the presence of badger was located during any of the surveys.

Invasive Species

New Zealand stonecrop

4.31 New Zealand stonecrop forms a dense mat of vegetation within Pond A (Photograph 19). For the approximate extent of this species within the pond refer Figure 1: Extended Phase 1 Habitat Survey Plan, in Appendix 2.

Cotoneaster

4.32 One small stand of cotoneaster *Cotoneaster* sp. is present on the wall at the southwestern boundary of the site (TN7, Photograph 20). For location, refer to Figure 1: Extended Phase 1 Habitat Survey Plan, in Appendix 2. The stand could not be identified to species level due to the time of year of the surveys. Therefore it is not possible to rule out the presence of one of the five cotoneaster species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).

Japanese knotweed

4.33 No Japanese knotweed is located within the site boundary, although one stand was noted approximately 20m outside the eastern boundary of the site (TN8). For location, refer to Figure 1: Extended Phase 1 Habitat Survey Plan, in Appendix 2.

5 Potential Impacts and Recommendations

5.1 Guidance on relevant legislation, policy the UK BAP and Species of Principal Importance can be found in Appendix 4.

Designated Sites

5.2 There are no statutory designated sites located within 1.5km of the centre of the site.

5.3 There are three non-statutory Natural Herirage Sites situated within 1.5km of the centre of the site, the nearest of which (Daking Brook) is situated 120m to the northwest of the site at its nearest point. This site does not have any direct hydrological connections to the proposed working area and since the proposed works are to be restricted to the study site, there are not anticipated to be adverse impacts on this or any other designated sites.

Habitats

5.4 The site predominantly comprises arable fields. The network of wetland habitats (two ponds, swamp habitat and marshy grassland) and the woodland within the eastern part of the site contributes to biodiversity and habitat connectivity across this part of the site.

5.5 It is anticipated that the development footprint will involve the loss of 7.0ha the arable habitat which is considered to be of low intrinsic ecological value and the loss is unlikely to be significant beyond the immediate context of the site.

5.6 The larger pond (Pond A) and the broadleaved woodland will be retained within the proposed layout and will be protected during construction. In addition, Pond A will be enhanced in the long-term via the removal of the invasive non-native New Zealand stonecrop which is present within the pond. Further details are set out in Paragraphs 5.42-5.44 below.

5.7 The proposals will result in the loss of the smaller pond (Pond B) as well as the marshy grassland and swamp habitats surrounding this pond. Although the marshy grassland and swamp habitats are of relatively low botanical value, they are of potential value to a range of protected species, as discussed below. All ponds are UK BAP Priority Habitats and are listed as Priority Habitats under the provisions of the NERC Act 2006. The loss of Pond B could, without appropriate compensation, result in a net loss of biodiversity in the local area.

5.8 As part of the proposed landscaping within the site, at least one new wildlife pond will be created which will be larger in size than Pond B and will serve to provide a replacement habitat of greater ecological value than the pond to be lost. In addition, an equivalent area (0.6ha) of swamp habitat and marshy grassland will be created through translocation as part of the proposed landscaping. Therefore in the long-term there will be no net loss of these habitats.

Protected Species

Birds

5.9 All nesting birds are protected under the Wildlife and Countryside Act 1981 (as amended), which makes it an offence to kill, injure or take any wild bird or take, damage or destroy its nest whilst in use or being built, or take or destroy its eggs. Further detail in relation to the legal protection afforded to birds is set out in Appendix 4.

5.10 Six of the species recorded (dunnock, house sparrow, linnet, reed bunting, song thrush and starling) are Species of Principal Importance under the provisions of the NERC Act 2006. All six are also Priority Species under the UK BAP.

5.11 Four of these species are of high conservation concern (Eaton *et al*., 2009): house sparrow, linnet, starling, song thrush. Seven species are of medium conservation concern: dunnock, swallow, reed bunting, willow warbler, kestrel, mallard and whitethroat. The remaining species are of low conservation concern or have no formally recognised status.

5.12 The proposed development will involve the loss of the arable habitats. The broadleaved woodland and Pond A will be retained. The wetland area will be removed and translocated to an area of open space in the northeastern part of the site.

5.13 The majority of habitats of value to birds will therefore either be retained (the woodland and Pond A), or translocated to create a similar habitat (swamp). Thus the main habitat to be lost is the arable fields.

5.14 Bird activity within the arable fields was low during the survey. Species characteristic of arable farmland habitats are not well represented through the site. Linnet, a species of high conservation concern, was recorded infrequently in small numbers, and is unlikely to nest within the arable fields within the site; other typical arable farmland species, such as yellowhammer *Emberiza citronella* and skylark *Alauda arvensis,* were not recorded.

5.15 A large flock of goldfinch was the most notable bird activity recorded within the crop, although typically smaller numbers were recorded. This species, which is common and widespread, is only likely to breed within the site in small numbers (2-3 pairs).

5.16 Reed bunting is a species typically associated with wetland habitats including those in arable farmland, and may be affected by the loss of the adjacent arable habitat, however, providing a sufficient area of wetland habitat is recreated in the eastern part of the site, this species (medium conservation concern and a Species of Principal Importance) is likely to be retained within the site. Similarly, sedge warbler would also be expected to use this replacement wetland habitat.

5.17 There may be opportunities to incorporate nesting sites into new buildings within the development which, if well located in relation to suitable habitats (such as the proposed open space, woodland and wetland habitats), could benefit species of conservation concern such as swift *Apus apus*, swallow, house martin *Delichon urbica*, house sparrow and starling, Nest boxes for woodland species could also be installed in the woodland to the south of the development.

5.18 In summary, providing woodland, scrub, grassland and wetland habitats are retained or translocated in sufficient area within the new development, the majority of bird species within the site are likely to continue to use the site, in particular, impacts on species of conservation concern, and species of principal importance, are likely to be avoided.

5.19 A direct impact on any birds nesting within the site can be avoided, allowing compliance with the legislation summarised above, by carrying out site clearance of development work which affects suitable nesting habitats (for example, tree, hedgerow or arable field clearance) outside the bird nesting season (i.e. avoiding the period between late February to late August). Should any works be required which affect these habitats during the nesting season, a suitably qualified ecologist would need to undertake an inspection of any the habitats to be removed to determine whether any nests are present. If nests are present work would need to be delayed until the chicks have fledged and are no longer dependent on the nest.

Bats

5.20 Bats are European Protected Species protected under the Conservation of Habitats and Species Regulations 2010 (as amended) and under the Wildlife and Countryside Act 1981 (as amended). Seven UK bat species are listed as priority species under the provisions of the NERC Act 2006.

5.21 No bat roosts were located during the targeted surveys of the Lombardy poplar trees or Properties 1 and 3 Claycliffe Road therefore no adverse impacts on roosting bats are anticipated as a result of the proposed works.

5.22 The majority of the proposed works will be sited within the open arable habitats where the least bat activity has been recorded. The proposed works will involve the removal of one of the Lombardy poplar trees, which falls within one of the key bat activity areas within the site (as shown on Figure 4: Areas of Key Bat Activity, in Appendix 2). However, the majority of the key bat activity areas will be retained throughout the course of the works (i.e. larger pond (Pond A) and broadleaved woodland) and will be strengthened via additional wetland creation to the north and east of the pond. In addition, tree planting will occur in close proximity to the retained Lombardy poplar trees and along the proposed new road. In combination, the proposed habitat retention, translocation and creation will compensate for the 0.63ha of habitat loss. In addition, the enhancement of the

habitats within the northeastern part of the site will provide stronger green links between these habitats and the surrounding landscape, potentially enhancing the value of the site for foraging and commuting bats.

5.23 Moderate levels of bat activity were also associated with the gardens located just outside the western site boundary. A 'garden buffer zone' will be established between these gardens and the new development, therefore no direct impacts on this habitat used by foraging bats is anticipated.

5.24 Overall, given that no bat roosts were recorded within the site and that the most suitable bat foraging and potential commuting habitats will be retained and strengthened through the proposed wetland creation, it is considered that the proposed works are unlikely to result in an adverse impact on bats. To enhance the value of the site for roosting bats features such as bat bricks or purpose-built bat boxes (e.g. Schwegler IFR) could be added to the building designs to provide opportunities for roosting bats within the buildings. These can be incorporated into the build structure to offer roosting space for bats; they are usually built into external walls. The access points for these roosts should be clear and ideally be in secluded, low-lit areas, ideally on a range of elevations and aspects close to foraging areas.

5.25 Indirect impacts to bats could arise from lighting within the new development, as much of the site is currently unlit. An increase in lighting can deter bats from foraging and commuting, and may alter the behaviour of their invertebrate prey. In order to reduce the risk of adverse impacts on bats from lighting, it is recommended that additional lighting is aimed away from the boundary features, in particular the woodland and the ponds. Where it is not possible to aim lighting away from boundary features, it is recommended that down-lighting or cut-off beams area used, in order to minimise disturbance to bats (Stone et. al, 2009). This would be in-line with guidance in Paragraph 125 of the NPPF.

Great Crested Newt

5.26 Great crested newts and their habitats are protected under the Wildlife and Countryside Act 1981 (as amended), and by the Conservation of Habitats and Species Regulations 2010 (as amended). Great crested newt and common toad are also listed as Priority Species under the provisions of the NERC Act 2006.

5.27 Given the presence of a great crested newt breeding pond within the site and the presence of 2.18ha of optimal great crested newt terrestrial habitat (0.20ha 'immediate', 1.63ha 'intermediate' and 0.35ha 'distant' habitat), the presence of this species within the suitable terrestrial habitats within the site is highly likely.

5.28 Although the law provides strict protection to great crested newts, it also allows this protection to be set aside (derogation) under Section 53 of the Conservation of Habitats and Species Regulations 2010 through the issuing of licences. These licences in England are currently determined by Natural England (NE) for development works and are known as European Protected Species (EPS) licences.

5.29 Where a lawful operation is required to be carried out, which is likely to result in an offence under the legislation set out above, an EPS licence may be obtained from NE to allow the operation to proceed. However, in accordance with the requirements of Section 53 of the Conservation of Habitats and Species Regulations 2010, an EPS licence can only be issued where the following derogation requirements are satisfied:

- The proposal is necessary '*to preserve public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment*';
- '*There is no satisfactory alternative*';
- The proposal '*will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range*.'

5.30 Where a site is subject to a planning application, under Section 9 of the Conservation of Habitats and Species Regulations 2010, the relevant local planning authority must, being defined as a '*competent authority*', have '*regard to the requirements of the Habitats Directive so far as they may*

be affected by the exercise of those functions'. This means that, in determining a planning application, the local planning authority must consider whether European Protected Species are to be affected and, if so, must show that they have given consideration as to whether the derogation requirements (above) might be met. If the local planning authority considers that the requirements are likely to be met, then they will have discharged their duty and may grant planning permission on those grounds. Although, this planning permission is likely to be subject to the condition that an EPS licence is obtained.

5.31 The development will not directly affect the great crested newt breeding pond but is likely to result in the loss of a proportion of the immediate (0-50m from the breeding pond), intermediate (50-250m) and distant (250-500m) terrestrial habitat. This comprises 0.20ha of optimal habitat within the immediate habitat, 1.63ha within the intermediate habitat and 0.35ha within the distant optimal habitat. The development could therefore, without mitigation, result in great crested newts being killed or injured, and their resting places (i.e. terrestrial habitats) being damage or destroyed and any newts present could be disturbed or killed. This would constitute an offence under the above legislation.

5.32 In addition, common toad was recorded within both Pond A and Pond B. Great crested newt and common toad are both UK Biodiversity Action Plan species and are listed as Species of Principal Importance under the provisions of the NERC Act 2006.

5.33 Due to the proposed clearance of suitable terrestrial habitats that are likely to be used by great crested newt, it is considered that a European Protected Species licence will need to be secured for the development to proceed. A detailed mitigation strategy will need to be drawn up in the form of a Method Statement. The mitigation approach will be to avoid killing or injury to great crested newts and to minimise the impact on the great crested newt population.

5.34 The proposed development will retain Pond A as part of landscaping within the eastern part of the site. In addition, the landscaping and proposed site drainage will be designed in such a way as to ensure that this pond will be protected from the indirect adverse impacts that could result due to changes in hydrology and pollutants in surface water runoff. This will involve the establishment of a buffer of optimal terrestrial habitat around the pond to separate it from the adjacent development. In addition, a series of pre-treatment areas formed of swales and ponds will be established to create a hydrological buffer between the development, the terrestrial habitats and the pond, to reduce the risk of indirect impacts to the terrestrial and aquatic habitats via pollution.

5.35 As compensation for the loss of 0.63ha optimal terrestrial habitat, 1.08ha of high quality aquatic and terrestrial habitats for great crested newts will be created within the proposed landscaping within the eastern part of the site, in close proximity to the great crested newt breeding pond (Pond A). The new landscaping will comprise swamp habitat, marshy grassland and hibernacula, and the creation of at least one new wildlife pond. A proportion (0.8ha) of this habitat will serve a dual function as public open space, and will involve the incorporation of a boardwalk through part of the terrestrial habitat.

5.36 In total, this will result in a net increase of 0.45ha (128%) of optimal newt habitat within the proposed development. The creation of high quality terrestrial habitat in close proximity to the breeding pond (Pond A) will provide a network of optimal terrestrial habitats along the eastern and southern areas of the proposed development, including the retained woodland, thereby enhancing the opportunities for great crested newts in the local area. The new pond(s) should be designed to create suitable breeding conditions for great crested newts. The creation of optimal terrestrial habitats and new pond(s) would form the basis of the mitigation strategy.

Water Vole

5.37 No evidence of water vole was located during the surveys therefore no adverse impacts are anticipated as a result of the proposed works. No mitigation measures or further survey work are required.

Reptiles

5.38 No reptiles were recorded during the course of the surveys although no targeted survey work has been undertaken. The mosaic of habitats which are considered to provide the most suitable reptile habitat (Pond A and the woodland) will be retained during the course of the works, therefore even if

reptiles were present, the key habitats will remain unaffected by the proposals. The temporary loss of the marshy grassland has the potential to result in the loss of habitat which has some suitability for grass snake, although the proposed compensation involving the translocation of marshy grassland and swamp within the eastern part of the site and the creation of at least one new wildlife pond will lead to an overall net increase in suitable reptile habitat.

5.39 As a precaution, the works should be timed to avoid the grass snake breeding season (April-June) and immediately prior to clearance of the marshy grassland it is recommended that this habitat should be thoroughly walked, in order to encourage any reptiles (should they be present) away from the area of works.

Badger

5.40 No evidence of badger was located during the surveys therefore no adverse impacts are anticipated as a result of the proposed works. No mitigation measures or further survey work are required.

Invasive Species

5.41 New Zealand stonecrop, five cotoneaster species and Japanese knotweed are listed in Schedule 9 (Part 2) of the Wildlife and Countryside Act 1981 (as amended), which makes it an offence to plant or cause these introduced invasive plants to grow in the wild, effectively making it illegal to spread these plant during development operations.

New Zealand Stonecrop

5.42 This species currently forms a dense mat of vegetation within Pond A. Material containing New Zealand stonecrop is classified as controlled waste and there are strict guidelines relating to its disposal. Guidance can be found in the “Environment Agency Managing invasive non-native plants in or near fresh water” (revised April 2010). Control measures can include chemical treatment, cutting or complete removal of all root and shoot material.

5.43 Since Pond A supports a breeding population of great crested newts, the removal of this invasive species should not involve the use of chemicals and will need to be timed to avoid the period which great crested newt will be present within the pond (i.e. March – July). It should be removed by hand and disposed of by burning or composting unless seeds are present.

5.44 Since the New Zealand stonecrop forms such as extensive area of cover within the pond, its loss is likely to involve the loss of some shelter for great crested newt. As such, following its removal, additional planting of appropriate native species should be undertaken to provide replacement shelter for newts within this pond.

Cotoneaster

5.45 Although this species cannot be confirmed due to the time of year of the surveys, as a precaution it is recommended that the small stand of cotoneaster is removed from the site in advance of the start of works in order to minimise the risk of spreading this plant through the course of the works. Material containing cotoneaster is classified as controlled waste there are strict guidelines relating to its disposal.

Japanese Knotweed

5.46 Since the area supporting Japanese knotweed is located just outside the site boundary it is recommended that contractors are made aware of its presence and measures are adopted to avoid spreading the Japanese knotweed during the works. If appropriate, the plant and the surrounding zone (up to seven metres) should be fenced-off during the works to prevent machinery access or disturbance to these areas.

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Appendix 1: Photographs

(overleaf)

Photograph 1: West across arable field (TN1)



Photograph 2: Pond A (TN2, late March 2012)



Photograph 3: Pond A (TN2, late April onwards 2012)



Photograph 4: Pond B (TN3)



Photograph 5: Swamp habitat



Photograph 6: Marshy grassland



Photograph 7: Wet ditch (TN4)



Photograph 8: Broadleaved woodland (TN5)



Photograph 9: Semi-improved neutral grassland (TN6)



Photograph 10: Tree 1



Photograph 11: Tree 2



Photograph 12: Tree 3



Photograph 13: Gap leading into eaves of Property 1 Claycliffe Road



Photograph 14: Gap leading into apex of gable end of Property 1 Claycliffe Road



Photograph 15: Roofspace of Property 1 Claycliffe Road



Photograph 16: Location of pipistrelle dropping on northern elevation of Property 3 Claycliffe Road



Photograph 17: Disused Barnsley canal



Photograph 18: Culvert leading beneath railway



Photograph 19: New Zealand stonecrop in Pond A

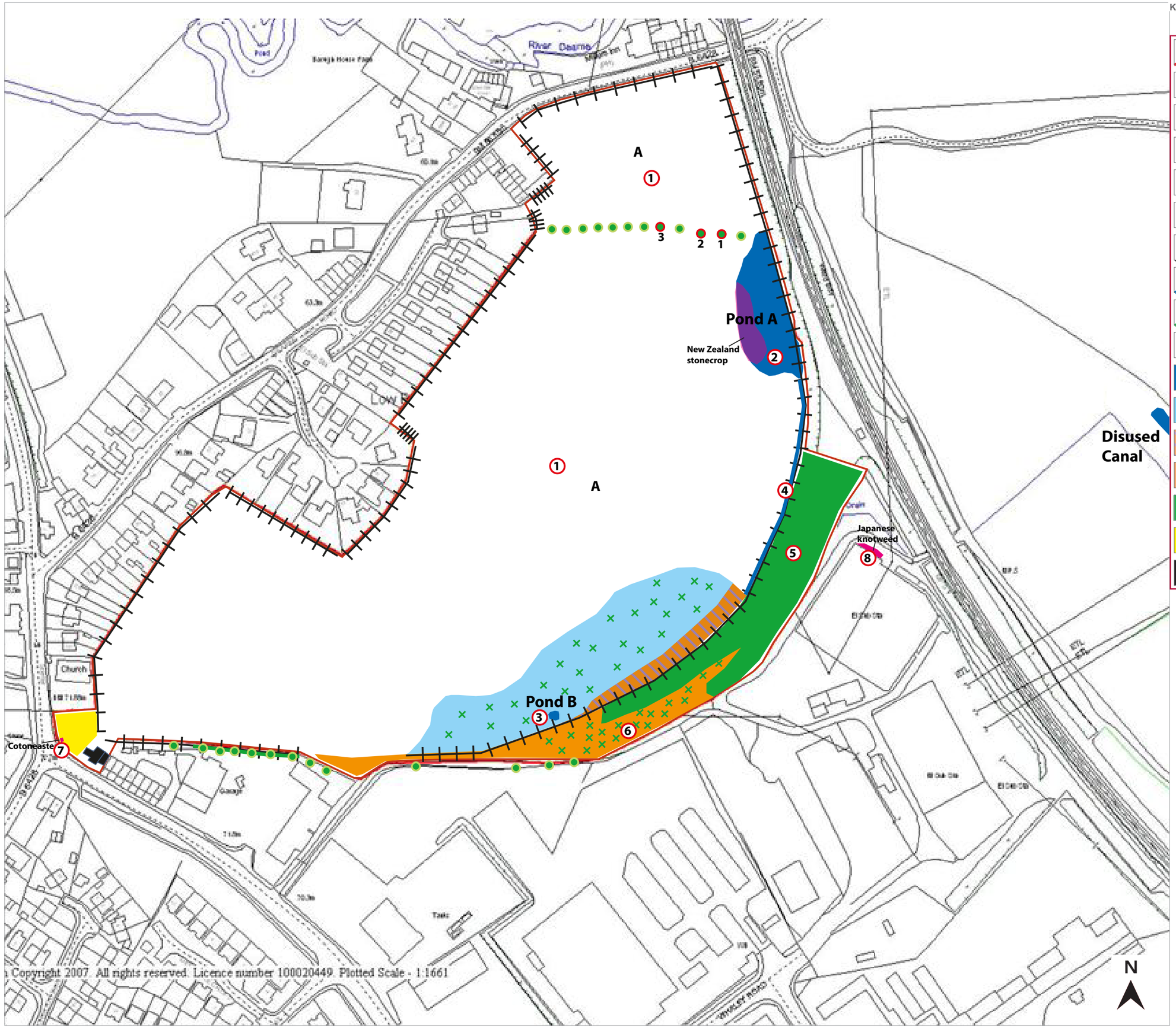


Photograph 19: Cotoneaster at southwestern boundary of site



Appendix 2: Figures

(overleaf)



KEY

- Survey boundary
- Target Note reference number
- Broadleaved tree (indicative location)
- Tree with bat potential
- Scattered scrub (indicative location)
- Invasive species
- Fence
- Wet ditch
- Species-poor hedgerow
- Arable field
- Pond/waterbody
- Swamp vegetation
- Marshy grassland
- Semi-improved neutral grassland
- Semi-mature broadleaved woodland
- Amenity-managed grassland
- Building

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PROJECT TITLE
LOW BARUGH, BARNSLEY

DRAWING TITLE
Figure 1:
Extended Phase 1 Habitat Survey Plan

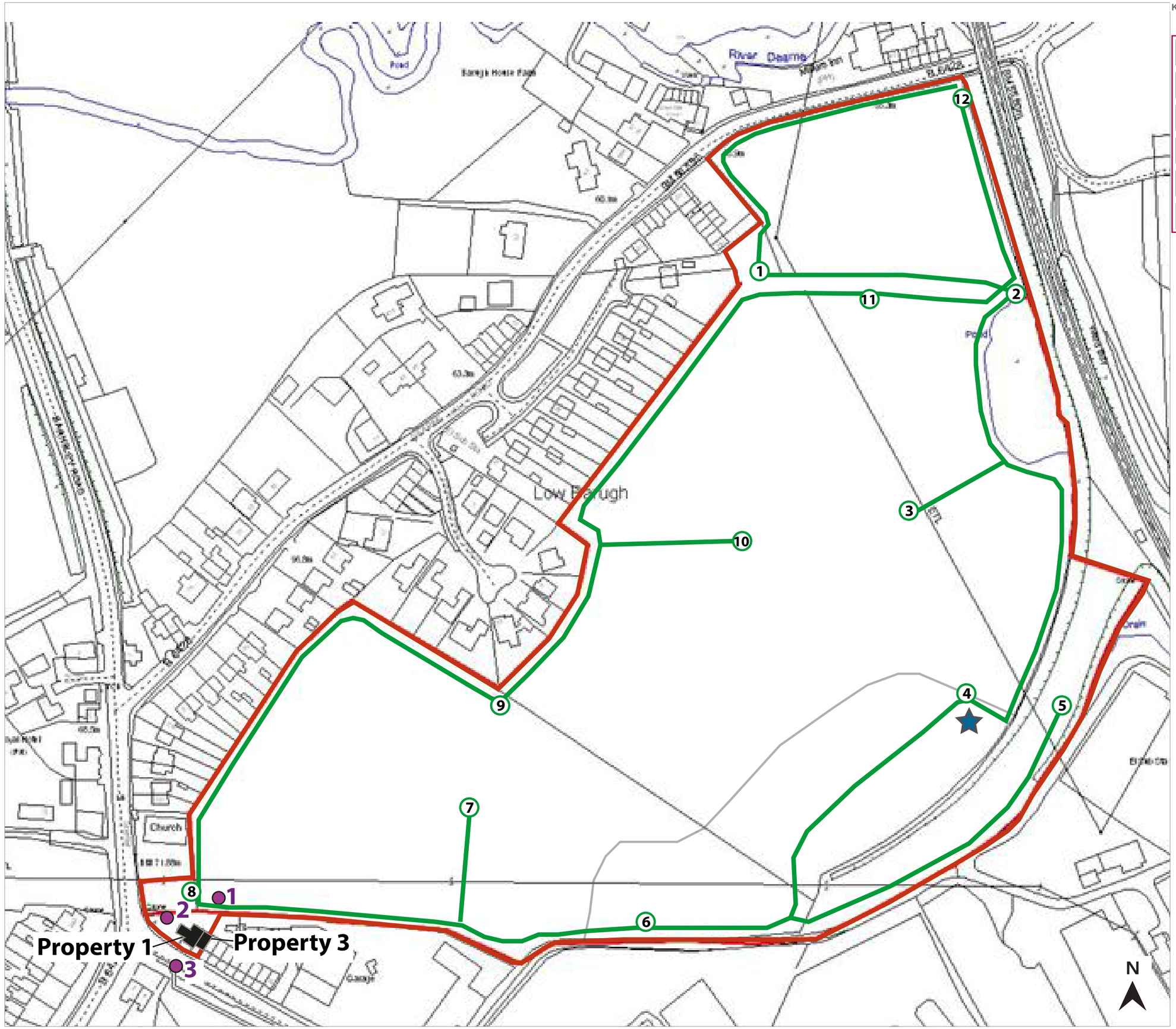
DATE: 06.03.2013 CHECKED: LRJ SCALE: NTS
DRAWN: LRJ APPROVED: PH STATUS: FINAL

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KEY

- Survey boundary
- Walked transect route
- Transect stop
- Remote Anabat location
- Surveyor location (evening emergence and dawn re-entry survey)
- Building

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PROJECT TITLE
LOW BARUGH, BARNSLEY

DRAWING TITLE
Figure 2:
Bat Survey Plan

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PROJECT TITLE
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Figure 3:
Breeding Bird Survey Results Plan

DATE: 20.07.2012 CHECKED: GM SCALE: NTS

DRAWN: RW APPROVED: PH STATUS: FINAL

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Key

B.	Blackbird
BH	Black-headed gull
BT	Blue tit
BZ	Buzzard
C.	Carrion crow
CH	Chaffinch
CC	Chiffchaff
CG	Canada goose
D.	Dunnock
GL	Grey wagtail
GO	Goldfinch
GS	Great spotted woodpecker
GR	Greenfinch
HS	House sparrow
J.	Jay
JD	Jackdaw
K.	Kestrel
LI	Linnet
MG	Magpie
MA	Mallard
MH	Moorhen
PH	Pheasant
PW	Pied wagtail
RB	Reed bunting
R.	Robin
SG	Starling
SL	Swallow
SN	Snipe
ST	Song thrush
SW	Sedge warbler
WH	Whitethroat
WW	Willow warbler
WP	Woodpigeon
WR	Wren
◯	Bird in song
–	Bird calling
=	Bird alarm calling
→	Direction of flight
PH fam	Pheasant with juveniles
RB food	Reed bunting with food
SW juv	Juvenile sedge warbler
MA egg	Mallard eggs
♀	Female
B.	Confirmed breeder
B.	Probable breeder
B.	Possible breeder
B.	Non breeder

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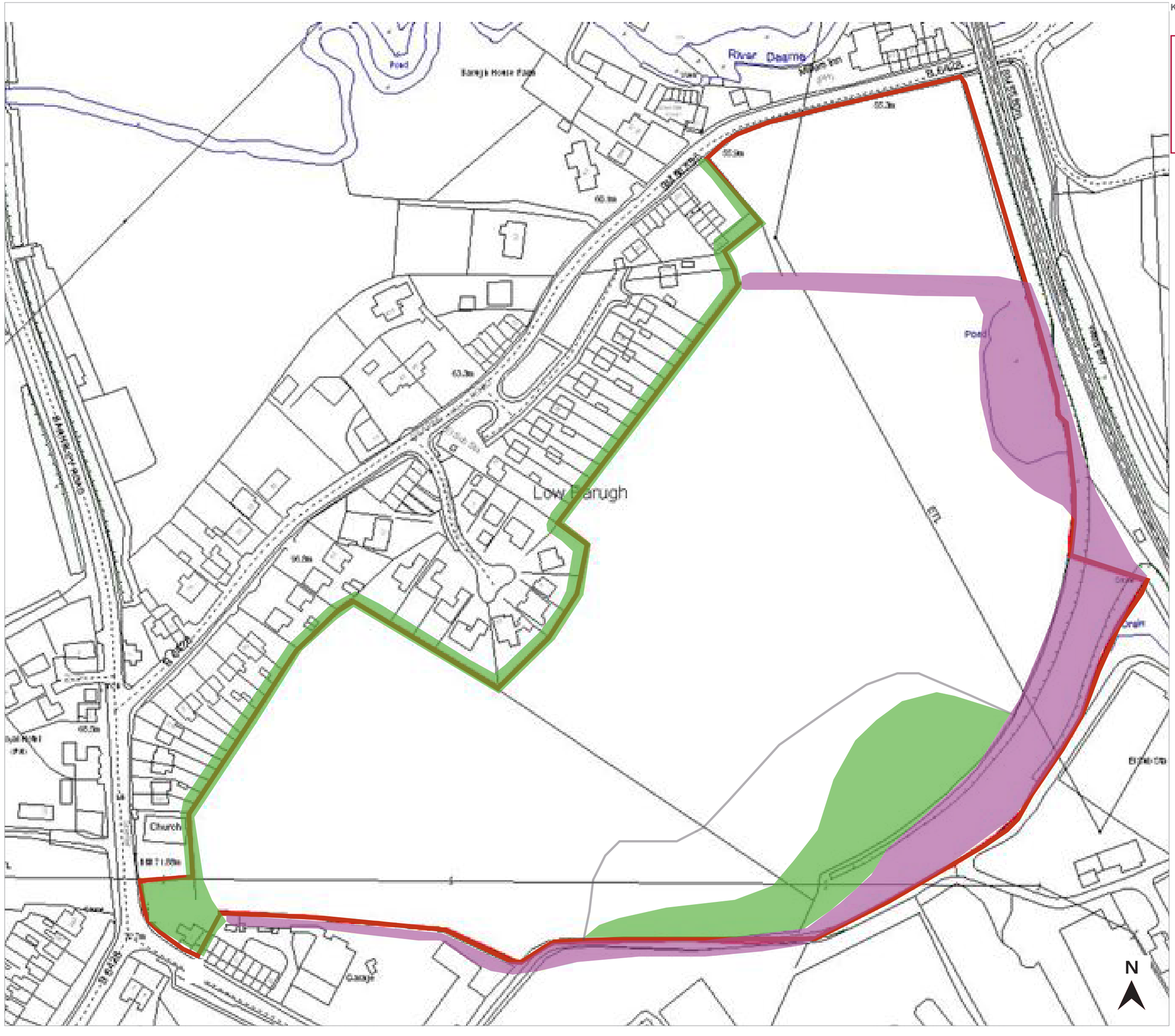
JOB REF: 3568.03

PROJECT TITLE
LOW BARUGH, BARNSLEY

DRAWING TITLE
Breeding Bird Survey Results Key

DATE: 20.07.2012 CHECKED: GM SCALE: NTS

DRAWN: RW APPROVED: PH STATUS: FINAL



KEY

- Survey boundary
- Area of key bat foraging activity
- Area of lower bat foraging activity
- Area of little/no bat activity

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PROJECT TITLE
LOW BARUGH, BARNSLEY

DRAWING TITLE
Figure 4:
Areas of Key Bat Activity

DATE: 06.03.2013 CHECKED: LRJ SCALE: NTS

DRAWN: LRJ APPROVED: PH STATUS: FINAL

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No dimensions are to be scaled from this drawing.
All dimensions are to be checked on site.
Area measurements for indicative purposes only.

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Appendix 3: Pond A Survey Results

Table 13: Pond A survey results

Method	Species	Survey visit					
		1: 10/04/12	**2: 17/04/12**	**3: 24/04/12**	**4: 30/04/12**	**5: 11/06/12**	**6: 12/06/12**
Bottle trapping	Great crested newt	0	1 female	2 (1 male, 1 female)	1 male	2 (1 male, 1 female)	3 (1 male, 2 female)
	Smooth newt	0	0	0	2 (1 male, 1 female)	3 (0 male, 3 female)	4 (2 male, 2 female)
	Palmate newt	0	0	0	0	0	0
	Common frog	0	0	0	0	0	0
	Common toad	1 tadpole	0	0	2 tadpoles	1 tadpole	0
Torch count	Great crested newt	3 (1 male, 1 female, 1 unknown)	35 (13 male, 14 female, 8 unknown)	161 (107 male, 54 female)	11 (8 male, 3 female)	6 (0 male, 6 female)	14 (0 male, 14 female)
	Smooth newt	16 (4 male, 7 female, 5 unknown)	56 (18 male, 18 female, 20 unknown)	95 (30 male, 65 female)	11 (5 male, 4 female, 2 unknown)	7 (3 male, 4 female)	16 (2 male, 14 female)
	Palmate newt	0	0	0	0	0	0
	Common frog	0	0	0	0	0	0
	Common toad	2 tadpoles	0	1 tadpole	30-50 tadpoles	0	0
Egg search	Great crested newt	-	-	Present	Present	0	0
	Smooth newt	-	-	0	0	0	0
	Palmate newt	-	-	0	0	0	0
	Common frog	-	-	0	0	0	0
	Common toad	-	-	0	0	0	0
Terrestrial search	Great crested newt	0	0	0	0	-	-
	Smooth newt	0	0	0	0	-	-
	Palmate newt	0	0	0	0	-	-
	Common frog	0	0	0	0	-	-
	Common toad	0	0	0	0	-	-

Appendix 4: Summaries of Relevant Legislation, Policy and Other Instruments

6.1 This section briefly summarises the relevant legislation, policy and related issues that are mentioned in the main text of the report. The following text does not constitute legal advice.

National Planning Policy Framework

6.2 The government published the National Planning Policy Framework (NPPF) on 27th March 2012. The NPPF states that, "*the planning system should contribute to and enhance the natural and local environment by*:

a. *Protecting and enhancing valued landscapes, geological conservation interests and soils;*

b. *Recognising the wider benefits of ecosystem services;*

c. *Minimising impacts on biodiversity and providing net gains in biodiversity, where possible contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;*

d. *Preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability; and*

e. *Remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate."*

Planning – land allocation and policies

6.3 The NPPF indicates that '*in preparing plans to meet development needs, the aim should be to minimise pollution and other adverse effects on the local and natural environment. Plans should allocate land with the least environmental or amenity value, where consistent with other policies in this Framework*.'

6.4 In paragraph 111, the NPPF refers to brownfield land as follows: '*planning policies and decisions should encourage the effective use of land by re-using land that has been previously developed (brownfield land), provided that it is not of high environmental value*.'

6.5 Local planning authorities are advised in paragraph 113 to '*set criteria-based policies against which proposals for any development on or affecting protected wildlife or geodiversity sites or landscape areas will be judged. Distinctions should be made between the hierarchy of international, national and locally designated sites so that protection is commensurate with their status and gives appropriate weight to their importance and the contribution that they make to wider ecological networks.*'

6.6 Local planning authorities are advised further to '*set out a strategic approach in their Local Plans, planning positively for the creation, protection, enhancement and management of networks of biodiversity and green infrastructure*…'

6.7 In paragraph 115 the NPPF states that for National Parks, the Broads and Areas of Outstanding Natural Beauty '*the conservation of wildlife and cultural heritage are important considerations in all these areas and should be given great weight in National Parks and the Broads*.' The accompanying Paragraph 116 sets out the assessment requirements should planning applications be considered in these areas although the default is that *' planning permission should be refused for major developments in these designated areas except in exceptional circumstances and where it can be demonstrated they are in the public interest*.'

6.8 The NPPF also states that, "*to minimise impacts on biodiversity and geodiversity, planning policies should:*

a. *Plan for biodiversity at a landscape-scale across local authority boundaries;*

b. Identify and map components of the local ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity, wildlife corridors and stepping stones that connect them and areas identified by local partnerships for habitat restoration or creation;

c. Promote the preservation, restoration and re-creation of priority habitats, ecological networks and the protection and recovery of priority species populations, linked to national and local targets; and identify suitable indicators for monitoring biodiversity in the plan;

d. Aim to prevent harm to geological conservation interests; and

e. Where Nature Improvement Areas are identified in Local Plans, consider specifying the types of development that may be appropriate in these Areas."

Planning applications and biodiversity

6.9 "When determining planning applications, local planning authorities should aim to conserve and enhance biodiversity by applying the following principles:

a. If significant harm 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;

b. Proposed development on land within or outside a Site of Special Scientific Interest likely to have an adverse effect on a Site of Special Scientific Interest (either individually or in combination with other developments) should not normally be permitted. Where an adverse effect on the site's notified special interest features is likely, an exception should only be made where the benefits of the development, at this site clearly outweigh both the impacts that it is likely to have 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;

c. Development proposals where the primary objective is to conserve or enhance biodiversity should be permitted;

d. Opportunities to incorporate biodiversity in and around developments should be encouraged;

e. Planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland and the loss of aged or veteran trees found outside ancient woodland, unless the need for, and benefits of, the development in that location clearly outweigh the loss; and

f. The following wildlife sites should be given the same protection as European sites:

i. potential Special Protection Areas and possible Special Areas of Conservation

ii. listed or proposed Ramsar sites; and

iii. sites identified, or required, as compensatory measures for adverse effects on European sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites."

6.10 "*The presumption in favour of sustainable development (paragraph 14 [of NPPF]) does not apply where development requiring appropriate assessment under the Birds and Habitats Directives is being considered, planned or determined*."

6.11 In paragraph 125 the NPPF stipulates that '*by encouraging good design, planning policies and decisions should limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation*.'

Species and Habitats of Principal Importance

6.1 The NPPF (paragraph 117) indicates that local authorities should take measures to "*promote the preservation, restoration and re-creation of priority habitats, ecological networks and the protection and recovery of priority species*" linking to national and local targets through local planning policies. Priority species are those species shown on the England Biodiversity List published by the Secretary of State under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. Planning authorities have a duty under Section 40 of the NERC Act to have regard to priority species and habitats in exercising their functions including development control and planning.

UK Biodiversity Action Plan

6.2 The Government has drawn up a national strategy to conserve our threatened native species and habitats - the UK Biodiversity Action Plan (BAP) [1]. The UK BAP includes detailed Action Plans for priority habitats and species. The list of priority habitats and species included within the UK BAP is closely related to the list of habitats and species of Principal Importance.

Local Biodiversity Action Plans

6.3 The UK BAP is supported by a series of Local Biodiversity Action Plans (LBAPs), usually set up on a local authority administrative boundary basis. Each LBAP identifies those habitats and species considered to be most important in that area (usually referred to as priority habitats and species). Commonly, an LBAP will identify a number of habitats and species for which "action plans" have been prepared.

European and National Legislation

European protected species

6.4 The Conservation of Habitats and Species Regulations 2010 consolidates the various amendments that have been made to the Regulations. The original (1994) Regulations transposed the EC Habitats Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (Council Directive 92/43/EEC) into national law.

6.5 "European protected species" (EPS) are those which are present on Schedule 2 of the Conservation of Habitats and Species Regulations 2010. They are subject to the provisions of Regulation 41 of those Regulations. All EPS are also protected under the Wildlife and Countryside Act 1981 (as amended). Taken together, these pieces of legislation make it an offence to:

a. Intentionally or deliberately capture, injure or kill any wild animal included amongst these species

b. Possess or control any live or dead specimens or any part of, or anything derived from a these species

c. deliberately disturb wild animals of any such species

d. deliberately take or destroy the eggs of such an animal, or

e. intentionally, deliberately or recklessly damage or destroy a breeding site or resting place of such an animal, or obstruct access to such a place

6.6 For the purposes of paragraph (c), disturbance of animals includes in particular any disturbance which is likely—

a. to impair their ability—

i. to survive, to breed or reproduce, or to rear or nurture their young, or

ii. in the case of animals of a hibernating or migratory species, to hibernate or migrate; or

b. to affect significantly the local distribution or abundance of the species to which they belong.

6.7 Although the law provides strict protection to these species, it also allows this protection to be set aside (derogation) through the issuing of licences. The licences in England are currently determined by Natural England (NE) for development works. In accordance with the requirements of the Regulations (2010), a licence can only be issued where the following requirements are satisfied:

a. The proposal is necessary 'to preserve public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment'

b. 'There is no satisfactory alternative'

c. The proposals 'will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.

[1] http://jncc.defra.gov.uk/page-5155 (The UK Biodiversity Action Plan) – 14 June 2011

Breeding Birds

6.8 All nesting birds are protected under the Wildlife and Countryside Act 1981 (as amended) which makes it an offence to intentionally kill, injure or take any wild bird or take, damage or destroy its nest whilst in use or being built, or take or destroy its eggs.

Badger

6.9 Badgers are protected under the Protection of Badgers Act 1992. This makes it an offence to wilfully kill, injure, take, possess or cruelly ill-treat a badger, or to attempt to do so; or to intentionally or recklessly interfere with a sett. Sett interference includes disturbing badgers whilst they are occupying a sett, as well as damaging or destroying a sett or obstructing access to it. A badger sett is defined in the legislation as "a structure or place, which displays signs indicating current use by a badger".

Reptiles

6.10 All British reptiles are protected under the Wildlife and Countryside Act 1981 (as amended). Grass snake, slow worm, common lizard and adder are protected against intentional killing or injury and against sale. In addition, all British reptiles are UK BAP priority species.

Invasive Species

6.11 A range of invasive non-native plant species, including New Zealand stonecrop, Japanese knotweed and five cotoneaster species, are listed in Schedule 9 (Part 2) of the Wildlife and Countryside Act 1981, which makes it an offence to plant or cause these introduced invasive plants to grow in the wild, effectively making it illegal to spread the plants during development operations.