ROCKINGHAM SITES ECOLOGICAL APPRAISAL

Rockingham, Hoyland, Barnsley

Harworth Estates

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1.0 INTRODUCTION

1.1 This report presents the results of investigations and surveys relating to the land at the former Rockingham open cast mining site, Hoyland, Barnsley (OS Grid Ref of approx. site centroid: SE355010 – Appendix A Figure 1) between the 31st May and 24th June 2013.

1.2 The aim of the survey was to record the habitats present on site and assess any features of importance or that would support the presence of protected species, or other species of nature conservation importance, and to determine if controlled non-native invasive species that could represent a constraint to redevelopment are present on site.

1.3 This report presents an assessment of potential ecological constraints to development, based on the results of the survey, along with recommendations for further, more detailed surveys to be undertaken, as appropriate.

BACKGROUND TO THE SURVEY

1.4 Applied Ecological Services Ltd (AES – LTD) was commissioned to undertake a Preliminary Ecological Appraisal of the site at Rockingham, Hoyland (Appendix A Figure 1).

1.5 The ecological appraisal was commissioned in relation to the potential redevelopment of the site.

1.6 The field surveys were undertaken by Chris Madine, Alan Jones (AES – LTD), Jon Goodrick (Grad CIEEM) and Jonathan Moore (MCIEEM), experienced field ecologists, with the assistance of Miss Sarah Moran (Assistant Ecologist). All works were project managed by Gary Tudor MCIEEM of AES – LTD.

HABITAT DESCRIPTION SUMMARY

1.7 The survey site was approximately 55ha in size and is situated at the former Rockingham surface mine site, adjacent to the town of Hoyland to the south and the village of Birdwell to the west within the Metropolitan Borough of Barnsley. The

centre of the town of Barnsley is approximately 5km to the north, and the centre of the town of Rotherham approximately 10km southeast.

1.8 The site is adjacent to the Shortwood Industrial Park on the Dearne Valley Parkway (A6195) dual carriageway which runs from the park on the northeastern border of the site through its centre in a southwesterly direction towards Junction 36 of the M1 motorway. Bridges and culverts under the road provide limited connectivity between the north and south areas of the site. A watercourse flows through a number of former balancing ponds, entering the site from the south and flowing in a northerly direction through the centre of the site.

1.9 The site has a variety of land uses including public recreational access, arable crops, pasture grassland and semi-natural and planted woodlands. A number of public rights of way pass through the centre of the site through blocks of young planted woodland, un-grazed grassland verges and beside water features including ditches and ponds. The western end of the site is currently used to graze horses, whilst the south eastern area is pasture grassland used for cattle grazing. An area of arable crop is situated to the north of the road, with pasture grassland and a small section of a mature ancient woodland located within the north of the site. Many of the field boundaries were hedgerows (both intact and defunct) and/or edges of young planted woodlands.

1.10 An area of ancient woodland extended beyond the northern boundary which is adjacent to Shortwood Industrial Park to the east. Agricultural arable and pasture grassland border the site to the southeast and northwest, whilst residential properties associated with the town of Hoyland to the south, and the village of Birdwell to the west. Further afield (circa 2km radius), the landscape was a mosaic of residential and industrial development related to the town of Hoyland and the villages of Birdwell and Tankersley, and a mixture of arable and pasture grassland interspersed with woodland blocks and copses. The M1 Motorway lies to the west of Birdwell reducing connectivity to habitats beyond.

1.11 The habitats on the survey site were well connected by woodland edges and hedgerows and a watercourse, although the Dearne Valley Parkway may limit movement between the north and south sides of the site. Connectivity to the immediate surrounding landscape was generally poor due to the proximity of

residential and industrial development to the east, south and west. However, a good network of linear woodlands and hedgerows provide good connectivity to the north.

2.0 LEGISLATION

2.1 This legal information is a summary and intended for general guidance only. It is recommended that the original documentation is referred to for detailed and definitive information. Web addresses are located in the References and Bibliography section of this report.

HABITAT REGULATIONS

2.2 The Conservation of Habitats and Species Regulations 2010 transpose Council Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Flora and Fauna (Habitats Directive) into English law, making it an offence to deliberately capture, kill or disturb wild animals listed under Schedule 2 of the Regulations. It is also an offence to damage or destroy a breeding site or resting place of such an animal (even if the animal is absent at the time).

WILDLIFE & COUNTRYSIDE ACT 1981

2.3 The Wildlife and Countryside Act 1981, as amended by the Countryside and Rights of Way Act (CRoW) 2000 and the Natural Environment and Rural Communities Act (NERC) 2006 (which also places a duty on authorities to have due regard for biodiversity and nature conservation) consolidates and amends existing national legislation to implement the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and Council Directive 79/409/EEC on the Conservation of Wild Birds (Birds Directive), making it an offence to:

- Intentionally kill, injure or take any wild bird or their eggs or nests (with certain exceptions) and disturb any bird species listed under Schedule 1 to the Act, or its dependent young while it is nesting;
- Intentionally kill, injure or take any wild animal listed under Schedule 5 to the Act; intentionally or recklessly damage, destroy or obstruct any place used for shelter or protection by any wild animal listed under Schedule 5 to the Act;

intentionally or recklessly disturb certain Schedule 5 animal species while they occupy a place used for shelter or protection;

- Pick or uproot any wild plant listed under Schedule 8 of the Act.

NATIONAL PLANNING POLICY FRAMEWORK

2.4 The NPPF outlines government planning policies and how they should be applied within local authorities. The framework places an emphasis on sustainable development, encouraging the re-use of land that has previously been developed over using land that has a higher environmental value and by minimising impacts on biodiversity. The NPPF states that developments should aim to conserve or enhance biodiversity and encourages opportunities to incorporate biodiversity in and around developments.

BIODIVERSITY ACTION PLANS

2.5 The original objective of the UK Biodiversity Action Plan (UKBAP) was to fulfil the requirements of the Rio Convention on Biological Diversity in 1992, to which the UK is a signatory. A list of national priority species and habitats has been produced with specific action plans defining the measures consider necessary to ensure their conservation. Regional and local BAPs have also been developed for species/habitats of nature conservation importance both regionally and locally.

LOCAL STRUCTURE PLANS

2.6 County, District and Local Councils have Structure Plans and other policy documents that include targets and policies which aim to maintain and enhance biodiversity through the planning system.

3.0 INVESTIGATION, SURVEYS, SITE ASSESSMENT AND RESULTS

DESKTOP STUDY

ECOLOGICAL RECORDS SEARCH

3.1 A desk study was undertaken in April 2013 as part of this study. Local Wildlife Site (LWS) and species information for the site and surrounding area (up to two kilometres) was requested from the:

Barnsley Biological Records Centre

MAGIC SEARCH

3.2 The Multi-Agency Geographic Information for the Countryside (MAGIC) internet resource was examined to find out the locations of areas designated for nature conservation in the area surrounding the surveyed land.

FLORA SURVEYS

PHASE 1 HABITAT SURVEY

3.3 The site visits were undertaken between April – August, Phase 1 Habitat Survey data were collected primarily in May and June 2013. The survey was carried out in accordance with the standard Phase 1 Habitat Survey methodology (JNCC, 2003). Dominant plant species were noted, as were any uncommon species or species indicative of particular habitat types.

3.4 The information collected during the surveys was mapped and is presented on the Phase 1 Habitat survey map in Appendix A (Figure 4). The initial surveys were carried out by Jon Goodrick, Jonathan Moore and Sarah Moran. Further surveys were undertaken by a variety of surveyors (see dedicated species surveys).

CONTROLLED INVASIVE SPECIES

3.5 The site was assessed during the Phase 1 Habitat survey for the presence of invasive non-native species including Japanese knotweed *Fallopia japonica*, and giant hogweed *Heracleum mantegazzianum*.

FAUNA SURVEYS

BATS

3.6 All bat surveys (risk assessments) were carried out using methodologies in line with guidance in Bat surveys - Good practice guidelines (Hundt, 2012).

BUILDINGS INTERNAL AND EXTERNAL VISUAL ASSESSMENT

3.7 Any structures located within the site boundary were visually assessed for potential access points and evidence of bat activity by Jonathan Moore (Natural England Bat Class Survey Licence WML CL18 (Bat Survey Level 2) Reg. No. CLS0314) in June 2013.

3.8 Features such as small gaps in barge/soffit/fascia boards, raised or missing ridge tiles and gaps at gable ends, which have potential as access points were sought. Evidence that potential access points were actively used by bats includes staining within gaps and bat droppings or urine staining under gaps; any marks such as these were recorded. Indicators that potential access points were likely to be inactive included the presence of cobwebs and general detritus within the access (Hundt, 2012).

3.9 The interior of any buildings, including roof void, was visually assessed for evidence of bat activity and/or for the potential to be used by bats. Evidence of a roost was determined as the presence of a dead or live bat, concentrated piles or scattered droppings, food remains such as insect wing fragments as well as scratch marks and/or staining.

3.10 Where / if roosts positively identified during an Internal and External Visual Assessment the building within which the roost is located is classified within the category Roost Present. Other buildings are classified as having High, Moderate, Low, Negligible potential to contain bat roosts based upon the number and quality of features present, and the buildings position in relation to the surrounding environs. Table 1 gives the features considered when attributing a potential classification to a building.

TABLE 1: FEATURES TYPICAL OF BUILDINGS WITHIN THE DIFFERENT POTENTIAL CATEGORIES

Negligible	Low Potential	Moderate Potential	High Potential
Geographic location poor species diversity (i.e.: extensive arable areas, upland sites)	Geographic location moderate species diversity	Geographic Location moderate species diversity	Geographic location with moderate or high species diversity (i.e.: Welsh valleys, southern counties)
No easily identifiable access points such as gaps within stonework or between tiles.	Limited number of access points	Some access points. Typically obscured by cobwebs or detritus.	Several possible access points. Some clean showing potential use.
No roof void	No roof void	Small or cluttered roof void	Large roof void with unobstructed flying spaces
No external cavities such as crevices within wall or behind fascia boards	Few external cavities with cavities present of low suitability	External cavities present suitable for small numbers of bats	A variety of external features offering a range of roosting locations. Crevices potentially suitable for larger colonies
Constructed from less suitable materials for roosting e.g.: metal or concrete fibre board sheeting	Constructed from a mixture of unsuitable and suitable materials (i.e. Stone barn with concrete fibre board roof).	Constructed from suitable materials (stone, brick, timber, slate, clay tile etc)	Constructed from suitable materials (stone, brick, timber, slate, clay tile etc) and over 100 years old
Located within areas of poor quality habitat, away from bat foraging or commuting routes	Area offering some habitat features likely to be used by bats	Area offering some habitat features likely to be used by bats	Good connectivity to high quality habitats
Unstable internal temperature and humidity conditions	Temperature and humidity conditions vary but conditions within potential roosting areas stable	Temperature and humidity conditions vary but conditions within potential roosting areas stable	Stable temperature and humidity conditions throughout building.
Not part of a group of buildings	Part of a group of buildings, all offering similar roosting opportunities	Part of a group of buildings, all offering similar roosting opportunities	Part of a group of buildings offering a range of different conditions and potential roost locations
Heavily disturbed	Potential roosting locations suffering little disturbance	Potential roosting locations suffering little disturbance	Building disused or little used, largely undisturbed

3.11 A High Potential building would typically be an older building situated close to high quality bat foraging habitats such as woodland, water features or substantial hedgerows. Buildings falling within this class will usually offer a variety of roosting opportunities suitable for use by a range of bat species.

3.12 Conversely a Negligible Potential building will typically be well sealed and of modern construction, offering no or few clear access points or roosting opportunities. The risk of a building housing a bat roost is further reduced if located within an area of poor quality habitat such as hard standing or amenity grassland.

GREAT CRESTED NEWTS

HABITAT SUITABILITY INDEX (HSI)

3.13 An initial Habitat Suitability Index (HIS) assessment was carried out on waterbodies on site recorded during the site visit. The waterbodies were assessed using the HSI methodology guidelines provided by the National Amphibian and Reptile Recording Scheme (NARRS 2008, based on Oldham et al. 2000).

3.14 The habitat suitability assessment uses ten key habitat criteria and is based on the assumption that habitat quality can be used as a tool to determine whether a water body is likely to contain great crested newts and the likely population size (Oldham et al. 2000). The criteria are as follows:

- SI1 = geographic location
- SI2 = waterbody area
- SI3 = waterbody permanence
- SI4 = water quality
- SI5 = waterbody shading
- SI6 = number of waterfowl
- SI7 = occurrence of fish
- SI8 = waterbody density
- SI9 = proportion of 'newt friendly' habitat
- SI10 = macrophyte (aquatic plant) content

3.15 Of these, SI2, SI3, SI5, SI6, SI8, SI9 and SI10 are assessed using objective measures, whilst SI1, SI4 and SI7 are assessment quality.

3.16 The HSI is derived using the following equation:

$$HSI = (SI1 \times SI2 \times SI3 \times SI4 \times SI5 \times SI6 \times SI7 \times SI8 \times SI9 \times SI10)^{1/10}$$

3.17 The results of the HSI calculation were compared to categorized HSI scores used by the National Amphibian and Reptile Recording Scheme (NARRS 2008) to identify the probability of a water body to support GCN. The five categories are summarised in Table 2 below.

TABLE 2: HSI SCORES

Probability of water bodies supporting GCN	HSI Scores
Poor	Below 0.5
Below average	0.5 – 0.59
Average	0.6 – 0.69
Good	0.7 – 0.79
Exceptional	Above 0.8

OTHER PROTECTED OR NOTABLE SPECIES

3.18 Field signs of other protected or notable species were noted by the surveyors during the surveys.

RESULTS

DESK TOP STUDY

LOCAL WILDLIFE SITES

3.19 In addition to the ecological records provided, Barnsley BRC provided a list of nine Local Wildlife Sites within a 2km radius of the survey site (see Table 3). The Local Wildlife Site status for these sites have been designated for different reasons but include semi-natural grassland, open water, swamp, semi-natural broadleaved woodland and great crested newt assemblages, indicating that there are a rich variety of natural and semi-natural habitats in the wider landscape. Full details of each wildlife site are provided in Appendix C.

TABLE 3: A SUMMARY OF LOCAL WILDLIFE SITES FROM WITHIN A 2KM RADIUS OF THE SURVEY SITE

LWS within the boundary of the development site						
LWS no.	**Name of LWS**	**Area**	**Habitats within development area**	**Grid reference**	**Notes**	**Distance Km and bearing**
30	Short Wood & Hay Green	15.5ha	• Running water, • Semi natural broadleaved woodland, • Semi improved neutral grassland, • Tall ruderal with scattered scrub	SE35474 01697		Within site

Table 3: Continued

LWS near the development site						
LWS no.	**Name of LWS**	**Area**	**Habitats within development area**	**Grid reference**	**Notes**	**Distance Km and bearing**
29	Wombwell wood	106.6ha	None	SE 37789 02641		1.4km NW
23	Rockley woods	69.4ha	None	SE 33236 01574		0.9km W
24	Worsborough Reservoir	37.1ha	None	SE 34503 03194		1.8km N
43	Sowell Pond	2.4ha	None	SK 33634 99474		2.0km SW
44	Black lane	0.4ha	None	SK 36287 98412		2.1km S
45	Skier's Spring Wood	9.8ha	None	SK 36905 99439		1.5km SE
51	Barrow Colliery	101.3ha	None	SE 36048 02803		0.8m NE
56	Potter Holes Plantation	8.5ha	None	SK 34220 99876		1.0km SW

3.20 No Sites of Special Sites of Scientific Interest (SSSI) or other sites designated for nature conservation purposes were present within 2km of the site

MAGIC SEARCH

3.21 The MAGIC search revealed that there are two Local Nature Reserves and 15 ancient woodlands within a 2km radius of the site boundary (see Table 4), of which 13 are semi-natural and two replanted.

3.22 The search revealed that there are 15 ancient woodlands within a 2km radius of the site (Table 4).

TABLE 4: RESULTS OF MAGIC SEARCH

Approx. Centroid OS Grid Ref	Name	Size (ha)	Distance from Site (km)	Bearing	Designation
SE354017	SHORT WOOD	9.4	0.0	N	Ancient & Semi-Natural Woodland
SE339013	THE OLD PARK	16.0	0.7	NWW	Ancient Replanted Woodland (3 units)
SK465779	POTTER HOLES PLANTATION	8.5	0.8	SW	Local Nature Reserve
SE337013	THE OLD PARK	5.0	0.9	NWW	Ancient & Semi-Natural Woodland (2 units)
SK348993	BULL WOOD	2.0	1.0	SSW	Ancient & Semi-Natural Woodland
SE347028	Null	3.1	1.1	N	Ancient & Semi-Natural Woodland
SE340019	Null	0.7	1.3	NW	Ancient & Semi-Natural Woodland
SK470782	WORSBOROUGH COUNTRY PARK	62.5	1.4	N	Local Nature Reserve
SE340021	WIGFIELD WOOD	4.1	1.4	NW	Ancient & Semi-Natural Woodland
SK368994	SKIERS SPRING WOOD	7.3	1.4	SE	Ancient & Semi-Natural Woodland
SE369024	Null	2.2	1.4	NE	Ancient & Semi-Natural Woodland (2 units)
SE353031	Null	4.0	1.5	N	Ancient & Semi-Natural Woodland
SE338021	Null	2.0	1.5	NW	Ancient & Semi-Natural Woodland
SE372031	WOMBWELL WOOD	22.3	1.8	NE	Ancient & Semi-Natural Woodland
SE374027	WOMBWELL WOOD	16.0	1.9	NE	Ancient Replanted Woodland (2 units)
SK336989	WEST WOOD	0.6	1.9	SW	Ancient & Semi-Natural Woodland (2 units)
SE332023	Null	1.9	2.0	NW	Ancient & Semi-Natural Woodland

ECOLOGICAL RECORDS

3.23 Over 15,000 ecological records were returned collectively from Barnsley Biological Record Centre. A third of the records were recorded at Worsborough Reservoir (approx. 1.9km to the north of the site) being predominately bird records, and almost 2,000 of the records were from the former Barrow Colliery site (approx. 0.7km to the northeast of the site) which mainly consisted of bird, flora and invertebrate records. Records date back to 1900 with over half being recorded in the 1980s and 90s. Over 6,700 records have been recorded since the year 2000. No details of record type were provided e.g. breeding activity

3.24 Full results of the ecological records search can be provided separately if required, however, for the purposes of this report, the records that are most relevant to the site, and those from the year 2000 onwards have been extracted from the data and are discussed below and summarised in Table 5.

RECORDS POST YEAR 2000 WITHIN 2KM

3.25 There were 192 records of species highlighted as being protected under the Wildlife & Countryside Act (W&C Act) and Badgers Act, of which 91 were birds, 62 amphibians, 35 terrestrial mammals and four reptiles. The distribution of these records are mapped in Figure 3 in Appendix A. In addition to these records there are 14 records of Biodiversity Action Plan species.

3.26 There were 51 records of European Protected Species (EPS), of which 20 were great crested newts Triturus cristatus recorded between 1.4 to 2.2km southwest of the site near the village of Tankersley. There were 31 records of bats *Chiropteran sp*. which have predominately been recorded to the north and northwest of the site. There are no other records of EPS post-2000.

3.27 In addition to bird species records listed under the W&C Act (192), there are also 960 records of Red and Amber birds on the Birds of Conservation Concern (BoCC) listings, within 2km of the site. These records are mainly associated with Barrow Colliery LWS and Worsborough Reservoir LWS. Barn owls have been recorded in the area at Barrow Colliery LWS to north of the site and Platts Common to the northeast.

3.28 A confidential record of badgers *Meles meles* was provided by Barnsley LRC, from along the edge of Short Wood approx. 400m north of the site.

RECORDS POST YEAR 2000 WITHIN APPROX. 200M

3.29 A noctule bat *Nyctalus noctula* and a common pipistrelle *Pipistrellus pipistrellus* were recorded on Shortwood Way, to the northeast of the site. There were no other records of EPS near the site.

3.30 There were no bird species listed under the W&C Act. However, there were 16 species on the Red and Amber BoCC list, of which four are also Biodiversity Action Plan (BAP) species including cuckoo *Cuculus canorus*, yellowhammer *Emberiza citrinella* and lapwing *Vanellus vanellus*. Common toad *Bufo bufo*, common frog *Rana temporaria* and smooth newt *Triturus vulgaris* have been recorded on site and in adjacent water features.

3.31 A number of ancient woodland indicator species were in the records mainly associated with the Short Wood and Hay Green LWS, including bitter vetch *Lathyrus linifolius*, bluebell *Hyacinthoides non-scripta* and yellow archangel *Lysimachia vulgaris*. Dyer's Greenwood *Genista tinctoria*, a typical component of unimproved meadows, was recorded on the site.

CONTROLLED INVASIVE SPECIES

3.32 Controlled invasive species were recorded in close proximity to the site. Himalayan balsam *Impatiens glandulifera* was recorded in Short Wood & Hay Green LWS and New Zealand pygmy weed *Crassula helmsii* was recorded in Ponds 1 & 2 (see Figure 2) adjacent to the site.

TABLE 5: PROTECTED FAUNAL SPECIES AND SPECIES OF CONSERVATION CONCERN RECORDED WITHIN @ 200M OF THE SITE

Taxa	Common name	Scientific	EPS	W&C Act	BAP	Red/Amber
Amphibian	Common Toad	*Bufo bufo*		✓	✓	
Amphibian	Common Frog	*Rana temporaria*		✓		
Amphibian	Smooth Newt	*Triturus vulgaris*		✓		
Bat	Noctule	*Nyctalus noctula*	✓	✓	✓	
Bat	Common pipistrelle	*Pipistrellus pipistrellus*	✓	✓		
Bird	Skylark	*Alauda arvensis*			✓	✓
Bird	Linnet	*Carduelis cannabina*			✓	✓
Bird	Goldfinch	*Carduelis carduelis*				✓
Bird	Stock Dove	*Columba oenas*				✓
Bird	Cuckoo	*Cuculus canorus*			✓	✓
Bird	Yellowhammer	*Emberiza citrinella*			✓	✓
Bird	Swallow	*Hirundo rustica*				✓
Bird	House Sparrow	*Passer domesticus*			✓	✓
Bird	Willow Warbler	*Phylloscopus trochilus*				✓
Bird	Dunnock	*Prunella modularis*				✓
Bird	Bullfinch	*Pyrrhula pyrrhula*			✓	✓
Bird	Starling	*Sturnus vulgaris*			✓	✓
Bird	Blackbird	*Turdus merula*				✓
Bird	Song Thrush	*Turdus philomelos*			✓	✓
Bird	Mistle Thrush	*Turdus viscivorus*				✓
Bird	Lapwing	*Vanellus vanellus*			✓	✓

FLORA SURVEYS

PHASE 1 HABITAT ASSESSMENT

3.33 Eleven habitat types were identified on the site under the Phase 1 Habitat system.

- Semi-improved grassland
- Improved grassland
- Semi-natural broadleaved woodland

- Plantation woodland
- Naturally re-vegetated hardstanding
- Hardstanding
- Hedgerows
- Tall ruderal
- Open Standing Water
- Ditch
- Running water

3.34 A Phase 1 Habitat survey map showing the location of the habitats is included at **Appendix A**, **Figure 4**. A non-exhaustive species list recorded during the survey and a description of the target notes are included as Appendix B.

SEMI-IMPROVED GRASSLAND

3.35 Semi improved grassland is the pre-dominant habitat within the survey area accounting for approximately 31ha. The semi-improved grassland varies in composition and structure across the site, however it can be split into two main types; rough grassland (SI 1) approximately 14.5ha and heavily grazed pasture (SI 2) approximately 15.5ha.

3.36 SI 1 is comprised of areas of rough and rank grassland likely to have been originally created as part of the restoration of the opencast mine site. The majority of this grassland is within two large open areas bordering the A6195 at the western end of the survey area, although there are small areas bordering the plantation woodland and hardstanding paths elsewhere on site.

3.37 SI 1 is more diverse than SI 2 with grasses less dominant within the sward. The grasses are for the most part a mixture of common species typical of rough grassland including; cocksfoot *Dactylis glomerata* (Abundant), meadow foxtail *Alopecurus pratensis* (Frequent), annual meadow grass (Frequent), Yorkshire fog *Holcus lanatus* (Frequent) and common bent *Agrostis stolonifera* (Frequent). In areas the grass sward changes to that more typical of less nutrient rich sites with glaucous

sedge *Carex flacca* (Locally abundant), crested dog's tail *Cynosurus cristatus* (locally frequent), red fescue *Festuca rubra* (locally frequent) and sweet vernal grass *Anthoxanthum odoratum* (locally frequent) present.

3.38 SI 1 also incorporates a small area of grassland that is included within the Short Wood and Hay Green LWS. This field was not fully surveyed due to restricted access, however the field was classified as Semi-improved neutral grassland during a previous survey of the LWS in 2010 (see Appendix C). Observations in June 2013 proved that this field is likely to have changed little. The habitat is likely to be more mature and consequently developed a more interesting floral composition than the other semi-improved grassland on site.

3.39 The flowering species of SI 1 are also typical common species of rough grassland including; ribwort plantain *Plantago lanceolata* (Abundant), creeping buttercup *Ranunculus repens* (Frequent), dandelion *Taraxacum sp*. (Frequent) and red clover (Frequent). Again, in areas, the floral diversity of SI 1 becomes more indicative of less nutrient enriched soils with species such as; bird's foot trefoil *Lotus corniculatus* (Locally Frequent) and horsetail *Equisetum sp.* (Occasional) present.

3.40 SI 2 is composed of four heavily grazed agricultural pasture fields within the southern half of the surveyed area. The floral diversity of this area is poor with the habitat dominated by common grasses such as perennial rye grass *Lolium perenne* (Abundant) and annual meadow grass *Poa annua* (Frequent). There are a small number of common flowering species present within the sward such as daisy *Bellis perennis* (Frequent), red clover *Trifolium pratense* (Locally Frequent) and white clover *Trifolium repens* (Occasional).

IMPROVED GRASSLAND

3.41 These fields were cultivated and lack floral diversity and are dominated by a silage crop of perennial rye grass *Lolium perenne* (Dominant) at the time of survey. No other species were recorded but occasional common agricultural weeds are likely to be present.

SEMI NATURAL BROADLEAVED WOODLAND

3.42 A small section (approx. 1.1ha) of Short Wood (Ancient Semi-Natural Woodland & Local Wildlife Site) stretches into the northernmost edge of the site. The woodland has a variable age structure, small clearings present and gaps in the canopy above some sections of the pathway (W1). Another area of woodland (W2) approx. 0.2ha in size has developed along a former railway embankment to the southeast of Short Wood. The area is linear with trees on either side of a pathway.

3.43 W1 - The canopy of this area of the wood includes mature sweet chestnut *Castanea sativa* (Frequent), oak *Quercus sp*. (Frequent) and birch *Betula sp.* (Frequent). A rich diversity of understory species were present including hazel *Corylus avellana* (Occasional), field maple *Acer campestre* (Occasional), bramble *Rubus fruticosus* (Frequent), elder *Sambucus nigra* (Occasional), rowan *Sorbus aucuparia* (Occasional) and holly *Ilex aquifolium* (Occasional).

3.44 Field layer vegetation includes ancient woodland indicators such as bluebell *Hyacinthoides non-scripta* (Frequent), and dog's mercury *Mercurialis perennis* (Occasional). Other species include common nettle *Urtica dioica* (Occasional), pink campion *Silene dioica* (Occasional), hard fern *Blechnum spicant* (Occasional).

3.45 Mature typical canopy species become less frequent along the southwestern edge where elder *Sambucus nigra* and birch *Betula sp*. become more abundant. Small clearings and open pathways are present in this area containing tall ruderal species such as grasses, broadleaved dock *Rumex obtusifolius* (Locally Frequent), creeping and meadow buttercup *Ranunculus repens* & *acris* (Locally Frequent), hogweed *Heracleum sphondylium* (Locally Occasional).

3.46 W2 - The canopy trees are mixture of mature and semi-mature trees including *Prunus sp*., birch *Betula sp*. (Occasional) and oak *Quercus sp*. (Occasional). The understory consists of hawthorn *Crataegus monogyna* (Frequent), elder *Sambucus nigra* (Occasional), dogrose *Rosa canina* (Occasional) and bramble *Rubus fruticosus* (Frequent). The field layer is dominated by grasses such as cocksfoot *Dactylis glomerata* (Frequent), and common nettle *Urtica dioica* (Occasional) and dandelion *Taraxcum agg*. (Occasional) are also present.

PLANTATION WOODLAND

3.47 A number of areas of plantation woodland are present on site. All of the woodland appears to be of a similar level of maturity suggesting it was planted as part of the open cast mine restoration approximately 15-20 years ago. The plantation woodland accounts for approximately 15ha of the site area.

3.48 The plantation woodland is for the most part planted with a typical restoration mix with a number of common species present and none dominant within the canopy. Species include a mixture of broadleaved trees including; ash *Fraxinus excelsior* (Frequent), birch *Betula sp*. (Frequent), field maple *Acer campestre* (Occasional) Swedish whitebeam *Sorbus intermedia* (Occasional) and oak *Quercus sp*. (Occasional).

3.49 Due to the immaturity of the woodland, the definition between canopy and shrub layer is blurred but a number of typical shrub species are included within the woodland planting including; hawthorn *Crataegus monogyna* (Frequent); hazel *Corylus avellana* (Occasional), dogwood *Cornus sp.* (Occasional), holly *Ilex aquifloium* (Occasional) and broom *Cytisus scoparius* (Occasional).

3.50 The ground flora within the woodland varies across the site, in areas it is typical of disturbed nutrient enriched ground with scrub and ruderal species dominant; with bramble *Rubus fruticosus* (Locally Abundant), common nettle *Urtica dioica* (Locally Abundant) and cleavers *Galium aparine* (Locally Abundant) and *willowherb Epilobium sp.* (Locally Abundant) present. Where the canopy is more open, species more typical of the surrounding grassland dominate; annual meadow grass (Frequent), perennial rye grass (Occasional), broadleaved plantain (Occasional) and ragwort *Senecio jacobaea* (Occasional). There are also areas of damp ground and closed canopy areas where species such as; glaucous sedge (Locally Abundant), soft rush *Juncus effusus* (Occasional) and male fern *Dryopteris filix mas* (Rare) are present.

3.51 Four common spotted orchid *Dactylorhiza fuchsii* were found on the eastern edge of the central band of woodland in the southern portion of the site (Target Note 3).

NATURALLY RE-VEGETATED HARDSTANDING

3.52 A small area (1ha) of naturally re-vegetated hardstanding runs adjacent to the A6195 north of Rockingham roundabout. The area seems to exist as a result of recent works to partially scrape the vegetation and top soil from this area.

3.53 For the most part the vegetation is made up of species that are re-colonising from the neighbouring grassland such as; perennial rye grass (Locally Abundant), creeping buttercup (Locally Abundant) and red clover (Locally Abundant). But there are also plants indicative of nutrient poor soils including; glaucous sedge (Locally Abundant), bird's foot trefoil (Frequent) and oxeye daisy *Leucanthemum vulgare* (Locally Frequent).

HARDSTANDING

3.54 A number of gravel paths run through the site. No particular areas of vegetation were noted in association with this habitat.

HEDGEROWS

3.55 The majority of the hedgerows on site appear to be of a similar age to the plantation woodland and are likely to have been planted as part of the restoration of the landscape following the closure of the opencast mine.

3.56 The hedgerows are composed of a number of native woody species including; Hawthorn (Abundant), oak (Occasional), field maple (Occasional), hazel (Occasional) and blackthorn *Prunus spinosa* (Occasional). There is little established ground flora with the majority of the hedgerow showing little difference from the neighbouring grassland.

TALL RUDERAL

3.57 There are a number of small areas throughout the site where common ruderal species are dominant. These areas are generally lacking in floral diversity being dominated by common species such as common nettle (Abundant), cow parsley *Anthriscus sylvestris* (Abundant) and broadleaved dock *Rumex obtusifolius* (Abundant).

OPEN STANDING WATER

3.58 The site includes 11 separate water bodies. Full descriptions are included within section C.2.3.2 Great Crested Newt.

DITCH

3.59 There are four boundary ditches included within the site. The majority of the ditches are dry and include a mixture of the semi improved grassland and tall ruderal vegetation. A full description of the ditch that held water at the time of survey is included within section C.2.3.2 Great Crested Newt.

RUNNING WATER

3.60 A tributary of the Short Wood Dike runs through the site in a northerly direction. The watercourse enters the site via a culvert on the southern boundary on the outskirts of the town of Hoyland. It then runs in a northwesterly direction where it meets Pond 4 before entering a culvert under the dual carriageway and entering Pond 3. The watercourse then continues northeast towards a culvert and then remerges off-site over 200m to the north where it runs into Pond 2 and Pond 1. The course then runs along the western boundary of Short Wood, where it passes through a circa Victorian stone built open topped culvert before entering a part brick part concrete built tunnel/culvert (see below for more information). At the time of survey, there was little perceivable flow and the watercourse was predominately shallow standing water with dry areas.

CONTROLLED INVASIVE SPECIES

3.61 A small area of Himalayan balsam *Impatiens glandulifera* was recorded along the path on the edge of Short Wood (Target Note 2). No other controlled invasive species were observed within the site boundary during the survey.

FAUNA SURVEYS

BATS

BUILDING INTERNAL AND EXTERNAL VISUAL ASSESSMENT RESULTS

3.62 The assessment was carried out on the 6th June 2013 on observed structures within the site boundary. (**Appendix A, Figure 2**). The results of the assessment are summarised in Table 5 below.

RETAINING STONE WALL (TARGET NOTE 4)

3.63 This is a stone built retaining wall on the eastern side of the watercourse running through the site. Drainage pipes are inserted into the wall which presumably run out of the soil backed up behind the wall. Whilst there are numerous gaps between the stonework of the wall, water was seeping through the gaps and pipes. There may be roosting opportunities for small groups of bats within the wall, but the damp nature of the wall renders it of limited value to bats.

3.64 During the assessment of the structure no evidence of roosting bats was observed. As the structure provides limited suitable roosting opportunities, it is considered to have a Low Potential to support roosting bats.

BRICK BUILT CULVERT (TARGET NOTE 4)

3.65 This is a part brick, part concrete culvert adjacent to the stone wall described above. The site watercourse runs through the culvert although there was no running water at the time of survey. Within the interior of the culvert there are numerous gaps between the brickwork where mortar has fallen away. Given that internal air temperatures are likely to fluctuate less than those externally and that humidity maybe higher than the ambient conditions, this structure has the potential to be provide suitable hibernation opportunities.

3.66 During the assessment of the structure no evidence of roosting bats was observed. As the structure provides suitable roosting opportunities, it is considered to have a Moderate Potential to support roosting bats.

UNDERPASS (TARGET NOTE 6)

3.67 The underpass under the dual carriageway in the centre of the site appeared to be well sealed and offered no obvious roosting opportunities for bats. No evidence of roosting bats was recorded. This structure was considered to provide Negligible Potential to support roosting bats.

CONCRETE CULVERTS (TARGET NOTE 5)

3.68 A number of grilled concrete culverts are present approximately 1.5m in diameter, through which ditches and the watercourse run. From an external inspection of the concrete culverts no obvious roosting opportunities were recorded. However, internal inspection of the culverts may reveal gaps between expansion joins or where the concrete has been damaged. Given air temperatures are likely to fluctuate less, particularly in the larger culverts, and humidity maybe higher than the ambient conditions, these structures have the potential to be provide suitable hibernation opportunities.

3.69 During the assessment of the structure no evidence of roosting bats was observed. Without information from an internal inspection of the culverts, at this stage, the bat roost potential of these structures cannot be assessed.

BADGERS

3.70 A group of large mammal holes were recorded on an embankment within the site on the western edge of Short Wood. No evidence was present to identify the species which may be using these holes. Given some of the holes were in excess of 20x30cm in size, it is considered that this has the potential to be an outlier badger sett.

GREAT CRESTED NEWTS

HABITAT SUITABILITY INDEX (HSI)

3.71 The assessment of the water bodies was conducted in June 2013. Full results of the HSI for each feature are included in **Appendix B**.

3.72 Eleven ponds and four ditches were assessed for their suitability to support breeding great crested newts. The ponds are interconnected by the ditches and a watercourse running through the site from south to north. Given little perceivable flow was evident in the watercourse at the time of survey four sections of the watercourse were assessed for their ability to support breeding great crested newts. Ponds 3 to 11 are within the site boundary, whilst Pond 1 and Pond 2 are located to approx. 20-30m west of the site boundary beside Short Wood.

3.73 The habitats surrounding each water body are similar, consisting of a mixture of semi-improved grassland and planted or semi-natural woodland. The ponds are connected to the wider landscape by a network of drains and ditches, hedgerows and woodland edges. The terrestrial habitat is considered to be of Moderate value. Excluding water bodies which may not be present on an Ordnance Survey map, each water body had between 11 and 14 water bodies within 1km.

PONDs 1, 3 & 4

3.74 Ponds 1, 3 & 4 are set along the route of the watercourse running through the site, and may act as settlement ponds for particulate matter draining from the former open cast site. The ponds are between 900-1100m2 at springtime levels, but at the time of survey the pond levels had decreased by approximately 20-70cm. The ponds appear deep in the centre and are considered to rarely dry up. Reed (*Phragmites sp*., *Typha sp.)* and rush *Juncus sp*. populate the shallow marginal areas and there is little bankside shading (0-10%). Macrophyte cover ranges between 25-75% and is considered to provide suitable egg laying material. Tadpoles were present in each of these ponds.

3.75 Using the Habitat Suitability Index assessment these ponds were assessed as being of Excellent Suitability for great crested newts.

POND 2

3.76 This is of similar nature to Ponds 1, 3 & 4, and lies at the end of the culvert running northeast from Running Water 3 and is connected to Pond 1 by Running Water 4. The pond is approximately 300m2 at springtime level, but at the time of survey this had decreased by approximately 1m and appeared quite shallow. There is more shading to this pond (30%) and it is considered to dry more frequently. This pond was assessed as being of Good Suitability for great crested newts.

POND 5

3.77 This is a small pond (12m^2) located where the watercourse enters the site from a culvert on the southern boundary. The pond is quite shaded (50%) and has little macrophytic cover (15%) however, the vegetation present is considered suitable egg laying material. Tadpoles were present and a female smooth newt was recorded. This pond was assessed as being of Poor Suitability for great crested newts.

POND 6

3.78 This is a small pond (15m2) located at the northern end of Ditch 4. Excess water flows into a drain leading off-site to the northwest. The pond is not shaded and the southern end of the ditch had significant macrophytic cover (60%). Whilst the vegetation present is considered suitable egg laying material, a dense population of sticklebacks was present. This pond was assessed as being of Below Average Suitability for great crested newts.

POND 7

3.79 This is a small pond (15m2) located at the northern end of Ditch 4. Excess water flows into a drain leading off-site to the northwest. The pond is not shaded and the southern end of ditch had significant macrophytic cover (60%). Whilst the vegetation present is considered suitable egg laying material, a dense population of sticklebacks was present. This pond was assessed as being of Poor Suitability for great crested newts.

PONDs 8-10

3.80 Three shallow scrapes (less than 2m2 each) dug into the semi improved grassland within the north western section of the site. The scrapes are unshaded and have little macrophytic cover. The vegetation present suggests the scrapes are highly ephemeral with semi improved grassland species dominating, although there are small areas of soft rush present. These ponds were assessed as being of Poor Suitability for great crested newts.

POND 11 AND DITCH

3.81 Pond eleven is located at the western end of the ditch demarking the boundary between the site and the A6195. The ditch (approx. 200m long) appears to have

been recently excavated and is approximately 1m wide and between 1m and 2m in depth. The water level varies along the course but appeared, at its deepest, to be 25cm deep. For the most part the ditch is vegetation free but in areas small stands of yellow flag iris and soft rush are present. The pond appears to be a shallow overflow of the ditch approximately $5m^2$ in area and contains limited vegetation. This pond was assessed as being of Poor Suitability for great crested newts.

OTHER PROTECTED AND NOTABLE SPECIES

3.82 Several mammal runs were observed on the site during the surveys although these were mainly fox, rabbit and other small mammals.

3.83 It was noted that hedgerows, woodlands, and some of the structures on the survey site are suitable for nesting birds and consequently a breeding bird survey has been undertaken. No ground nesting birds were noted on the site during the Phase 1 Habitat Surveys. The majority of the grassland on site was heavily grazed by horses and cattle and as a result is likely to be of limited value to ground nesting birds. The areas of grassland at the western end of the site are less intensively grazed (grazing limited to tethered ponies), and as a result may be of value as potential nesting sites to species such as skylark *Alauda arvensis* although no individuals were noted during the survey.

3.84 A group of large mammal holes were recorded on an embankment within the site on the western edge of Short Wood (Target Note 1). No evidence was present to identify the species that may be using these holes. Given some of the holes were in excess of 20x30cm in size, it is considered that this has the potential to be an outlier badger *Meles meles* sett. The woodlands and hedgerows on site may conceal further potential sett entrances.

4.0 INTERPRETATION AND EVALUATION OF RESULTS

DESIGNATED SITES

LOCAL WILDLIFE SITES

4.1 There are nine Local Wildlife Sites within 2km of the site. The boundary of the Short Wood & Hay Green LWS lies within the northern border of the site, which consists of semi-improved neutral grassland and semi-natural woodland. The Barrow Colliery LWS lies beyond Short Wood approximately 800m from the site, and there is good connectivity between these sites to the survey site.

4.2 Connectivity to the remaining LWSs is restricted by residential, industrial and major infrastructure development.

ANCIENT WOODLAND

4.3 Short Wood is designated as ancient semi-natural woodland and is included within the Short Wood & Hay Green LWS. A section of this ancient woodland (approx. 1ha) falls within the site boundary.

FLORA

PHASE 1 HABITAT SURVEY

4.4 The Phase 1 Habitat survey identified that there is an area of naturally re-vegetated hardstanding located in the southwest corner of the survey site. The habitat appears to have formed due to a recent scraping of the site to remove the top soil. The floral diversity of the sward falls short of the recognised UK BAP priority habitat criteria for the site to be classed as open mosaic habitat. However, the vegetation does include flowering species that could be of interest for certain notable invertebrates, most notably bird's foot trefoil the caterpillar food plant for dingy skipper butterfly.

4.5 The majority of the grassland on site is managed for agriculture (SI2 intensively grazed agricultural pasture, improved grassland as silage) and as a result is dominated by common species and is of limited floral diversity. SI 1 is less intensively managed and as a result has a much more diverse sward. The area of grassland within the Short Wood & Hay Green LWS in particular may have previously been managed as a semi improved neutral grassland meadow and although it currently

displays some signs of scrub and ruderal encroachment, it is likely to have an underlying floristic diversity. SI 1 is likely to be of value to local wildlife and in particular may have significant value for invertebrate species.

4.6 The majority of the woodland on site is plantation woodland that is likely to have been planted as part of the original restoration of the open cast coal mine. As a result of this none of the plantation woodland has yet reached maturity, with the majority of the trees less than 15-20 years old. The canopy displays a good diversity of (mostly native) tree species but the structure of the woodland is poor due to the limited age; there is no definition between the canopy and shrub layer and for the most part the ground flora is lacking in diversity. However, there are small areas of more diverse native ground flora as indicated by the presence of glaucous sedge and common spotted orchid. The plantation woodland is likely to provide a substantial resource for local wildlife, particularly for hedge and tree nesting birds.

4.7 The site includes a small area of established woodland (W1), part of Short Wood (Ancient Woodland) which is also designated as a Local Wildlife Site (Short Wood & Hay Green). Typical ancient woodland flora species are present in a diverse field layer and the canopy is of a varied age structure with a diverse understory. In addition to its value to bats (see BATS below), the woodland and surrounding fields support a rich diversity of bird species.

4.8 The hedgerows on site are of a similar age and planting list to that of the plantation woodland. Similarly, although the tree species diversity is good, the limited age of the hedgerow detracts from its structure with no standard trees and no woodland ground flora of note. Despite this the hedgerows are of value to local wildlife due to their nature as connective habitat along with their value as potential nesting sites for hedgerow nesting birds.

4.9 The remaining floral species and habitats identified on site were found to be common and contain limited floral diversity.

CONTROLLED INVASIVE SPECIES

4.10 Controlled invasive species were recorded in proximity to the site. Himalayan balsam *Impatiens glandulifera* was recorded in Short Wood & Hay Green LWS and New Zealand pygmy weed *Crassula helmsii* was recorded in Ponds 1 & 2 (see Figure 2) adjacent to the site. No evidence of controlled invasive species were recorded

during the survey, however, as records show that they are in the area, their presence on the site must not be ruled out.

FAUNA

BATS

4.11 The data search shows that bats have been recorded within 2km of the site. Furthermore, there are records of common pipistrelle and noctule bats within 200m of the site. Suitable bat foraging and commuting habitat is present within the landscape by ancient woodlands, water bodies, hedgerow lined agricultural fields and residential gardens.

4.12 The boundary of an ancient woodland comes within the northern area of the site. Mature trees are present within the ancient woodland which will be of an appropriate age to have developed suitable roosting features such as cavities, natural holes and split limbs. Dead, veteran and/or ancient trees may also be present which may have developed an extensive range of roosting features. As bats are heavily associated with ancient woodlands, it is considered that bat roosts are likely to be present within the wood. Bat foraging activity is also highly associated with ancient woodlands.

4.13 The site itself contains suitable foraging and commuting habitat in the form of hedgerows, planted and semi-natural woodland, and water bodies. Additionally, there are several structures on site which have been assessed as providing Low and Moderate potential to support roosting bats.

4.14 As bats are highly mobile species, have been recorded in the area, and have suitable roosting, foraging and commuting habitat present on site and the surrounding area, it is likely that bats are using the site.

4.15 Considering the survey findings and for further survey works the site is assessed to provide Medium Habitat Quality.

GREAT CRESTED NEWTS

4.16 The data search shows that there are records of great crested newts within 2km of the site. Whilst these records are located on the opposite side of the M1 motorway to the site (which reduces connectivity between habitats), it is likely that these species are present within other areas in the surrounding landscape.

4.17 A network of interconnected water bodies are present on site, including 11 ponds and four ditches, connected by a watercourse flowing through the site. Suitable terrestrial habitat is present in the form of woodlands and grassland. HSI scores on the ponds range from Poor to Excellent.

OTHER PROTECTED AND NOTABLE SPECIES

BADGERS

4.18 The data search shows that badgers have been recorded within 400m of the site. Suitable badger foraging habitat is present on the site in the form of grassland, woodland and hedgerows. Whilst no evidence of badgers was recorded during the survey, a group of large mammal holes are present within Short Wood within the survey site boundary. There was no evidence to indicate which species were using these holes.

BARN OWLS

4.19 The data search shows that barn owls have been recorded within 1km of the site. Suitable foraging habitat is present on the site in the form of un-grazed grassland along pathways, verges, and in the grassland areas surrounding the ponds. Whilst there are no buildings or structures on site suitable for breeding barn owls, there may be suitable cavities present for breeding sites within the Short Wood ancient woodland

BIRDS

4.20 The data search shows that there are a number of notable species recorded within 2km of the site including lapwing, cuckoo and yellowhammer. The site includes habitat features suitable for hedgerow and tree nesting species as well as some areas of grassland (SI2) that may be of value to ground nesting species such as Skylark.

INVERTEBRATES

4.21 The site includes a number of habitat types that may be of some importance for invertebrate species, in particular sparsely vegetated hardstanding (which includes the caterpillar foodplant of the dingy skipper butterfly), ancient woodland ground

flora, semi improved neutral grassland (SI3) and standing water (ponds and scrapes).

5.0 CONCLUSIONS AND RECOMMENDATIONS

DESK STUDY

WILDLIFE SITES AND ECOLOGICAL RECORDS

5.1 As a Local Wildlife Site is present on the site and connectivity is available to other Local Wildlife Sites and Local Nature Reserves, it is possible that any redevelopment proposals may have a direct effect on these areas. As a result, the connectivity to and presence of Local Wildlife Sites needs to be considered in any redevelopment proposals for the site and consequently, further consultations with the local Wildlife Trusts and/or Natural England along with mitigation measures, may be required at a later stage.

FLORA

PHASE 1 HABITAT SURVEY

5.2 The site was found to contain a number of habitats of ecological interest.

5.3 The site contains part of the Short Wood & Hay Green LWS, in particular areas of semi natural ancient woodland and semi improved neutral grassland. Further to this areas of SI1 and the naturally re-vegetated hardstanding were found to contain areas of particular floral diversity which maybe of local wildlife importance. If these areas are to be affected by the any eventual development further botanical surveys would be required to establish their value to allow the production of a suitable compensation and mitigation strategy. In this regards a quantifiable assessment of the habitat would be required in those areas which would be gained using the standard National Vegetation Classification methodology.

5.4 Hedgerows are a UK BAP priority habitat; however, the hedgerows on site were planted as part of the restoration scheme and were not well established. If total retention is not possible the proposals should look to replace any loss with like for like hedgerow plant elsewhere on the site and/or enhancing through additional planting or improved management of the remaining lengths of hedgerow present on site.

5.5 Ponds are designated UK BAP Priority Habitat and as a result should be retained and enhanced where possible. If retention is not possible the proposals should look to incorporate the creation of replacement ponds in a suitable location on site.

5.6 All of the remaining habitats and floral species identified on site are common and were found to contain limited flora diversity. As a result of this, no further botanical survey is required.

CONTROLLED INVASIVE SPECIES

5.7 Himalayan balsam has been recorded on the site and, along with New Zealand pygmy weed, have also been recorded in close proximity to the site (within Short Wood & Hay Green LWS and Pond 1-2). These species are included within Schedule 9 part 2 of the Wildlife and Countryside Act 1981. Section 14 of the act states that: "Subject to the provisions of this Part, if any person plants or otherwise causes to grow in the wild any plant which is included within Part II of Schedule 9 he shall be guilty of an offence."

5.8 As a result of this it is recommended that the client impose a suitable method statement on the proposed development to ensure that these plants are not spread as a result of the development. This should include the stipulations that;

- Workers should be informed on the identification of the controlled invasive species.
- If at any point controlled invasive species are identified within the development area an appropriate specialist should be contacted and control measures instigated.

FAUNA

BATS

DATA SEARCH

5.9 As the site has been found to be suitable for bats, consultation with South Yorkshire Bat Group is recommended prior to undertaking further survey works to ascertain further detailed information on roosts within the area. A 2km radial search of the site is recommended.

5.10 In accordance with BCT's major infrastructure development survey guidelines (Hundt, 2012), further survey works maybe required on roosts present in the area to assess how these bats may be commuting or using the site. Once the data consultation results are received, AES – LTD., can provide further advice as to the necessity of further survey works.

STRUCTURES

5.11 There were structures identified on site as having Low to Moderate potential for roosting bats.

5.12 As a result, and in accordance with the BCT survey guidelines (Hundt, 2012), further presence/absence surveys on these structures would be required should any works related to the development have potential to impact these structures.

5.13 Furthermore, as the interior of the culverts could not be accessed, should any works have the potential to impact these structures, further internal investigation would be required.

5.14 Following confirmation of the development proposal, AES - LTD., can provide further advice as to whether further survey works to these structures would be required.

TREES

5.15 Mature trees are present within the site boundary located in the areas identified as semi-natural woodland. If removal or any works to these trees are proposed as part of the development, in accordance with the BCT survey guidelines (Hundt, 2012), further investigation as to the potential of these trees should be undertaken. Trees that have the potential to support bat roosts should be identified from ground level. Further investigation of trees that are identified as providing potential for supporting bat roosts should be undertaken in the form of presence/absence surveys i.e. aerial inspections or nocturnal emergence/return surveys.

5.16 Following confirmation of the development proposal, AES - LTD. can provide further advice as to whether further survey works on trees would be required.

HABITATS

5.17 As suitable foraging and commuting habitat is present on site, and an ancient woodland is within the site boundary, the site has been assessed as providing Medium Habitat Quality. In accordance with the BCT survey guidelines further survey works are required to assess the use of the site by bats prior to development of the site.

5.18 As a result of these findings it is recommended that prior to any development, further bat surveys to assess the value of the trees and other suitable habitat features on the site for foraging and commuting bats. The impact of any development on flight lines and general disturbance over a longer period should also be determined (Hundt, p60, 2013). The surveys should include; the placement of static broadband bat detector recording equipment (automated surveys) close to suitable bat foraging and commuting habitat on the site, and ground level transect surveys across the site using broadband bat detector recording equipment.

PRESENCE/ABSENCE SURVEY METHODS

5.19 Presence/absence surveys should be carried out in line with the guidance set within the Bat Surveys: Good Practice Guidelines, 2nd edition (Hundt, 2012). Either of the following methods are considered suitable for confirming the presence or absence of roosting bats:

TREE AERIAL INSPECTION

5.20 Ropes and harnesses should be used to access trees identified as requiring an aerial survey by the client. Surveys should be carried out by two surveyors both of which are NPTC certified to climb trees and perform aerial rescue (for H&S purposes) and include a minimum of one Natural England licenced bat ecologist.

5.21 All potential roosting features that are accessible should be surveyed using endoscopes and torches where appropriate. If a tree or parts of a tree are considered to be too dangerous to climb for H&S purposes or access is unavailable, these should be recorded and alternative survey methods suggested where appropriate.

EMERGENCE/RETURN NOCTURNAL SURVEYS

5.22 This should involve surveyors observing a tree 15 minutes before sunset and up to two hours after sunset (dusk emergence), and then for 1.5 to 2 hours before sunrise (dawn re-entry). Dependent on the roost potential of the tree or building, a combination of the following surveys should be employed:

- A maximum of 3 dusk emergence and/or pre-dawn re-entry surveys during May to September (optimum period May to August).

ACTIVITY SURVEYS

TRANSECT SURVEYS

5.23 Transect surveys should be carried out in line with the guidance set within the Bat Surveys: Good Practice Guidelines, 2nd edition (Hundt, 2013). Transects should be conducted by a surveyor with a broadband automated bat detector recording device who should walk at a constant speed along a planned route taking in 3-5 minute point counts taking in the range of different habitat types on the site. Bat activity should also be recorded between point counts. Two transects are considered sufficient to cover the 55ha site. Surveys should be designed in accordance with the guidelines for a proposed major infrastructure medium habitat quality site:

- One visit per transect per month (April to September)
- At least one survey should comprise dusk and pre-dawn surveys (or a dusk to dawn survey) within one 24-hour period

AUTOMATED SURVEYS

5.24 Automated surveys should be carried out in line with the guidance set within the Bat Surveys: Good Practice Guidelines, 2nd edition (Hundt, 2012). Surveys should be designed in accordance with the guidelines for a proposed major infrastructure medium habitat quality site:

- Two recording locations per transect
- Data to be collected on five consecutive nights each month (April to September)

5.25 In addition to the recording devices associated with the transect routes, additional recording locations in or near Short Wood Ancient Woodland is recommended to ascertain the level of activity and probability of roosts associated with this habitat.

GREAT CRESTED NEWT

5.26 The survey identified that the ponds suitable for breeding great crested newts are present within the site boundary and a record of great crested newt was provided within 1.4km of the site. Furthermore, there are suitable habitats on site for terrestrial great crested newts and good connectivity to other suitable breeding ponds.

5.27 As a result of this it is recommended that further great crested newt breeding surveys are undertaken to establish the presence/absence of great crested newts within the potential redevelopment area or in its locality.

5.28 These surveys should be carried out in line with the guidance set within the Great crested newt mitigation guidelines (English Nature, 2001).

5.29 Presence/absence GCN surveys should be undertaken at all water bodies as identified within a 250m radius of the proposed development area. Dependent on the status of the water body a selection of the following four survey methodologies should be used:

- Bottle trapping – Bottle traps will be placed at intervals of 2m around the shoreline of each water body at dusk. The following morning the traps will be checked for GCN and removed.
- Egg Searching – Emergent vegetation should be searched for GCN eggs. Once eggs have been confirmed at a water body the search should be terminated.
- Torch Survey – Ecologists should search the water body for adult GCN using a torch with a minimum of 1,000,000 candle power.
- Netting – Surveyors should use pond dipping nets to search the margins of the water body for GCN (adult, juvenile and efts).

5.30 Appropriate water bodies should be surveyed using the above methodologies during four separate visits within the recommended survey period (Mid-March – Mid June).

If GCN are found within a water body a further two further surveys will be required to determine a population size class assessment.

OTHER PROTECTED AND NOTABLE SPECIES

BADGERS

5.31 No evidence of badger activity was observed within the site boundary and the nearest badger record provided is approximately 400m away. However, large mammal holes were identified and it was noted that a suitable badger foraging habitat is present on the site and that denser hedgerows could conceal sett entrances. Furthermore, badgers are highly mobile species known to occupy wide territories and readily move sett locations within these territories.

5.32 As a result of these findings it is recommended that the following reasonable avoidance measures are followed during any works:

- Prior to works commencing, workers should inspect the immediate work area for badger setts. If a badger sett (actual or suspected) is found then works should cease in that area and AES - LTD contacted immediately for further advice (Tel: 01388 835084).
- Any open trenches left overnight should be covered or left with a means of escape for mammals.

NESTING BIRDS

5.33 No evidence of nesting birds was observed during the Phase 1 Habitat survey, however, three of the main habitats on the site (SI2, hedgerow and woodland) were identified as being suitable for nesting birds. Furthermore, the site is located less than 2km from Worsborough Reservoir and Barrow Colliery, both locally important sites for birds. As a result, it is recommended that prior to any development a breeding bird survey is conducted across the site to establish the importance of the site within the local context.

5.34 The survey should be carried out in line with the abbreviated version of the standard BTO territory mapping methodology (Marchant, 1983) as stated by Hill et al. (2005). This proposes five separate visits between April and June. Each visit involves the surveyor walking all internal boundaries and bird species marked on maps in

accordance with BTO annotations. Breeding bird surveys should be started within one hour or at sunrise and should be completed by 11:00hrs.

INVERTEBRATES

5.35 Key habitats (partially re-vegetated hard standing, semi-natural ancient woodland, semi- improved neutral grassland, ponds) for invertebrates were identified during the survey including potentially suitable habitat for dingy skipper butterfly. As a result further assessment is recommended:

5.36 Any further survey should focus on the key target invertebrate taxa below to avoid bias towards *Lepidoptera* and therefore an incorrect assessment of the sites value.

- *Aculeate hymenoptera* (bees and wasps)
- *Lepidoptera* (butterflies and day-flying moths)
- *Syrphidae* (hoverflies)
- *Dolochopodidae* (dolyflies)
- *Sciomyzidae* (snail-killing flies)
- The "larger *brachycera*" (robberflies, horseflies, soldierflies and allies)
- Other small incidental *Dipera* families

5.37 Based on the above, and the key invertebrate habitats identified on site the following survey methodology is recommended. Four separate surveys should be conducted within the recommended survey period (Mid-March to Mid-Mid-October) using the techniques below:

- **Sweep sampling** - this method is the most efficient method of cataloguing a site's invertebrate resource.
- **Spot sampling** – this method should be employed to collect large, conspicuous invertebrates from such as bees and wasps from flowering plants and to supplement the standardised sweep samples.

- **Pond dipping** - focused on standardised sampling of the ephemeral ponds for water beetles and aquatic *heteroptera* (two key indicator groups for these features). The sampling protocol followed that laid out in NE research document NERR005.

SURVEY VALIDITY

5.38 The relevance of any ecological survey work degrades with time. Therefore, if the development works have not commenced within 12 months of the publication date of this report, further surveys will be required to re-establish the ecological status of this site.

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