

LAND OFF WEST MOOR CROFT ROAD, GOLDTHORPE (PHASE 3)

Ecological Impact Assessment (EclA)

Prepared for Gleeson Homes Limited

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1.0 INTRODUCTION

1.1 Terms of Reference

SLR Consulting Ltd was commissioned by Gleeson Homes Ltd to undertake an Ecological Impact Assessment (EclA), based on an Extended Phase 1 Habitat Survey and desk study, for an area of land to the west of Moor Croft Road, Goldthorpe, South Yorkshire (central OS grid reference SE 46570369).

This assessment was undertaken in order to inform a planning application for up to 69 houses and associated infrastructure. This application is the final phase of a three-phase scheme of development for which the first phase is complete and the second phase is under construction.

1.2 Site Description

The application site (hereafter referred to as the 'Site') consists of a single disused field, approximately 2.2ha in size, enclosed by just over 0.6km of species-poor hedgerows. The field itself supports a mix of dense bramble scrub and scattered scrub, tall ruderals, and small patches of open flower-rich and more extensive (less flower-rich) coarse grass-dominated swards elsewhere. A small area of marshy grassland occurs at the southern end of the Site.

Land immediately to the east of the Site supports recently constructed properties and properties under construction which comprise Phase 1 and Phase 2 of this housing scheme; the currently application forming Phase 3.

Land to the south of the Site supports areas of marshy and wet grassland, a wet ditch and a large pond with marginal and aquatic vegetation. Allotments and areas of scrub lie to the west of the Site, and housing off Lindale Gardens lies to the north.

1.3 Details of the Proposed Development

Proposals involve the construction of up to 69 houses and associated infrastructure, as set out in Appendix 1.

1.4 Purpose of this Report

This report:

- Describes the baseline data collection and assessment methodologies used;
- Summarises the baseline ecological conditions and identified important ecological receptors, where relevant;
- Identifies and describes all potentially significant ecological effects associated with the proposed development upon important receptors (or confirms that no potentially significant effects will occur);
- Sets out the mitigation and compensation measures required to ensure compliance with nature conservation legislation and/ or to address any potentially significant ecological effects, where relevant;
- Provides an assessment of the significance of any residual effects to important receptors (where relevant), and the legal and policy implications; and
- Identifies appropriate enhancement measures, where appropriate.

1.5 Relevant Legislation and Policy

Relevant legislation and national planning policy is provided in Appendix 2.

Planning applications for Barnsley are determined by Barnsley Metropolitan Borough Council, and therefore a summary of the relevant local planning policy is described below.

1.5.1 Barnsley Local Plan (2019)

The Barnsley Local Plan, which was adopted in January 2019¹, provides local planning policy (including that relating to the consideration of planning applications) up to the year 2033.

A summary of the most relevant sections is given below:

Policy CSP 3 (Sustainable Drainage Systems):

“All developments will be expected to use Sustainable Drainage Systems (SuDS). Only in exceptional circumstances, where it can be demonstrated that all types of SuDS are impractical, will other drainage management systems be permitted”.

Policy GI 1 (Green Infrastructure):

“We will protect, maintain, enhance and create an integrated network of connected and multi-functional Green Infrastructure assets that:

- *Provides attractive environments where people want to live, work, learn, play, visit and invest;*
- *Meets the environmental, social and economic needs of communities across the borough and the wider City Regions;*
- *Enhances the quality of life for present and future residents and visitors;*
- *Helps to meet the challenge of climate change;*
- *Enhances biodiversity and landscape character;*
- *Improves opportunities for recreation and tourism;*
- *Respects local distinctiveness and historical and cultural heritage;*
- *Maximises potential economic and social benefits; and*
- *Secures and improves linkages between green and blue spaces;”*

“At a strategic level Barnsley’s Green Infrastructure network includes the following corridors which are show on the Green Infrastructure Diagram 5 (refer to Appendix 1, within the Local Plan):

- *River Dearne Valley Corridor;*
- *River Dove Valley Corridor;*
- *River Don Valley Corridor;*
- *Dearne Valley Green Heart Corridor; and*
- *Historic Landscape Corridor.*

Diagram 5 within the Barnsley Local Plan (2019) confirms that the Site lies within the River Dearne Green Heart Corridor.

¹ <https://www.barnsley.gov.uk/services/planning-and-buildings/local-planning-and-development/our-new-local-plan/barnsleys-local-plan/>

Policy GI 1 goes on to state:

“The network of Green Infrastructure will be secured by protecting open space, creating new open spaces as part of new development, and by using developer contributions to create and improve Green Infrastructure.”

Paragraph 17.1 states *“Green Infrastructure (GI) can be described as including strategic networks of accessible, multifunctional sites (including playing fields, parks, woodland, informal open spaces, nature reserves and historic sites) as well as linkages (such as principal transport corridors, river corridors and floodplains, wildlife corridors and greenways). These contribute to maintaining the region’s biodiversity and environmental quality as well as peoples’ well-being. GI networks should consist of a series of features (both existing and new), appropriate at various spatial scales, preferably with links connecting smaller, more local sites with larger, more strategic ones, including the region’s National Parks and key nationally and internationally important habitats”.*

Policy BIO 1 (Biodiversity and Geodiversity):

“Development will be expected to conserve and enhance the biodiversity and geological features of the borough by:

- Protecting and improving habitats, species, sites of ecological value and sites of geological value with particular regard to designated wildlife and geological sites of international, national and local significance, ancient woodland and species and habitats of principal importance identified via Section 41 of the Natural Environment & Rural Communities Act 2006 (for list of the species and habitats of principal importance) and in the Barnsley Biodiversity Action Plan;*
- Maximising biodiversity and geodiversity opportunities in and around new developments;*
- Conserving and enhancing the form, local character and distinctiveness of the borough’s natural assets such as the river corridors of the Don, the Dearne and Dove as natural floodplains and important strategic wildlife corridors;*
- Proposals will be expected to have followed the national mitigation hierarchy (avoid, mitigate, compensate) which is used to evaluate the impacts of a development on biodiversity interest;*
- Protecting ancient and veteran trees where identified; and*
- Encouraging provision of biodiversity enhancements.”*

“Development which may harm a biodiversity or geological feature or habitat, including ancient woodland and aged or veteran trees found outside ancient woodland, will not be permitted unless effective mitigation and/ or compensatory measures can be ensured.

Development which adversely effects a European Site will not be permitted unless there is no alternative option and there are imperative reasons of overriding public interest (IROPI).”

Barnsley Biodiversity Action Plan

The Barnsley Biodiversity Action Plan (BAP)² sets out the habitats and wildlife species that are a priority for conservation. The last full edition of the Plan which was published in 2009 has since included some updates made during 2020.

The BAP lists a total of 21 local priority habitats, of which ‘hedgerows’ is relevant to the Site.

² www.barnsleybiodiversity.org.uk/BarnsleyBAP.html

It also lists a number of local priority species, of which hedgehog (*Erinaceous europaeus*), three species of bat, namely soprano pipistrelle (*Pipistrellus pygmaeus*), noctule (*Nycatuls noctula*) and brown long-eared (*Plecotus auratus*) bat, and number of Red List birds, including house sparrow (*Passer domesticus*), starling (*Sturnus vulgaris*), and linnet (*Linaria cannabina*) are relevant to the Site.

Dearne Valley Green Heart Nature Improvement Area (NIA)

The Site lies within the Dearne Valley Green Heart Nature Improvement Area, which is designed to help restore and enhance the ecological networks of the River Dearne, its floodplain, and its link to habitats on surrounding slopes and hills. At its core will be a 1300ha reedbed, wet grassland, wet woodland and woodland, with a 2690ha buffer area of farmland, amenity grasslands, and reclaimed industrial areas where biodiversity value will be enhanced.

2.0 METHODOLOGY

2.1 Desk Study

The Barnsley Biological Records Centre (BBRC) and Doncaster Local Records Centre (DLRC) were commissioned to undertake a search of non-statutory designated sites for nature conservation and protected/ notable species for the Site, and land within a 2 km radius of its centre. Data from the BBRC was supplied on the 7th July 2020, and that from the DLRC was provided on the 10th July 2020.

Information on statutory designated sites for nature conservation and geological interest, for the Site and 2km radius, was also obtained from the MAGIC website managed by Natural England www.magic.gov.uk, which was reviewed on the 10th August 2020.

2.2 Field Survey

2.2.1 Extended Phase I Habitat Survey

An Extended Phase 1 Habitat Survey and mapping exercise³ was carried out by Mr Jim Flanagan ACIEEM, Senior Field Ecologist with SLR Consulting, on the 19th of June 2020.

Mr Flanagan has over 18 years' relevant experience within ecological consultancy, is a competent ornithologist and botanist, who holds survey licences for great crested newt (*Triturus cristatus*), barn owl (*Tyto alba*) and white-clawed crayfish (*Austropotamobius pallipes*).

The survey aimed to identify any potential ecological constraints to the proposed development. Habitats and features with potential to support protected and/ or conservation priority fauna, together with any field signs of such species were searched for. This included the following:

- A search for badger (*Meles meles*) setts and field signs within the Site and 30m radius (where accessible);
- An assessment of buildings and/ or trees (if present) to ascertain their potential for roosting bats, based on criteria within the third edition of the Bat Conservation Trust's Good Practice Guidelines⁴;
- An assessment of the Site's potential to support a breeding bird assemblage of ecological importance;
- An assessment of the Site's potential to support great crested newt (*Triturus cristatus*); and
- An assessment of the potential of the Site to support reptiles.

Searches were also made for invasive species, including those listed on Schedule 9 of the Wildlife and Countryside Act 1981, which includes Japanese knotweed (*Fallopia japonica*), giant hogweed (*Heracleum mantegazzianum*) and Himalayan balsam (*Impatiens glandulifera*).

³ Joint Nature Conservation Committee (2010) Handbook for Phase 1 Habitat Survey – A Technique for Environmental Audit (Revised reprint). Joint Nature Conservancy Council, Peterborough.

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

2.2.2 Reptile Presence/ Absence Survey

During the Extended Phase I Habitat the habitats within the Site were assessed as having potential to support reptiles, and therefore a full reptile presence/ absence survey was undertaken. This involved the deployment of 50 reptile refuges (50cm x 50cm sections of heavy-duty roofing felt) on the 13th of August and their subject inspection on seven occasions throughout August and September, followed by their removal.

This number of refuges exceeds with the minimum recommended refuge density of 10 per hectare⁵. The refuges were placed within suitable areas of reptile habitat across the Site, including open areas of grassland around scrub and stands of tall herb.

Inspections of the refuges were combined with passive searching, for example, of patches of tussocky grassland, aided by the use of binoculars.

The survey dates, times and prevailing weather conditions during each of the reptile inspections are provided in Table 2-1 below:

Table 2-1
Timing and weather conditions during the reptile presence/ absence surveys

Date (2020)	Time	Temp (°C)	Cloud cover and Rainfall	Wind Speed
18 th August	19.00 – 19.55	21-23	4/8 and dry	Light air
24 th August	10.15 – 11.05	19-20	4/8 and dry	Gentle breeze
26 th August	11.21 – 12.10	20-21	4/8-5/8 and dry	Light breeze
3 rd September	0.00-10.00	18	4/8 and dry	Gentle breeze
11 th September	15.40 – 16.30	19	4/8 - 7/8 and dry.	Gentle breeze
17 th September	14.50 – 15.40	20	4/8 and dry.	Light breeze
21 st September	10.30 – 11.20h	17-19	2/8 – 4/8 and dry.	Light breeze

⁵ Froglife Advice Sheet 10: Reptile Survey, and Introduction to planning, conducting, and interpreting surveys for snake and lizard conservation.

2.2.3 Bat Commuting Route and Foraging Surveys

Bat Commuting Route Surveys

Given that the Site is situated between areas of existing houses, located to the north (with potential to support roosting bats), and a large waterbody, ditch and area of marshy grassland, located to the south (likely to be of value to foraging bats), surveys undertaken to establish whether the Site, and in particular the hedgerows/ areas of scrub located along its western and eastern boundaries, act as a commuting route for bats, travelling from the houses, to the foraging areas.

Commuting route surveys were therefore carried out on the evening of the 18th of August and the 28th of September 2020, involving two surveyors on each occasion. Surveys commenced 15 minutes before sunset and finished 1.5 hours after sunset; surveyors were positioned at a mid-way point along the western and eastern boundaries, to record levels of bat activity, including, where evident, the direction of flight. Surveyors were equipped with Duet (Batbox Ltd) combined frequency division and heterodyne bat detectors, and an Anabat Express (Titley Scientific) ultra-sonic bat detector. Bat calls recorded using the Anabat Expresses were subsequently analysed using Anlook software, to confirm species/ species group, where necessary.

The surveys were undertaken by Mr Jim Flanagan, Mrs Hazel Douglas, Associate Ecologist with SLR Consulting and holder of a Level 2 bat survey licence, and Mr Dan Alexander, Ecologist with SLR Consulting and holder of a Level 1 Natural England bat survey licence.

The bat species echolocation guide provided by Russ (2012)⁶ was used to identify bat calls to species or species group (identifying bats to species level by call alone is not always possible, with a high degree of certainty). The guide, which is based on the frequency of the call containing maximum energy, was used in conjunction with other features, such as call shape and habitat (i.e. 'open' or 'cluttered'), to aid species identification.

Static Bat Detector Surveys

The bat commuting surveys were supplemented by the use of static bat detectors, comprising Anabat Express (Titley Scientific) ultra-sonic bat detectors, which were deployed at three fixed locations within the Site, namely, one on the western boundary, one on the eastern boundary, and one within a small area of marshy grassland located towards the southern end of the Site.

The static detectors were deployed for five consecutive nights throughout August (nights of 13th to 17th August), and five consecutive nights in September (nights of 23rd to 27th of September). The calls were subsequently downloaded and analysed using Russ (2012)⁵.

2.2.4 Great Crested Newt eDNA Surveys

Water samples were collected from two water bodies to the south of the Site, namely from a north-south orientated ditch located at SE 46583 03563 (approximately 15 metres from the Site boundary at its closest point), and a shallow but relatively large pond located at SE 46603 03527 (approximately 30 metres from the Site at its closest point).

⁶ Russ, J. (2012) *British Bat Calls: A Guide to Species Identification*, Pelagic Publishing, Exeter

The water sampling was undertaken in accordance with standard protocols; twenty samples were collected from the margins of the pond using a ladle provided with the kit and mixed to form an aggregated sample. Six samples were then taken from the aggregated water sample, and 'fixed' within the test tubes provided, then sent off to a specialist laboratory where they were tested for traces of great crested newt eDNA.

The samples were collected by Mr Dan Alexander, holder of a Natural England great crested newt survey licence, on the 26th of August 2020, and subject to laboratory analysis on the 11th of September 2020.

2.3 Limitations

2.3.1 Desk Study

Desk study data is unlikely to be exhaustive, especially in respect of species, and is intended mainly to set a context for the study. It is therefore possible that protected species not identified during the data search do in fact occur within the vicinity of the Site.

2.3.2 Field Survey

The fieldwork was undertaken by a team of experienced and appropriately licensed ecologists. Though the great crested newt eDNA sampling was undertaken outside of the standard survey window, the results are considered to be robust in the sense that great crested newt, and their efts/ young of the year, remain in ponds until September⁷ and their eDNA, once shed, is detectable in the water for up to 21 days. The results are therefore robust in the sense that they establish the presence, or otherwise, of a great crested newt breeding population, if not the potential presence of a very small number of non-breeding adults, the majority of which tend to leave the water during the month of July⁶.

2.3.3 Quality Assurance and Environmental Management

The lead surveyors, Jim Flanagan, Hazel Douglas and Dan Alexander are members of the Chartered Institute of Ecology and Environmental Management (CIEEM) and follows the Code of Professional Conduct set out by the institute when undertaking ecological work. This report has been peer reviewed by Mr Gary Oliver, a Principal Ecologist with SLR Consulting, and full member of the Institute (MCIEEM), with over 24 years' experience within ecological consultancy.

2.4 Assessment Methodology

The CIEEM Guidelines for Ecological Impact Assessment in the UK (henceforth referred to as the CIEEM guidelines)⁸ form the basis of the impact assessment presented in this report.

⁷ Refer to the table on page 25 of the Great Crested Newt Mitigation Guidelines, Natural England (2001)

⁸ Chartered Institute of Ecology and Environmental Management (CIEEM) (2018) *Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland*

http://www.cieem.net/data/files/Publications/EclA_Guidelines_Terrestrial_Freshwater_and_Coastal_Jan_2016.pdf

2.4.1 Determining Importance

In accordance with the CIEEM guidelines only ecological receptors (habitats, species, ecosystems and their functions/ processes), which are considered to be important and potentially affected by the project should be subject to detailed assessment. It is not necessary to carry out detailed assessment of features that are sufficiently widespread, unthreatened and resilient to project impacts and will remain viable and sustainable, although these can be included in the assessment in order to demonstrate ecological enhancements, for example.

Ecological features are considered within a defined geographical context. For this project the following geographic frame of reference is used:

- International;
- National (i.e. UK);
- Regional (i.e. Yorkshire and the Humber);
- County (i.e. South Yorkshire); and
- Local (i.e. 2km).

For designated sites, importance should reflect the geographical context of the designation. For example, a Site of Special Scientific Interest would normally be considered nationally important.

In accordance with CIEEM guidelines the value of habitats has been measured against published selection criteria where available. Examples of relevant criteria include Annex 1 of the Habitats Directive, descriptions of priority habitats⁹, e.g. those included in Section 41 of NERC Act 2006, local Wildlife Site Criteria, and Habitat Action Plans (HAPs) contained within the Local Biodiversity Action Plan.

In assigning a level of value to a species, it is necessary to consider its distribution and status. Reference has therefore been made to published lists and criteria where available. Examples of relevant lists and criteria include: species of European conservation importance (as listed on Annexes II, IV and V of the Habitats Directive), and UK priority species, e.g. Section 41 species, and Birds of Conservation Concern¹⁰.

For the purposes of this assessment ecological features of Local importance or greater and/ or subject to legal protection have been subject to detailed assessment. Effects on other ecological features are considered unlikely to be significant in legal or policy terms.

2.4.2 Impact Assessment

The impact assessment process involves the following steps:

- identifying and characterising impacts;
- incorporating measures to avoid and mitigate (reduce) these impacts;
- assessing the significance of any residual effects after mitigation;

⁹ i.e. Priority habitats and species as listed in the UK and devolved administrations, as listed: <http://jncc.defra.gov.uk/page-5705>

¹⁰ Eaton, M.A., Aebischer, N.J., Brown, A., Hearn, R.D., Lock, L., Musgrove, A.J., Noble, D.G., Stroud, D.A., & Gregory, R.D. (2015). Birds of Conservation Concern 4: the population status of birds in the UK, Channel Islands and Isle of Man. *British Birds*, 108: 708-746.

- identifying appropriate compensation measures to offset significant residual effects (if required); and
- identifying opportunities for ecological enhancement.

Both direct and indirect impacts are considered. Direct ecological impacts are changes that are directly attributable to a defined action, e.g. the physical loss of habitat occupied by a species during the construction process. Indirect ecological impacts are attributable to an action which affects ecological resources through effects on an intermediary ecosystem, process or feature, for example increases in recreational pressure arising from the introduction of new residents.

For the purposes of this assessment, in accordance with CIEEM guidelines, a 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features or receptors'.

Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/ local nature conservation policy). Effects can be considered significant at a wide range of scales from international to local. For example, a significant effect on a Site of Special Scientific Interest is likely to be of national significance whilst a significant effect on a locally important population of a species is likely to be of local significance.

2.4.1 Avoidance, Mitigation, Compensation and Enhancement

A sequential process has been adopted to avoid, mitigate and compensate for ecological impacts. This is often referred to as the 'mitigation hierarchy' (i.e. avoid, mitigate, compensate, enhance).

It is important for the EclA to clearly differentiate between avoidance, mitigation, compensation and enhancement and these terms are defined here as follows:

- Avoidance is used where an impact has been avoided e.g. through changes in scheme design;
- Mitigation refers to measures which reduce or remedy a specific negative impact *in situ*;
- Compensation describes measures taken to offset residual effects, i.e. where mitigation *in situ* is not possible; and
- Enhancement is the provision of new benefits for biodiversity that are additional to those provided as part of mitigation or compensation measures, although they can be complementary.

3.0 SURVEY RESULTS

3.1 Desk Study

Relevant desk study data provided by the BBRC and DLRC are contained in Appendices 3 and 4 respectively and has been summarised below. Species records have not been included within these appendices but can be provided separately upon request.

3.1.1 Statutory Designated Sites

The Site and the surrounding 2km search radius do not contain any statutory designated sites, and statutory sites have therefore not been subject to further assessment.

3.1.2 Non-Statutory Designated Sites

The Site itself does not contain any non-statutory sites, although three Local Wildlife Sites (LWSs) occur within the 2km search radius, as summarised in Table 3-1 below (citations are provided in the relevant appendices):

Table 3-1:
Non-Statutory Local Wildlife Sites within 2km of the Site

Name of site	Central OS Grid reference	Distance from the Site ¹¹	Description
Bolton upon Dearne Wetlands LWS	SE 4580 0308	825m SW	Barnsley Wildlife Site mostly comprising semi-improved neutral grassland along with some marshy grassland, species-poor hedge, tall ruderal stands, a few patches of <i>Typha</i> sp. swamp and some scattered scrub
Hickleton Park LWS	SE 4821 0466	860m NE	Includes a large portion of woodland called Bella Wood which contains ancient woodland indicator plants. The largest part is a wooded parkland landscape with some cattle-grazed pasture as well as small areas of neutral, calcareous and acidic grassland.
Hickleton Golf Course LWS	SE 4795 0582	1.95km NE	Golf course containing remnants of older species-rich hedgerow and broad-leaved woodland along with some small ponds, some patches of unimproved neutral grassland, scrub and wooded streams supporting woodland flora

These non-statutory protected areas are not ecologically connected to the Site and lie a sufficient distance away not to be affected; they have therefore been omitted from further assessment.

¹¹ Distance measured to the nearest point

There is also a Royal Society for the Protection of Birds (RSPB) Nature Reserve known as Adwick Washlands, which lies on the north side of the River Dearne approximately 390m south of the Site. The reserve contains a range of open habitats featuring shallow waterbodies and scrapes that support several species of resident and non-resident waders and wildfowl.

The reserve is assessed as being of County importance, ecologically, and given its relative close proximity to the Site it has been subject to further assessment.

3.1.3 Species

The BBRC provided a total of 1,171 species records for the 2km search radius, whereas the DLRC provided 1,781 species records, as summarised below:

Birds

A total of 911 bird records was provided by BBRC for the period 2007-2018. The records relate to red and amber-listed BoCC and Schedule 1 protected species. Also included in the data were two old records of corn bunting (*Miliaria calandra*) dating from 1982 and 1984 with the latter for an un-specified location in Goldthorpe (SE40R). Ten bird records of birds relate to the 1km grid square in which the Site sits (SE4603) but only two of these, both records of willow warbler (*Phylloscopus trochilus*) dating from 2012, appear to relate to the Site itself.

A total of 581 bird records was provided by the DLRC with the vast majority dating between 2003-2018. A large proportion of these records were for areas in and around Adwick Washlands and at Bella Wood; as far as can be ascertained none of the records relate to the Site itself.

Bats

A total of seven records were provided by the BBRC, including a roost record of noctule (*Nyctalus noctula*) for the Goldthorpe area and a roost record for common pipistrelle (*Pipistrellus pipistrellus*) at Goldthorpe Primary School.

A total of seven bat records were also provided by the DLRC, four of which relate to common pipistrelle and one for soprano pipistrelle (*Pipistrellus pygmaeus*); a records was also provided for Daubenton's bat (*Myotis daubentonii*) at Wath Ings dating from 1967. and a more recent record of whiskered bat (*Myotis mystacinus*) from a location in Goldthorpe, north of the Site, dating from 1992.

Badger

There were no records of badger in the data provided by either the BBRC or the DLRC.

Other Mammals

BBRC provided a total of 190 records of water vole (*Arvicola amphibius*) with the records coming from two years of survey work undertaken in 2002 and in 2013. The 2013 records totalled 121, for Adwick Washlands and various locations along the River Dearne. Records of three other mammal species were provided, relating to harvest mouse (*Micromys minutus*) and brown hare (*Lepus europaeus*) at Adwick Washlands, and European hedgehog (*Erinaceus europaeus*) for a location in Thurnscoe.

DLRC provided 11 records of otter (*Lutra lutra*), mostly between 2005-2007) for sightings mainly on the River Dearne and 53 of water vole, the latter all dating from 2002 at Adwick Washlands and the River Dearne corridor. In addition there were two records of American mink (*Neovison vison*) dating from 2005 at Bolton on Dearne and Adwick. Records were also provided for European rabbit (*Oryctolagus cuniculus*), red fox (*Vulpes Vulpes*) and brown

rat (*Rattus norvegicus*); a 2005 record of red squirrel (*Sciurus vulgaris*) was provided for Thurnscoe, which is still awaiting full verification.

Amphibians

BBRC provided 16 records of four species of amphibian and this including four records of great crested newt dating from 2011 for two locations, three of which overlap the north-east boundary of the Site (SE 466 038) whilst the other was provided for a location 315m to the west of the Site, north-east of the Dearne Leisure Centre (SE 462 038). Each of the records relate to a single male. The three records from SE 466 038 was suspected to be for the same individual which was recorded on three dates: 6th April, 5th May and 26th May, during earlier surveys conducted by SLR Consulting¹²

DLRC provided nine records of four species of amphibian, including two for great crested newt, one of which is an unverified record dating from 2018 for a property located 40 metres to the north-east of the Site (at SE 46647 03854) and is reported to be for an observation of a single sub-adult ('4-5 inches in size') female outside the back door of a domestic property. The second record was much older (1970) relating to Barnburgh Hall Pond, located over 1km to the north-west of the Site.

Reptiles

The BBRC provided just one record of grass snake (*Natrix helvetica*) within the search area, dating from 2013 for Adwick Washlands.

A total of five records of grass snake was provided by DLRC with the two most recent records dating from 1995, one for a road kill on the A63 at Hickleton and another of a live specimen in a garden, also in Hickleton, both over 1km to the north-east of the Site.

Invertebrates

A total of 13 records of invertebrate were provided by BBRC, comprising four records of two species of butterfly and nine records of four species of moth of conservation concern. None of these records relate to the Site.

A total of 75 records of invertebrate were provided by DLRC, comprising mostly common species of beetles and butterflies from a variety of locations with the desk study search area, away from the Site itself.

Vascular plants

A total of seven records of two species of vascular plant was provided by BBRC, including two records of the hybrid of native bluebell and Spanish bluebell (*H. x massartiana*). None of the records relate to the Site.

A total of 1,032 records of vascular plants was provided by DLRC, including records of Schedule 9 invasive plants (see below).

Schedule 9 Species

A total of six records of Japanese knotweed and one record of giant hogweed were provided by the DLRC, none of which relate to the Site or surrounding land.

¹² SLR Consulting Limited (June 2011), Results of Great Crested Newt Surveys (SLR project reference 424.02437.00004).

3.2 Results of Habitat Survey

The results of the Extended Phase 1 Habitat Survey are illustrated in Drawing 1, whilst the various habitats present are described below:

3.2.1 Hedgerows

The Site boundary supports approximately 620m of mostly species-poor hedgerow, nearly all of which is overgrown, with gaps (Plate 1). The majority of the hedgerows are dominated by hawthorn (*Crataegus monogyna*), with blackthorn (*Prunus spinosa*) also being frequent in some hedgerows, whilst field maple (*Acer campestre*), dog rose (*Rosa canina*), elder (*Sambucus nigra*), and grey willow (*Salix cinerea*) were also recorded.

Hedgerow H6, a short section of hedgerow located along the northern Site boundary, comprises non-native cypress. Ditches associated with Hedgerows H1, H2 and H4 were found to be dry, relatively insignificant features.

Table 3-1:
 Summary of hedgerows on Site boundary

Ref (see Drawing 1)	Length (m)	Woody species present & frequency of occurrence	Condition	Status
H1	52	hawthorn (F), blackthorn (F), field maple (LF), dog rose (O), elder (LF), grey willow (R)	Overgrown, 5m gap at western end	Moderately species-rich
H2	180	hawthorn (LD), blackthorn (LD)	Overgrown, two gaps totalling over just over 20m	Species-poor
H3	130	hawthorn (D), elder (LF)	Overgrown in northern half, southern half mostly dense bramble	Species-poor
H4	165	hawthorn (D), elder (O)	Overgrown, gaps totalling less than 10m	Species-poor
H5	75	Hawthorn (LD), blackthorn (LD), elder (LF)	Overgrown, intact, dense growth	Species-poor
H6	18	Cypress hedge running along edge of adjacent property.	Managed by periodic trimming	Non-native

Key: D = dominant; LD = locally dominant; F = frequent; LF = locally frequent; O = occasional; R = rare

Given that hedgerows are a habitat of principal importance, they are deemed to be of local intrinsic ecological importance, and as such they have been subject to further assessment.

3.2.2 Scrub

This was widely distributed in much of the western half of the Site where bramble (*Rubus fruticosus* agg.) was the dominant species, forming large dense patches in places, some at least 2m in height, sometime occurring with abundant hedge bindweed (*Calystegia sepium*).

This scrub extended into the eastern half of the Site, where it was typically more scattered and here bramble often gave way to other species such as field rose (*Rosa arvensis*), dog rose, goat willow (*Salix caprea*) and grey willow.

Given that the areas of scrub essentially form an extension of the hedgerow habitat, which they abut, they have also been assessed as being of local ecological importance, and have been subject to further assessment.



Plate 1: Hedgerow H2 on the eastern Site boundary (looking north), showing the typical condition and form of the majority of the hedgerows on the Site boundary.

3.2.3 Marshy grassland

A relatively small area of rush-dominated marsh grassland occurs in the southern part of the Site (Plate 2). The swards support much compact rush (*Juncus conglomeratus*) which occurs alongside frequent hairy willowherb (*Epilobium hirsutum*) and creeping buttercup (*Ranunculus repens*), and lesser amounts of marsh willowherb (*Epilobium palustre*), marsh thistle (*Cirsium palustre*) and common figwort (*Scrophularia nodosa*).

Southern marsh orchid (*Dactylorhiza praetermissa*) and common spotted orchid (*Dactylorhiza fuschii*) were also recorded in good numbers within this area of marshy grassland (Plates 3 and 4).

Grasses formed only a minor component of the cover here and were represented mostly by Yorkshire fog (*Holcus lanatus*) and smooth meadow-grass (*Poa pratensis*).

The marshy grassland has been assessed as having local ecological importance and has been subject to further assessment.



Plate 2: View (looking north) of marshy grassland present in the southern part of the Site along with a low grass sward dominated by creeping buttercup with locally frequent southern marsh orchid.



Plate 3: Southern marsh orchid, found within marshy grassland



Plate 4: Common spotted orchid, found within marshy grassland

3.2.4 Poor semi-improved grassland

This was mostly located in area adjacent to the eastern boundary (Plate 5) and consisted of a sward dominated by tall coarse grass species such as false oat-grass (*Arrhenatherum elatius*), cock's-foot (*Dactylis glomerata*) and particularly common couch (*Elytrigia repens*). Some areas also contained herbs including creeping buttercup, ribwort plantain (*Plantago lanceolata*), common ragwort (*Jacobaea vulgaris*), dandelion (*Taraxacum officinale* agg.) and cleavers (*Galium aparine*), as well as locally frequent hogweed (*Heracleum sphondylium*) along with several small patches of bramble.

The poor semi-improved grassland has less than local ecological importance and has therefore not been subject to further assessment.



Plate 5: Poor semi-improved grassland comprising of coarse grass species and tall herbs.

3.2.5 Neutral semi-improved grassland

Small/ narrow patches of more species rich semi-improved grassland occur in a broken line, down the centre of the Site (as illustrated in Drawing 1).

The sward was largely comprised of Yorkshire fog and smooth meadow-grass; herbs were frequent and featured mainly ribwort plantain, dandelion, common cat's-ear (*Hypochaeris radicata*), creeping buttercup, smooth tare (*Vicia tetrasperma*), bird's-foot trefoil (*Lotus corniculatus*), yarrow (*Achillea millefolium*), red clover (*Trifolium pratense*), white clover (*Trifolium repens*), goat's-beard (*Tragopogon pratensis*), beaked hawk's-beard (*Crepis vesicaria*) and red bartsia (*Odontites verna*). A single plant of ox-eye daisy (*Leucanthemum vulgare*) was recorded in this area.

The narrow patches of neutral semi-improved grassland have been assessed as having local ecological importance and this habitat has been subject to further assessment.



Plate 6: View (looking north) of part of the narrow area of semi-improved neutral grassland which runs down the centre of the Site, in a broken line (as illustrated in Drawing 1).

3.2.6 Tall herb communities

Tall herb stands were extensive across the Site, especially so in the northern, central and western areas (Plate 7). In the north and centre of the Site hogweed was abundant; along the western areas of bramble encroachment common nettle (*Urtica dioica*), creeping thistle (*Cirsium arvense*), great willowherb and common ragwort formed locally extensive stands. In some places rosebay willowherb (*Chamaenerion angustifolium*) was particularly frequent.

Further south the range of tall herbs also included occasional teasel (*Dipsacus fullonum*), hoary ragwort (*Jacobaea erucifolia*) and bristly oxtongue (*Helminthotheca echioides*).

At the south-west corner of the Site the tall herb assemblage was locally enriched by the presence of hemlock (*Conium maculatum*), and on the opposite eastern boundary locally frequent Michaelmas daisy (*Aster* sp.) was recorded.

Overall, the tall herb communities were assessed as having local importance and were subject to further assessment.



Plate 7: View (looking south-east) of a part of the centre of the site that supports an abundance of hogweed

3.2.7 Off-Site habitats

The Site itself does not contain any water bodies, however a fairly well-vegetated ditch containing water lies 15m south-east of the Site (Plate 8) and an area of marshland that surrounds open water fringed by reedmace (*Typha latifolia*), rush (*Juncus* sp.) and other water-side vegetation lies approximately 30 metres to the south-east of the Site boundary (Plate 9). The marsh is shallow but muddy along some margins and abundant New Zealand pygmyweed (*Crassula helmsii*), a Schedule 9 species, was recorded in a few locations.



Plate 8: Ditch located approximately 15 metres to the south-east of the Site boundary.



Plate 9: Open water located within marshland approximately 30 metres to the south-east of the Site.

Immediately south of the southern Site boundary further extensive areas of marshy grassland and wet grassland occur (Plate 10).



Plate 10: View (looking south-west) of marshy grassland situated to the south of the southern Site boundary

The off-Site areas of marshy grassland, open water and ditch, lying to the south and south-east of the Site have been assessed as having local ecological importance, and have been subject to further assessment.

3.3 Results of Species Surveys

3.3.1 Reptile Presence/ Absence Survey

No reptiles were recorded on Site during the presence/ absence surveys conducted within August and September 2020. Reptiles have therefore been omitted from further assessment.

In addition, no amphibians were recorded beneath any of the refuges (see below).

3.3.2 Great Crested Newt eDNA Survey

Both the ditch and pond, located a short distance to the south of the Site, tested negative for great crested newt DNA (refer to Appendix 5), indicating that neither support a breeding population of great crested newt. As such, great crested newt have been omitted from further assessment.

3.3.3 Bat Survey

Bat Commuting Surveys

Neither of the surveys found evidence of bat commuting activity across the Site.

During the survey of 18th August, a moderate number of common pipistrelle and noctule passes were recorded, along with single passes by soprano pipistrelle and Myotis sp. The bats were observed mainly foraging around the hedgerows and scrub, around or close to the Site boundaries, but not in high numbers.

Bat activity levels were generally lower during the survey of 28th September, in comparison to the August survey; a single common pipistrelle was recorded foraging briefly on the eastern Site boundary before flying off-Site to the south, and low levels of common pipistrelle activity and a single noctule pass were recorded at the western Site boundary, and in the centre of the Site, with no clear direction of movement evident.

Static Bat Detector Surveys

The results of the static bat detector surveys are illustrated in Drawing 2, which shows the level of bat activity and the species composition of the bats involved, at all three sample locations, averaged throughout the August and September surveys.

From this it may be seen that noctule and common pipistrelle accounted for the highest levels of activity (reflecting the findings of the bat commuting surveys), with lesser amounts of soprano pipistrelle activity, and low levels of Myotis sp. activity.

The highest levels of bat activity were recorded by the detector placed within the small area of marshy grassland in the southern part of the Site (Location C in Drawing 2), even though only two bat species were recorded here, common pipistrelle and noctule. This is considered likely to relate to bats being recorded at both the western and eastern hedgerows, as well as at the short southern hedgerow; in other words, it is likely that the bulk of the activity relates to bats on the boundaries, rather than in the core of the Site, due to the narrow nature of the Site.

Overall, the Site has been assessed as being of local importance for foraging bats, and bats have been subject to further assessment.

3.3.4 Other Species/ Species Groups

Birds

Several species of passerine bird are likely to nest within boundary hedgerows/ scrub and scrub within the Site. The field, having been abandoned for a long period of time, is considered sub-optimal for ground nesting birds such as skylark (*Alauda arvensis*) due to its overgrown and somewhat 'enclosed' nature; certainly no skylark, or other ground-nesting species were recorded within the Site whilst undertaking any of the other surveys.

Overall, the Site is assessed as having less than local importance for breeding birds, however, as active bird nests (i.e. nests containing eggs or young, or in the process of being built) are protected under the Wildlife and Countryside Act 1981 (as amended) nesting birds have been discussed further within this report.

Hedgehog

The Site has some potential to support hedgehog, and this species has therefore been assessed as having local importance, and has been subject to further assessment.

Invertebrates

The Site has the potential to support some invertebrate interest and a single adult cinnabar moth (*Tyria jacobaeae*) was observed in June 2020. However, overall the Site has been assessed as having less than local importance for this group, and invertebrates have therefore not been subject to further assessment.

Badger

Neither the field, nor any of the associated field boundaries, support badger setts, and no badger field signs were recorded during the Survey. Badger has therefore been omitted from further assessment.

Otter and Water Vole

The Site does not contain any watercourses and only minor, dry ditches are present within some of the hedgerows, and therefore the Site does not have potential to support either water vole or otter, both of which are therefore removed from further assessment.

Invasive Species

No evidence of invasive Schedule 9 Wildlife and Countryside Act plant species, such as Japanese knotweed or Himalayan balsam, were recorded on or around the Site. As stated previously the pond within the areas of marshland located to the south-east of the Site was found to support the Schedule 9 New Zealand pygmyweed.

3.3.5 Summary of Important Receptors

Ecological receptors of local importance or above, which could potentially be affected by unmitigated development are summarised in Table 3-2 overleaf.

Table 3-2
Summary of Important Ecological Receptors Subject to Detailed Assessment

Ecological Receptor	Scale at which Feature is Important	Comments on Legal Status
Adwick Washlands RSPB Reserve (400 metres to south of Site)	County	Supports a wide variety of breeding and non-breeding birds, and other wildlife.
Hedgerows and scrub	Local	Hedgerows are a S41 habitat; hedgerows and scrub have potential to support nesting birds and foraging bats
Orchid-rich marshy grassland in south of Site	Local	Contains southern marsh orchid and common spotted orchid
Neutral semi-improved grassland	Local	Relatively species-rich and of value to invertebrates
Tall herb communities	Local	Relatively species-rich and of value to invertebrates
Marshy grassland, ditch and open water to the south/south-east of the Site	Local	Likely to be of value to a range of wildlife, located off-Site
Foraging & commuting bats	Local	Bats are a European Protected Species
Hedgehog	Local	S41 species, in decline
Nesting birds	Less than Local	WCA (nests and eggs/ young are protected)

Table Key:

HR: Conservation of Habitats and Species Regulations 2010 (as amended) (Habitats Regulations);

WCA: Wildlife & Countryside Act 1981 (as amended);

S41: Species of Principal Importance for the Purpose of Conserving Biodiversity in England, listed under Section 41 of NERC Act 2006

4.0 ASSESSMENT OF EFFECTS INCLUDING MITIGATION MEASURES AND PROPOSED BIODIVERSITY ENHANCEMENTS

4.1 Adwick Washlands RSPB Reserve

The Adwick Washlands RSPB reserve, a series of pools and wet grassland created from arable land from 2012, lie approximately 400 metres to the south of the Site ‘as the crow flies’. This reserve was established and is being managed mainly to create breeding habitat for waders such as snipe (*Gallinago gallinago*), lapwing (*Vanellus vanellus*) and redshank (*Tringa totanus*), along with farmland birds such as reed bunting (*Emberiza schoeniclus*), yellowhammer (*Emberiza citrinella*) and skylark¹³.

The reserve is accessible from the Dearne Way, which extends eastwards from Lowfield Road, and by a number of interconnected pathways (Plate 11). It also contains a number of raised vantage points, and a central observation area. Many of the pathways are separated from more sensitive parts of the reserve by a ditch and/or low post and rail fence, and a substantial electric fence (Plate 12).



Plate 11: A view (looking west) of one of the interconnecting paths linking the Dearne Way to the wider area of countryside on the east side of Bolton upon Dearne

¹³ www.rspb.org.uk/community/placestovisit/dearnevally/b/dearnevally-blog/archive/2012/02/17/adwick-washland-the-dearne-valley-s-newest-nature-reserve.aspx



Plate 12: View (looking north-west with a part of Bolton upon Dearne in the far distance) of one of the shallow scrapes of the Adwick Washlands RSPB reserve. In the foreground is well vegetated a deep ditch and electric fence which is aimed at restricting access to the open areas by predators and the Public

It is understood that the electric fence is designed ostensibly to prevent access by foxes (which may predate upon the young and/ or eggs of ground-nesting birds), but is also contains livestock, which are grazing a number of the compartments within the reserve, and acts as a highly effective barrier to the public and/ or their dogs/ pets. Farm gates and other potential access points support ‘Wildlife Only’ signs, stating that it is a criminal offence to disturb certain species of breeding bird and stating that people should stick to the paths. The reserve is therefore very robustly designed to restrict the movements of people to areas where they will not cause disturbance to ground-nesting birds, and other wildlife.

As such, the modest increase in visitor numbers likely to arise from the proposed development is unlikely to impact upon the reserve, its breeding waders and the other wildlife that it supports.

Furthermore, the Site is a sufficient distance from that Site such that construction-related impacts are unlikely to arise, and the houses, once built, will not result in visual disturbance.

In addition, the Development Site itself is not ‘functionally linked’ to the reserve, given that it is separated from the reserve by a large arable field.

No appreciable impact upon Adwick Washlands RSPB Reserve is therefore predicted.

4.2 Habitats

4.2.1 Native Hedgerow

The proposed site layout (Appendix 1) indicates that the majority of the boundary hedgerows are being retained. Areas of scrub within the Site are, however, being removed and no native scrub planting proposed.

The overall net impact upon hedgerows and scrub is therefore predicted to be adverse but not significant at the local level.

4.2.2 Orchid-Rich Marshy grassland

There is no scope to retain or recreate the marshy grassland within the proposed layout. However, it is recommended that the orchids, or soil containing the orchid seeds, is transferred to another nearby site, potentially including the marshland to the south and/or south-east of the Site, or to the Adwick Washlands RSPB Reserve, if permission can be obtained from the RSPB.

If an effective orchid translocation can be achieved then the impact is likely to be adverse but not significant locally.

4.2.3 Neutral semi-improved grassland

There is no scope to retain the small areas of neutral semi-improved grassland within the proposed layout, however, these areas are small and their loss is therefore adverse but not significant at the local level.

4.2.4 Tall Herb Communities

There is no scope to retain the tall herb communities within the proposed development layout. Although not a like-for-like replacement many of the gardens will support flowers which will provide, to some degree, alternative habitat and nectar sources for invertebrates, and other wildlife.

The overall net impact upon tall herb communities is therefore predicted to be adverse but not significant at the local level.

4.2.5 Marshy grassland, ditch and open water to the south and south-east of the Site

This area is not readily accessible on foot from the Site, and there are no footpaths or tracks running through the marshland located off-Site, suggesting that it will not be subject to increased levels of recreational pressure. As such no direct or indirect impact is predicted.

4.3 Species

4.3.1 Foraging Bats

As the majority of the boundary hedgerows are due to be retained the Site is likely to continue to support foraging and/ or commuting bats. Whilst the scrub, tall herb and grassland habitats within the Site shall be lost, gardens and street trees, once mature, will to some extent replace the loss of this habitat.

Overall the net impact upon foraging and/ or commuting bats is predicted to be adverse, but not significant.

4.3.2 Hedgehog

The Site has some potential to support hedgehog, and desk study data indicates that hedgehog occur in the local area. In order to ensure that hedgehogs are able to move around the Site, and between gardens, fences (dividing

plots) shall not act as a barrier. This will be achieved either by leaving 15 x 15 cm gaps at the base of fences at strategic locations (or 30cm wide x 15cm high gaps where these gaps straddle the boundary of two or more properties), particularly within the gardens of houses situated close to the Site boundaries, and away from roads, including internal access roads.

Each gap will be fitted with a sign/ label, clearly demonstrating what it's function¹⁴, to help ensure that as many of these gaps as possible are retained by new residents (see below, or similar), refer to Plate 13.

Whilst it is anticipated that there will be a reduction in the overall value of the Site for hedgehog, post-development, by introducing 'hedgehog highways; into the scheme gardens will be made accessible, and the overall net impact upon hedgehog is predicted to be adverse, but not significant in the local context.



Plate 13: Example of a 'hedgehog highway', and signage to inform occupants of purpose of the gaps.

4.3.3 Breeding Birds

Vegetation clearance will take place outside of the bird nesting season (which extends between March and August inclusive) if possible. If this is not possible then a pre-commencement survey shall be undertaken by a suitably qualified ecologist immediately prior to the removal of the vegetation (ideally within 24 hours of the vegetation removal taking place), and if bird nests are present these will be retained, along with a suitable buffer (typically five metres around the nest), until the young have fledged, or the nesting attempt is otherwise complete.

As such, no contravention of wildlife legislation is predicted.

¹⁴ <https://ptes.org/shop/hedgehog-highways-signs/hedgehog-highway-labels/>

4.4 Ecological Enhancement

4.4.1 Roosting Bats

The Site currently does not have potential to support roosting bats, therefore 10% of the properties (seven in total) shall have in-cavity bat boxes incorporated into them, as they are constructed. The majority of the bat roosting features shall be placed within gable ends, at height, and face south; they shall be placed close to the western and southern Site boundaries, adjacent to suitable bat commuting routes and foraging areas.

The overall net impact upon roosting bats will be positive, but not significant at the local level.

4.4.2 Nesting Birds

10% of the properties (seven in total) shall have bird boxes built into them as they are constructed or fitted to them externally, post construction. Three of the boxes shall be suitable for swift (*Apus apus*); three for house sparrow (*Passer domesticus*) and one for starling (*Sturnus vulgaris*).

This will provide nesting opportunities for three species of bird which are declining nationally, where such opportunities are absent at present.

4.5 Summary of Net Effects

The overall net impact of the scheme upon receptors of ecological importance is illustrated in Table 4-1 below, along with the proposed biodiversity enhancements.

Table 4-1:
Net Impact Upon Important Ecological Features (including Site Enhancement)

Ecological Receptor	Scale at which Feature is Important	Net Impact
Adwick Washlands RSPB Reserve	County	No impact predicted
Hedgerows and scrub	Local	Adverse (not significant)
Orchid-rich marshy grassland	Local	Adverse (not significant assuming orchids are translocated to an adjacent area)
Neutral semi-improved grassland	Local	Adverse (not significant)
Tall herb communities	Local	Adverse (not significant)
Marshy grassland, ditch and open water to the south of the Site	Local	No impact predicted
Foraging & commuting bats	Local	Adverse (not significant)
Hedgehog	Local	Adverse (not significant)
Roosting bats	N/A	Positive (not significant)
Nesting birds	Less than Local	No contravention of wildlife legislation predicted; positive for certain species

DRAWING 1

Results of Extended Phase I Habitat Survey



LEGEND	
	SITE BOUNDARY
	INTACT SPECIES-POOR HEDGEROW
	INTACT NON-NATIVE HEDGEROW
	FENCE
	SCATTERED SCRUB
	BRAMBLE DOMINANT HABITAT
	TALL HERB DOMINANT HABITAT
	MARSHY GRASSLAND
	SEMI-IMPROVED NEUTRAL GRASSLAND
	POOR SEMI-IMPROVED GRASSLAND
	HEDGEROW REFERENCE
	TARGET NOTE

UNIT 2, NEWTON BUSINESS CENTRE
THORNCLIFFE PARK ESTATE
NEWTON CHAMBERS ROAD
CHAPELTOWN
SHEFFIELD, S35 2PH
T: +44 (0)114 2455153
www.slrconsulting.com

LAND OFF WEST MOOR CROFT RD,
GOLDTHORPE

ECOLOGICAL IMPACT ASSESSMENT
(EcIA)

**EXTENDED PHASE 1 HABITAT
SURVEY**

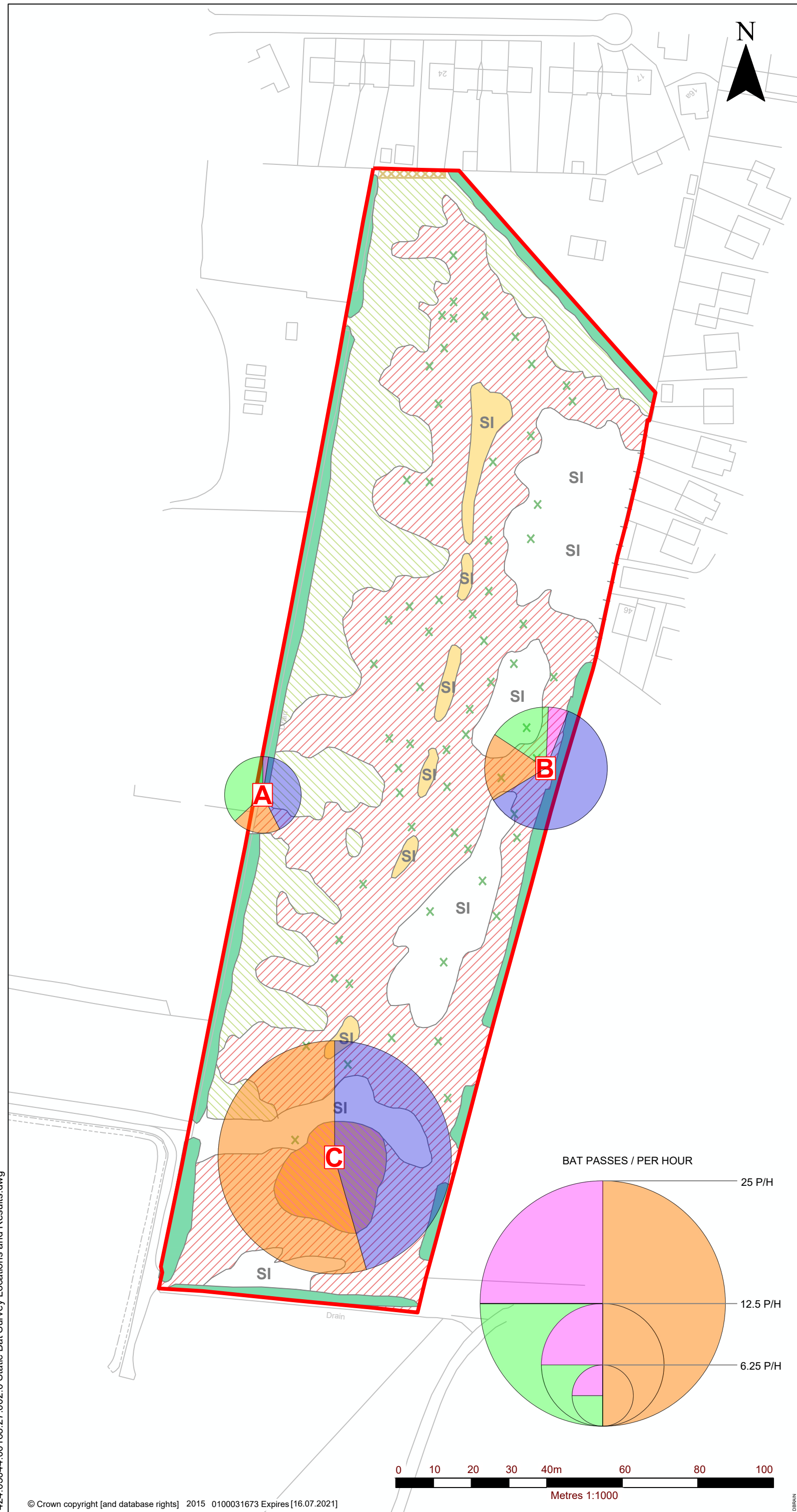
DRAWING 1

Scale 1:1000 @ A3	Date JUNE 2020
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424_03044_00168.27.001.0 Ex Ph 1 Hb Svy.dwg


DRAWING 2


Static Bat Detector Locations and Results of Survey



LEGEND

	APPLICATION SITE BOUNDARY
	STATIC BAT DETECTOR LOCATION AND REFERENCE
	COMMON PIPISTRELLE
	SOPRANO PIPISTRELLE
	MYOTIS sp.
	NOCTULE





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 CHAPELTOWN
 SHEFFIELD, S35 2PH
 T: +44 (0)114 2455153
 www.slrconsulting.com

LAND OFF WEST MOOR CROFT RD,
GOLDTHORPE

ECOLOGICAL IMPACT ASSESSMENT
(EcIA)

**STATIC BAT LOCATIONS AND
RESULTS OF SURVEY**

DRAWING 2

Scale 1:1000 @ A3	Date OCTOBER 2020
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APPENDIX 1

Proposed Site Layout



- Existing tree to be removed
- Existing tree to be retained and protected during construction to British Standard BS:1991.
- Areas of new tree planting see schedule for species
- New shrubs/ ground cover planting
- Grass to front garden
- Paving slab access paths to level threshold for principle entrance. Gradient not to exceed 1 in 12 for maximum 5.00m length
- 5.W. boarded vertical screen fence 1.80m high (100 x 22mm boards with 22mm gaps, 2No. 75 x 50mm rails, 100 x 100mm posts @ 1.875m centres).
- Plot division fence, 1.20m high timber.
- House type code reference number
- Plot number
- Garages location.
- Parking bays
- Show house & Sales office

HOUSE TYPE code	type	no
201	2 bed semi det/ terr	5
202	2 bed semi det	6
212	2 bed semi det	2
301	3 bed semi det	6
304	3 bed detached	11
309	3 bed semi det	9
311	3 bed semi det	3
313	3 bed semi det	3
314	3 bed detached	5
315	3 bed detached	7
401	4 bed detached	6
405	4 bed detached	6
TOTAL		69



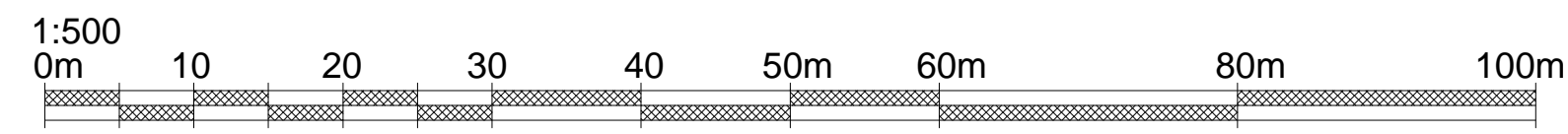
Richard Ward Design **RW**
 Chartered Architectural Technologist
 Architectural Design & Development Consultant
 Richard S. Ward 2. Burtram Close
 M.C.I.A.T. Weston Favell
 Telephone 01604 410943 Northampton NN3 3PH

BARNBURGH LANE GOLDTHORPE Ph.3

planning layout
GLEESON HOMES & REGENERATION

A] Existing sewer position added, plots 95-62 revised to suit. 09.06.20	Scale
B] Plots 11-12 revised, reduction of one plot and the rest of the development re-numbered. Road adj to P 57 shortened and 62-65 moved towards access road. Shared surface re-positioned adj P18/ 52. Visitors parking. Footpath link through open space and chicane road narrowing added. 15.02.20	1:500 at A1
C] Detail to pump station and access added. Footpath route revised. Garage to plots 27&29 omitted, drives revised. 15.09.20	Date 13.03.20
D] Garage to P26 moved forward, paired with P25 garage to avoid proposed sewer. 19.10.20	Draw No 1014/3C

**- NOT FOR USE ON SITE -
 PROVISIONAL LAYOUT DRAWING,
 SUBJECT TO PLANNING APPROVAL**



APPENDIX 2

Relevant Legislation and National Planning Policy

Relevant Legislation¹⁵

Conservation of Habitats and Species Regulations 2017¹⁶

The Conservation of Habitats and Species Regulations 2017 (the Habitats Regulations) 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 disturb¹⁷ 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 not present at the time).

Wildlife & Countryside Act 1981¹⁸

The Wildlife and Countryside Act 1981, as amended by the Countryside and Rights of Way Act (CRoW) 2000¹⁹ and the Natural Environment and Rural Communities Act (NERC) 2006²⁰, 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)²¹, 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; or
- Plant or cause to grow in the wild any plant species listed under Schedule 9 of the Act.

Protection of Badgers Act 1992²²

The Protection of Badgers Act 1992 makes it illegal to kill, injure or take a badger or to intentionally or recklessly interfere with a badger sett. Sett interference includes disturbing badgers whilst they are occupying a sett or

¹⁵ Please note that the summary of relevant legislation provided here is intended for general guidance only. The original legislation should be consulted for definitive information.

¹⁶ <http://www.legislation.gov.uk/ukxi/2017/1012/contents/made>

¹⁷ Disturbance, as defined by the Conservation of Habitats and Species Regulations 2017, includes in particular any action which impairs the ability of animals to survive, breed, rear their young, hibernate or migrate (where relevant); or which affects significantly the local distribution or abundance of the species.

¹⁸ www.opsi.gov.uk/RevisedStatutes/Acts/ukpga/1981/cukpga_19810069_en_1

¹⁹ www.legislation.hmso.gov.uk/acts/acts2000/20000037

²⁰ http://www.opsi.gov.uk/acts/acts2006/ukpga_20060016_en_1

²¹ eur-lex.europa.eu/LexUriServ/site/en/consleg/1979/L/01979L0409-20070101-en

²² http://www.opsi.gov.uk/ACTS/acts1992/ukpga_19920051_en_1

obstructing access to it.

Natural Environment & Rural Communities (NERC) Act 2006²³

The NERC Act 2006 places a duty on authorities to have due regard for biodiversity and nature conservation during the course of their operations.

Section 41 of the Act requires the publication of a list of habitats and species which are of principal importance for the purpose of conserving biodiversity, which is used to guide authorities in implementing their duty to have regard to the conservation of biodiversity.

Relevant Planning Policy

National Planning Policy Framework

The National Planning Policy Framework (NPPF, 2019)²⁴ sets out guidance for local planning authorities and decision-makers on how to apply planning policies when drawing up plans and making decisions about planning applications. Along with Government Circular 06/05²⁵, the broad policy objectives in relation to the protection of biodiversity and geological conservation in England through the planning system are set out.

Paragraph 170 d of the NPPF states that:

“Planning policies and decisions should contribute to and enhance the natural and local environment by:

- *Minimising impacts on, and providing net gains for, biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures.”*

Furthermore, Paragraph 171 states that plans should:

“.....take a strategic approach to minimising and enhancing networks of habitats and green infrastructure, and plan for the enhancement of natural capital at a catchment or landscape scale across local authority boundaries”.

Paragraph 174 states that:

“To protect and enhance biodiversity and geodiversity, plans should:

- a) Identify, map and safeguard components of local wildlife-rich habitats and wider 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 national and local partnerships for habitat management, enhancement, restoration or creation; and*
- b) Promote the conservation, restoration and enhancement of priority habitats, ecology networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity”.*

²³ http://www.opsi.gov.uk/acts/acts2006/ukpga_20060016_en_1

²⁴ Department for Communities and Local Government (February 2019) *National Planning Policy Framework*.

²⁵ Office of the Deputy Prime Minister. 2005. Government Circular: Biodiversity and Geological Conservation – Statutory Obligations and their Impact within the Planning System. ODPM Circular 06/2005.

Paragraph 175 goes on to state:

“When determining planning applications, local authorities should apply the following principles:

- a) If significant harm to biodiversity, resulting from a development cannot be avoided (through locating to an alternative site with less harmful impacts), adequately mitigated for, or, as a last resort, compensated for, then planning permission should be refused;*
- b) Development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments) should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;*
- c) Development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons, and a suitable compensatory strategy exists; and*
- d) Development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity”.*

APPENDIX 3

Desk Study Data from the Barnsley Biological Records Centre (BBRC)

Statutory and Non Statutory Local Wildlife Sites Within the Search Area

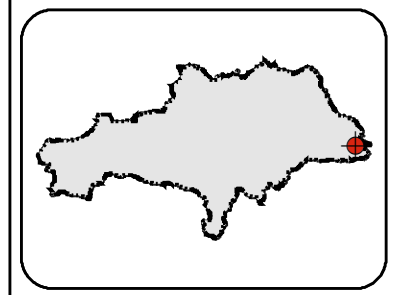
Barnburgh View



Key

- Centre of Search Area
- 1.5km Search Area
- LNR Natural England
- SSSI
- Barnsley Wildlife Sites
- Barnsley District Boundary

SHEFFIELD BIOLOGICAL RECORDS CENTRE



Map Created - 23 Jun 2020



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39. Bolton on Dearne Wetland

LWS Assessment and Phase 1 Survey

Prepared by
TEP

for

Barnsley Metropolitan Borough Council

January 2011
(Edited December 2011)

Genesis Centre
Birchwood Science Park
Warrington
WA3 7BH

T: 01925 844004
F: 01925 844002
E: tep@tep.uk.com
W: www.tep.uk.com



Site Name:	Bolton-on-Dearne Wetland
Site Area:	2.52ha
Survey Date:	September 2010
Nearest Settlement:	Bolton Upon Dearne
Grid Reference at Centre:	SE45773, 03094
Surveyor(s)	LAC, VG

Site Description:

Bolton-on-Dearne Wetland is adjacent to an active railway which forms the western border of the site. Residential developments of Bolton Upon Dearne lie beyond the railway and to the north.

A matrix of agricultural fields lies to the south and west of the site. Semi-improved neutral grassland covers the majority of the site. In the north west of the site there is an area of marshy grassland, where soft rush (*Juncus effusus*) is abundant. A species-poor hedge with trees, dominated by hawthorn (*Crataegus monogyna*), runs along the northern boundary of the site.

Within the site there are scattered areas of tall ruderal and two small areas of swamp that are dominated by greater reedmace (*Typha latifolia*). A strip of tall ruderal runs along the railway line, which forms the western boundary. Nettle (*Urtica dioica*) are abundant here and there is a scattering of bramble (*Rubus fruticosus* agg.) and goat willow (*Salix caprea*) scrub. In the south west corner, outside the site boundary, there is an area of standing water dominated by water soldier (*Stratiotes aloides*).

Important Species:

Water soldier (*Stratiotes aloides*) is recognised as a Near Threatened species in the Vascular Plant Red Data List.

Target Note:	TN1	
Habitat:	Species-poor hedge	
Species List:		
Scientific Name	Common Name	Frequency
<i>Crataegus monogyna</i>	Hawthorn	D
<i>Equisetum arvense</i>	Field Horsetail	O
<i>Betula pendula</i>	Silver Birch	O
<i>Arrhenatherum elatius</i>	False Oat-grass	O
<i>Quercus robur</i>	English Oak	O
<i>Rubus fruticosus</i> agg.	Bramble	O
<i>Salix cinerea</i> ssp. <i>cinerea</i>	Grey Willow	O
<i>Dryopteris dilatata</i>	Broad Buckler-fern	R
D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare		

Target Note:	TN2	
Habitat:	Standing water, marginal vegetation	
Species List:		
Scientific Name	Common Name	Frequency
<i>Stratiotes aloides</i>	Water-soldier	D
<i>Juncus effusus</i>	Soft Rush	F
<i>Ranunculus flammula</i>	Lesser Spearwort	F
<i>Typha latifolia</i>	Greater Reedmace	F
<i>Mentha aquatica</i>	Water Mint	F
<i>Carex hirta</i>	Hairy Sedge	O
<i>Ranunculus lingua</i>	Greater Spearwort	O
<i>Iris pseudacorus</i>	Yellow Flag Iris	O
<i>Equisetum fluviatile</i>	Water Horsetail	O
<i>Eleocharis palustris</i>	Common Spike-rush	O
<i>Cyperus longus</i>	Galingale	O
<i>Salix fragilis</i>	Crack Willow	O
<i>Lotus pedunculatus</i>	Marsh Bird's-foot Trefoil	O
<i>Caltha palustris</i>	Marsh-marigold	O
<i>Poa pratensis</i>	Smooth Meadow-grass	O
<i>Deschampsia cespitosa</i>	Tufted Hair-grass	O
<i>Juncus conglomeratus</i>	Compact Rush	O
<i>Alopecurus geniculatus</i>	Marsh Foxtail	O
<i>Juncus articulatus</i>	Jointed Rush	O
<i>Juncus inflexus</i>	Hard Rush	O
<i>Sparganium erectum</i>	Branched Bur-reed	O
<i>Bidens tripartita</i>	Trifid Bur-marigold	R
<i>Nymphaea species</i>	Water-lily	R
<i>Ranunculus sp.</i>	Water-crowfoot species	R
<i>Myosotis scorpioides</i>	Water Forget-me-not	R
<i>Alisma plantago-aquaticum</i>	Water-plantain	R
<i>Cirsium palustre</i>	Marsh Thistle	R

D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare

Target Note:	TN3	
Habitat:	Tall ruderal herbs, scattered scrub	
Species List:		
Scientific Name	Common Name	Frequency
<i>Urtica dioica</i>	Nettle	A
<i>Ranunculus repens</i>	Creeping Buttercup	F
<i>Rubus fruticosus agg.</i>	Bramble	F
<i>Holcus mollis</i>	Creeping Soft-grass	F
<i>Cirsium arvense</i>	Creeping Thistle	F
<i>Holcus lanatus</i>	Yorkshire-fog	F
<i>Galium aparine</i>	Cleavers	F
<i>Agrostis stolonifera</i>	Creeping Bent	F
<i>Arrhenatherum elatius</i>	False Oat-grass	F
<i>Lolium perenne</i>	Ryegrass	O
<i>Dactylis glomerata</i>	Cock's-foot	O
<i>Calystegia silvatica</i>	Large Bindweed	O
<i>Juncus effusus</i>	Soft Rush	O
<i>Crataegus monogyna</i>	Hawthorn	O
<i>Sambucus nigra</i>	Elder	O
<i>Heracleum sphondylium</i>	Hogweed	O
<i>Plantago lanceolata</i>	Ribwort Plantain	O
<i>Epilobium hirsutum</i>	Great Willowherb	O
<i>Chenopodium album</i>	Fat-hen	O
<i>Stachys sylvatica</i>	Hedge Woundwort	O
<i>Ranunculus acris</i>	Meadow Buttercup	O
<i>Artemisia vulgaris</i>	Mugwort	O
<i>Elytrigia repens</i>	Common Couch	O
<i>Taraxacum officinale agg.</i>	Dandelion	O

<i>Festuca rubra</i>	Red Fescue	O
<i>Arctium minus</i>	Lesser Burdock	O
<i>Sonchus oleraceus</i>	Smooth Sow-thistle	O
<i>Vicia cracca</i>	Tufted Vetch	O
<i>Cerastium fontanum</i>	Common Mouse-ear	O
<i>Trifolium pratense</i>	Red Clover	O
<i>Trifolium repens</i>	White Clover	O
<i>Lotus corniculatus</i>	Bird's-foot Trefoil	O
<i>Poa annua</i>	Annual Meadow-grass	O
<i>Phleum pratense</i>	Timothy	O
<i>Hypochaeris radicata</i>	Common Cat's-ear	O
<i>Juncus inflexus</i>	Hard Rush	O
<i>Centaurea nigra</i>	Knapweed	O
<i>Crococsmia x crocosmiiflora</i>	Montbretia	R
<i>Mycelis muralis</i>	Wall Lettuce	R
<i>Salix caprea</i>	Goat Willow	R
<i>Cirsium vulgare</i>	Spear Thistle	R
<i>Lotus pedunculatus</i>	Marsh Bird's-foot Trefoil	R
<i>Medicago lupulina</i>	Black Medick	R
<i>Fallopia convolvulus</i>	Black Bindweed	R
<i>Sonchus asper</i>	Prickly Sow-thistle	R
<i>Rosa canina</i> agg.	Dog Rose	R
<i>Senecio erucifolius</i>	Hoary Ragwort	R
<i>Bryonia dioica</i>	White Bryony	R
<i>Tripleurospermum inodorum</i>	Scentless Mayweed	R
<i>Gnaphalium uliginosum</i>	Marsh Cudweed	R
<i>Conyza canadensis</i>	Canadian Fleabane	R
<i>Geranium molle</i>	Dove's-foot Cranesbill	R
<i>Anisantha diandra</i>	Great Brome	R

D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare

Target Note:	TN4	
Habitat:	Species-poor hedge and trees	
Species List:		
Scientific Name	Common Name	Frequency
<i>Crataegus monogyna</i>	Hawthorn	D
<i>Urtica dioica</i>	Nettle	F
<i>Rubus fruticosus</i> agg.	Bramble	O
<i>Sambucus nigra</i>	Elder	O
<i>Hedera helix</i>	Ivy	O
<i>Geum urbanum</i>	Wood Avens	O
<i>Anthriscus sylvestris</i>	Cow Parsley	O
<i>Acer pseudoplatanus</i>	Sycamore	O
<i>Fraxinus excelsior</i>	Ash	O
<i>Prunus spinosa</i>	Blackthorn	O
<i>Corylus avellana</i>	Hazel	O
<i>Salix caprea</i>	Goat Willow	O
<i>Tamus communis</i>	Black Bryony	R
<i>Dryopteris filix-mas</i>	Male-fern	R
<i>Solanum dulcamara</i>	Bittersweet	R
<i>Calystegia silvatica</i>	Large Bindweed	R
<i>Epilobium montanum</i>	Broad-leaved Willowherb	R

D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare

Target Note:	TN5	
Habitat:	Marshy grassland	
Species List:		
Scientific Name	Common Name	Frequency
<i>Juncus effusus</i>	Soft Rush	A
<i>Epilobium palustre</i>	Marsh Willowherb	F
<i>Ranunculus repens</i>	Creeping Buttercup	F
<i>Holcus lanatus</i>	Yorkshire-fog	F
<i>Agrostis stolonifera</i>	Creeping Bent	F
<i>Lychnis flos-cuculi</i>	Ragged Robin	F
<i>Deschampsia cespitosa</i>	Tufted Hair-grass	F
<i>Equisetum arvense</i>	Field Horsetail	O
<i>Juncus bufonius</i>	Toad Rush	O
<i>Lathyrus pratensis</i>	Meadow Vetchling	O
<i>Salix cinerea ssp. cinerea</i>	Grey Willow	O
<i>Rumex obtusifolius</i>	Broad-leaved Dock	O
<i>Scrophularia auriculata</i>	Water Betony	O
<i>Rumex acetosa</i>	Common Sorrel	O
<i>Persicaria maculosa</i>	Redshank	O
<i>Festuca rubra</i>	Red Fescue	O
<i>Apium nodiflorum</i>	Fool's Watercress	O
<i>Carex nigra</i>	Common Sedge	O
<i>Iris pseudacorus</i>	Yellow Flag Iris	O
<i>Ranunculus flammula</i>	Lesser Spearwort	O
<i>Mentha aquatica</i>	Water Mint	O
<i>Persicaria amphibia</i>	Amphibious Bistort	O
<i>Juncus inflexus</i>	Hard Rush	O
<i>Typha latifolia</i>	Greater Reedmace	O
<i>Plantago lanceolata</i>	Ribwort Plantain	O
<i>Epilobium hirsutum</i>	Great Willowherb	O
<i>Filipendula ulmaria</i>	Meadowsweet	O
<i>Polygonum aviculare</i>	Knotgrass	O
<i>Chenopodium album</i>	Fat-hen	O
<i>Lotus pedunculatus</i>	Marsh Bird's-foot Trefoil	O
<i>Cirsium palustre</i>	Marsh Thistle	O
<i>Carex ovalis</i>	Oval Sedge	R
<i>Lemna minor</i>	Common Duckweed	R
<i>Juncus articulatus</i>	Jointed Rush	R
<i>Tripleurospermum inodorum</i>	Scentless Mayweed	R
<i>Myosotis sp.</i>	Forget-me-not species	R
<i>Juncus conglomeratus</i>	Compact Rush	R
<i>Achillea ptarmica</i>	Sneezewort	R
<i>Senecio aquaticus</i>	Marsh Ragwort	R
<i>Rumex crispus</i>	Curled Dock	R
<i>Potentilla reptans</i>	Creeping Cinquefoil	R
<i>Berula erecta</i>	Lesser Water-parsnip	R
<i>Lythrum salicaria</i>	Purple Loosestrife	R
<i>Geranium dissectum</i>	Cut-leaved Cranesbill	R
<i>Artemisia vulgaris</i>	Mugwort	R
<i>Potentilla anserina</i>	Silverweed	R
<i>Glyceria fluitans</i>	Floating Sweet-grass	R
<i>Epilobium sp.</i>	Willowherb species	R
<i>Hypericum tetrapterum</i>	Square-stalked St John's-wort	R
<i>Stachys palustris</i>	Marsh Woundwort	R
<i>Linaria vulgaris</i>	Common Toadflax	R

D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare

Target Note:	TN6	
Habitat:	Semi-improved neutral grassland	
Species List:		
Scientific Name	Common Name	Frequency
<i>Holcus lanatus</i>	Yorkshire-fog	F
<i>Rumex obtusifolius</i>	Broad-leaved Dock	F
<i>Lolium perenne</i>	Ryegrass	F
<i>Ranunculus repens</i>	Creeping Buttercup	F
<i>Agrostis stolonifera</i>	Creeping Bent	F
<i>Plantago lanceolata</i>	Ribwort Plantain	F
<i>Dactylis glomerata</i>	Cock's-foot	F
<i>Achillea ptarmica</i>	Sneezewort	O
<i>Juncus inflexus</i>	Hard Rush	O
<i>Poa trivialis</i>	Rough Meadow-grass	O
<i>Poa pratensis</i>	Smooth Meadow-grass	O
<i>Juncus conglomeratus</i>	Compact Rush	O
<i>Alopecurus pratensis</i>	Meadow Foxtail	O
<i>Odontites verna</i>	Red Bartsia	O
<i>Cerastium fontanum</i>	Common Mouse-ear	O
<i>Carex hirta</i>	Hairy Sedge	R
<i>Arrhenatherum elatius</i>	False Oat-grass	R
<i>Crepis capillaris</i>	Smooth Hawk's-beard	R

D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare

Management Issues:

The site is privately owned and is not currently accessible by the public, as the owner has previously had problems with fly-tipping/theft. The owner confirmed that they are intending to graze horses on the site, which will prevent scrub from encroaching but will have an adverse effect on the grassland.

During the 2010 survey a considerable amount of scrap metal was found on site, apparently originating from the breaker's yard which backs onto the site.

Diversity:

127 species were recorded during the September survey, which is a good diversity for such a small area (although some of these species were recorded from the adjacent pond).

The marshy grassland and swamp are relatively uncommon habitats in Barnsley, especially in a lowland urban setting such as this one.

Perhaps the most interesting feature is the offsite pond, which has a good diversity of marginal species and contains an abundant population of water soldier (*Stratiotes aloides*) an IUCN Red List 'Near Threatened' species.

Naturalness:

The habitats on site are relatively well established and are subject to natural processes.

Rare or Exceptional Features:

Lowland marshy grassland and swamp in an urban setting are relatively rare habitats. The adjacent pond and population of the 'Near Threatened' water soldier is also worthy of note.

Fragility:

There is a potential for pollution to affect the site, originating from the adjacent breakers yard.

The 2010 survey identified a considerably smaller area of marshy grassland and a larger area of dry semi-improved neutral grassland than the previous survey. This may be due to drainage changes for the site.

Typicalness:

Lowland marshy grassland and swamp are relatively uncommon habitats in the Barnsley area.

Recorded History & Cultural Associations:

The previous survey reported possible historical 'ridge-and-furrow' agriculture, however no evidence of this was found in the 2010 survey.

Connectivity within the Landscape:

The site is surrounded on two sides by the urban development of Bolton Upon Dearne, whereas much of the land use to the south is arable. The site is relatively well connected in the wider landscape via ditches, hedgerows and through the corridor of trees bordering the railway. Links to the larger area of wetland to the north could be improved.

Value for appreciation of Nature and Learning:

The Barnsley Boundary Walk runs close by to the south east of the site, however the site is privately owned and is currently not open to the public.

Recommendations:

The water-body that sits adjacent to the current western boundary of this site has considerable ecological value, as it contains water soldier (*Stratiotes aloides*), which is a Near Threatened plant. This area of water should be included within the site boundary.

This site is connected to a wider network of ditches and to the River Dearne and it has the potential to support water vole (*Arvicola terrestris*). A survey should be carried out to determine the presence of this species.

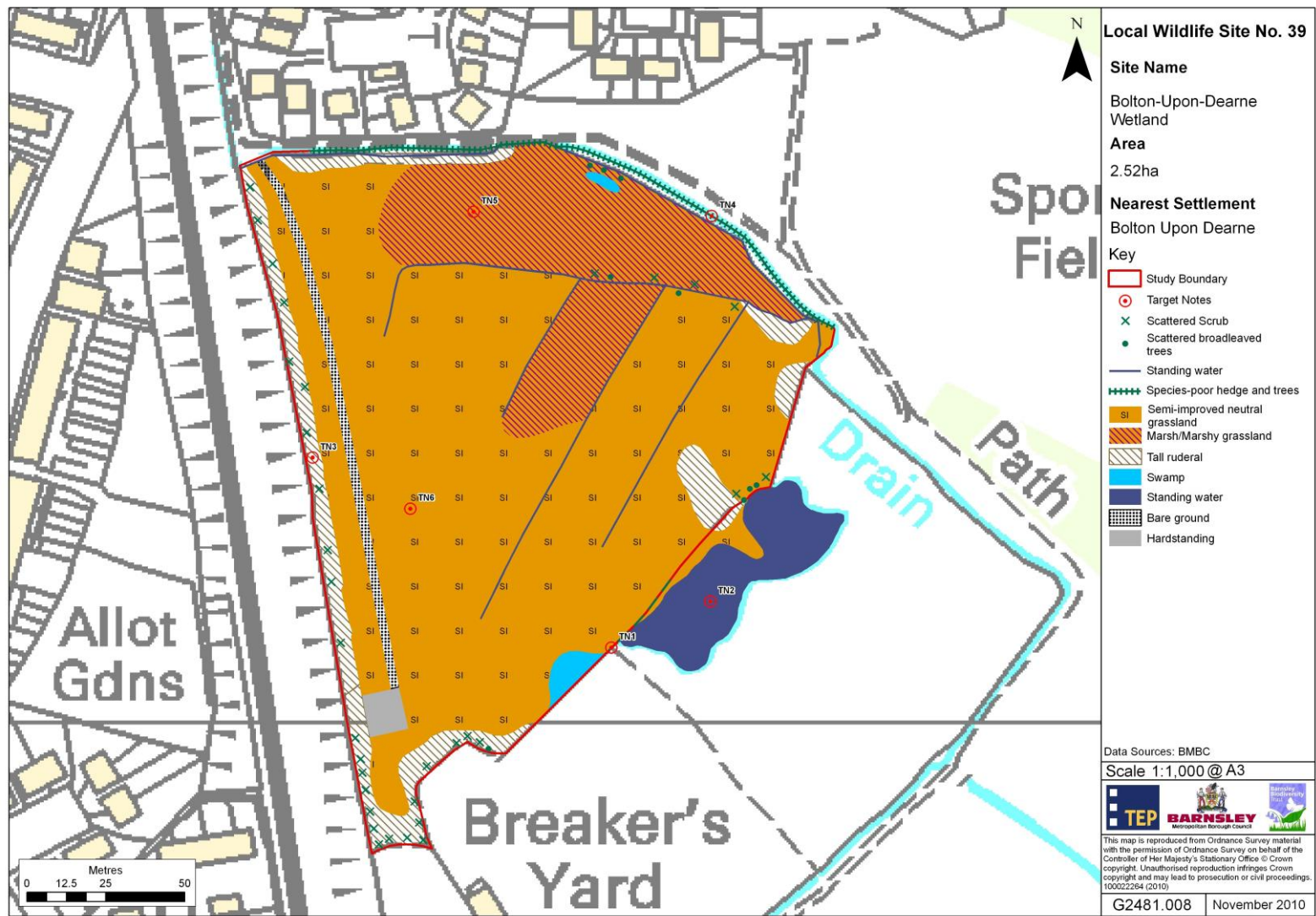
Habitat links to the larger area of wetland to the north could be improved.

Action:

Retain status as Local Wildlife Site

Extend site boundary to include the pond containing the water soldier

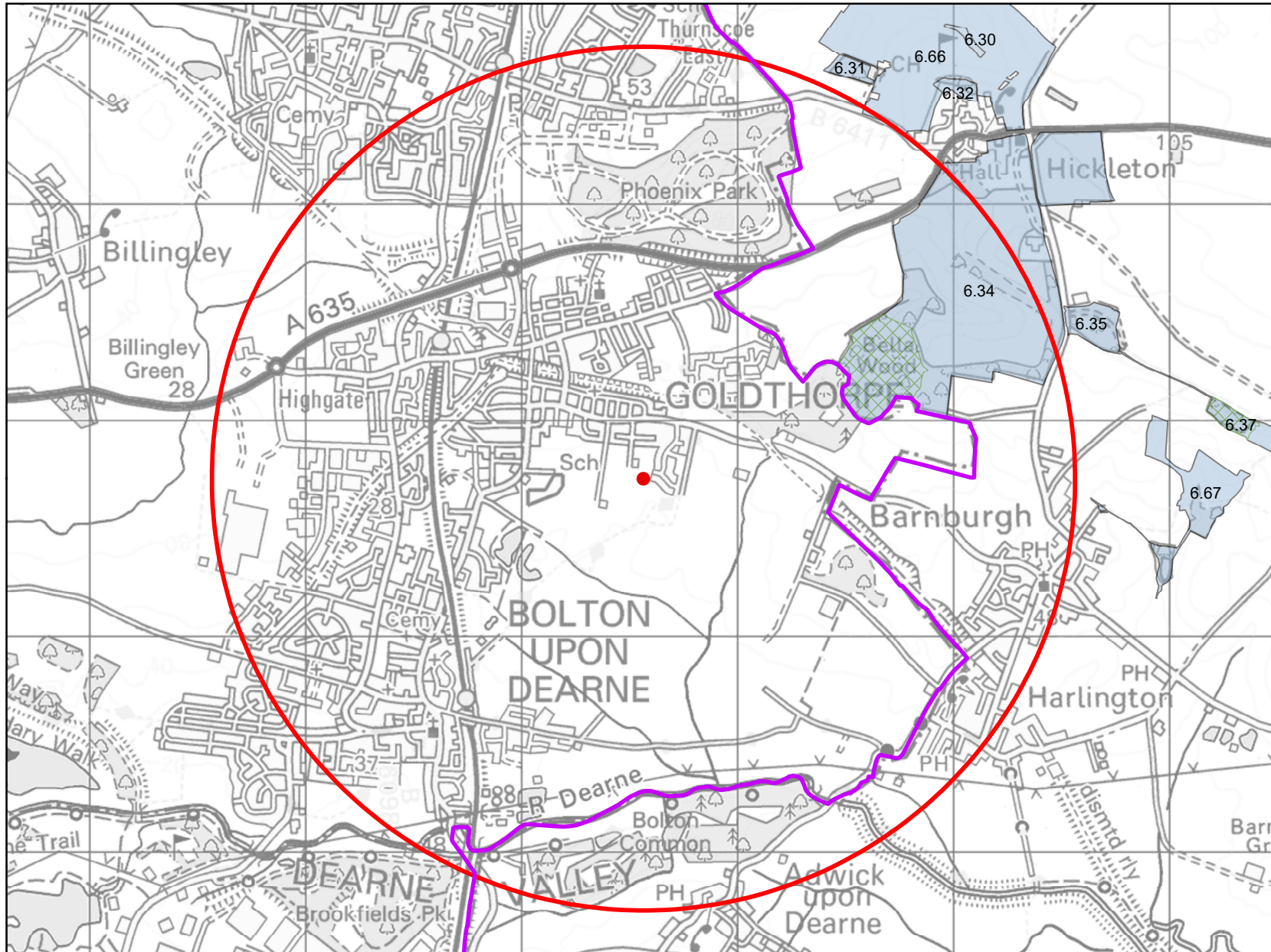
Carry out water vole survey to determine the sites' use and potential for expansion



APPENDIX 4

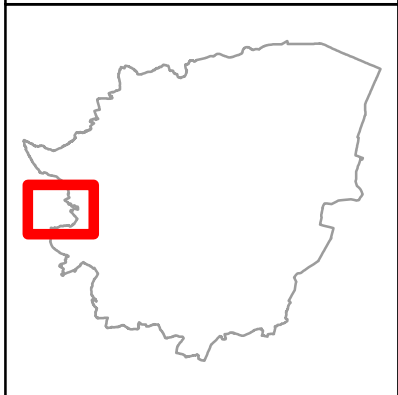
Desk Study Data from the Doncaster Local Records Centre (DLRC)

Appendix 2. Distribution of designated sites within the search area



Legend

- Centroid
- Ancient Woodland
- Local Wildlife Site
- Search area boundary



Client: SLR Consulting

Client Ref: Barnburgh View
Goldthorpe

LRC ref: 00801

Scope of search: 2km search on
centroid SE4656503726

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Completed by:
Bob Marsh

Map Reference:
Doncaster Local Records Centre

Date produced:
17/06/2020

Scale:
1:26,816



Appendix 3. Local Site(s) Citation

Site Status	Local Wildlife Site		
Site Code	6.34	Grid Reference	SE 480046
Site Name	Hickleton Park		
Site Owner	Private	Access	There is no presumption about Site Access
Site Area (ha)	93.89	Natural Area	Coal Measures
Geology	Carboniferous Mudstone		
Soil Type	Waterlogged loam/clay		
Aspect	South-west facing in part	Exposed Strata	No
Audit Species Recorded (within 1km grid square)			
- Invertebrates: White Letter Hairstreak (Satyrium w-album (Strymonidia w-album))			
- Vascular Plants: Autumn crocus(Meadow saffron(Naked ladies (Colchicum autumnale)			
Habitats Recorded	PBW (Broad-leaved Plantation Woodland) / SBW (Broad Leaved Scattered Trees) / SNG (Semi-improved Neutral Grassland) / SWE (Standing Water Eutrophic) / AM (Amenity Grassland) / HS (Hard Standing)		
NVC Affiliation	A9 / MG1 / MG7 / S14 / W8 / W10 / W16		
Criteria for LS Designation	WD2 / WD3 / WD5 / PK1 / GR2 / SW1 / SM1 / SM2		
Other Designations (on site or adjoining)	Parks and Gardens Greenspace		
Informative (on site or in locality)	Creeping Thistle (Cirsium arvense) Spear Thistle (Cirsium vulgare) Japanese Knotweed (Fallopia japonica) Broad-Leaved Dock (Rumex obtusifolius) Common Ragwort (Senecio jacobaea)		
Boundaries (Link to interactive map if available)	URL		
Site Description at last visit			
		13/07/2011	
Date of visit - 09 & 23/05/2011, 10 & 17/06/2011 & 13/07/2011			
<p>This large site comprises extensive areas of parkland/wood pasture, mixed deciduous woodland plantations and more formal ornamental gardens and trees. It is centred on Hickleton Hall, now utilised as a Sue Ryder Care Home, and located immediately south of Hickleton Village, at the junction of Hickleton Road and Barnsley Road. The general altitude lies between 50 - 110 m. A.O.D. and the surrounding land use is agricultural and residential housing.</p> <p>A fairly continuous area of mixed deciduous woodland plantation occupies the southern and south-western sectors of the site and continues part way around the eastern boundary as a thin shelter belt. Elsewhere, more ornamental planted woodland is located west of the Hall at the northern end. The parkland trees are scattered or locally frequent throughout the extensive central grassland zones, and typify the 'wood-pasture' or parkland landscape.</p> <p>The principal woodland area, Bella Wood, incorporating the narrow roadside strip extending from it, contains abundant sycamore (Acer pseudoplatanus) with locally abundant sessile oak (Quercus petraea), locally frequent pedunculate oak (Q. robur) and the hybrid (Q. x rosacea), silver and downy birch (Betula pubescens, B. pendula), beech (Fagus sylvatica), sweet chestnut (Castanea sativa), larch (Larix decidua) and ash (Fraxinus excelsior). Other species of scattered or local occurrence include wych and English elm (Ulmus glabra, U. procera),</p>			

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hornbeam (*Carpinus betulus*), rowan (*Sorbus aucuparia*), wild cherry (*Prunus avium*), common lime (*Tilia x europaea*), horse chestnut (*Aesculus hippocastanum*), yew (*Taxus baccata*) and Scots pine (*Pinus sylvestris*). Much of the canopy is quite mature, even-aged and regularly-spaced, indicating planted origin. The canopy is often 40 - 45 ft. in height, but elsewhere 30-35 ft, and regeneration is not generally well developed, although birch, oak and sycamore are all showing scattered spontaneous growth in some areas. There are scattered amounts of dead wood and occasional very old cut stumps. There has been recent woodland management to remove or thin some of the conifers. The woodland rides are wide, open and sunny and support an abundance of flowering herbs.

The more-ornamental woodland adjacent to the Hall contains widespread sycamore, with some wild cherry (*Prunus avium*), locally-frequent yew, laurel (*Prunus laurocerasus*), snowberry (*Symphoricarpos albus*), common lime and beech, and these species, with occasional horse chestnut, are also found as scattered mature trees throughout the pasture/parkland zones. Within the ornamental woodlands the herb layer is dominated by ivy (*Hedera helix*) and dog's-mercury (*Mercurialis perennis*) with some locally-dominant ramsons (*Allium ursinum*), and occasional patches of wood anemone (*Anemone nemorosa*). There is a clump of Japanese knotweed (*Fallopia japonica*) growing near a garden waste dumping area not far from an old quarry south of the Hall.

There is a scattered or elder (*Sambucus nigra*) shrub layer in the main woodland zones, and hawthorn (*Crataegus monogyna*) is a frequent hedge species fronting the road or in other edge situations. Other shrub species are generally scarce or local, and include scattered wild privet (*Ligustrum vulgare*), gooseberry (*Ribes uva-crispa*), blackthorn (*Prunus spinosa*), holly (*Ilex aquifolium*) and planted rhododendron (*Rhododendron ponticum*).

The species composition of the herb layer within the woodlands indicates calcareous, neutral and moderately acidic soil types. Bramble (*Rubus fruticosus*) is abundant in many areas and particularly beneath a dominant sycamore canopy, where it is associated with frequent wood millet (*Milium effusum*) and locally-frequent ground ivy (*Glechoma hederacea*), herb robert (*Geranium robertianum*), wood avens (*Geum urbanum*), yellow archangel (*Lamiastrum galeobdolon*), yellow pimpernel (*Lysimachia nemorum*), dog's mercury (*Mercurialis perennis*) and ivy (*Hedera helix*). Other species of scattered occurrence in this more-neutral soil type include hedge woundwort (*Stachys sylvatica*), dog rose (*Rosa canina*), hairy brome (*Bromopsis ramosa*), bluebell (*Hyacinthoides non-scripta*), wood false brome (*Brachypodium sylvaticum*) and red campion (*Silene dioica*).

The open sunny rides of Bella wood support a profusion of flowering herbs including bugle (*Ajuga reptans*), slender St John's-wort (*Hypericum pulchrum*), self heal (*Prunella vulgaris*), primrose (*Primula vulgaris*), meadow buttercup (*Ranunculus acris*) and wood speedwell (*Veronica montana*), as well as the common woodland herbs.

Within Bella wood there are two spring-fed streams which arise in the pastures around the Estate. The streams have been impounded by a dam to create a pond within the woodland. The dam is no longer maintained and the pond has long since silted up. These damper shady zones have locally-frequent giant fescue (*Festuca gigantea*), tufted hair grass (*Deschampsia cespitosa*), creeping buttercup (*Ranunculus repens*), enchanter's nightshade (*Circaea lutetiana*) and, rarely, hemp agrimony (*Eupatorium cannabinum*). Where there is permanent flow of water through the soils, rarer species such as marsh marigold (*Caltha palustris*), large bittercress (*Cardamine amara*), opposite-leaved golden saxifrage (*Chrysosplenium oppositifolia*), lady fern (*Athyrium filix-femina*) occur together with angelica (*Angelica sylvestris*), remote sedge (*Carex remota*), meadow sweet (*Filipendula ulmaria*), hairy St John's-wort (*Hypericum hirsutum*) and water mint (*Mentha aquatica*) under the canopy of alder (*Alnus glutinosa*), crack willow (*Salix fragilis*), and grey willow (*Salix cinerea*).

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More acidic soil types beneath sessile oak and birch have a herb layer of locally abundant creeping soft grass (*Holcus mollis*) with locally frequent bracken (*Pteridium aquilinum*) and wavy hair grass (*Deschampsia flexuosa*) with scattered honeysuckle (*Lonicera periclymenum*), foxglove (*Digitalis purpurea*), wood sage (*Teucrium scorodonia*), gorse (*Ulex europaeus*), broad buckler and male fern (*Dryopteris dilatata* and *D. filix-mas*).

In edge areas, on the fringes of the site especially the roadside woodland strips, a more ruderal vegetation type is present, associated with bramble and other species already described. In such zones, rosebay willowherb (*Chamerion angustifolium*), nettle (*Urtica dioica*) and hedge garlic (*Alliaria petiolata*) are locally frequent, together with scattered raspberry (*Rubus idaeus*) and lesser burdock (*Arctium minus*).

The extensive wooded parkland landscape comprises cattle-grazed neutral pasture which is generally species poor and dominated by perennial rye-grass (*Lolium perenne*), white clover (*Trifolium repens*), locally-frequent creeping thistle (*Cirsium arvense*), meadow and creeping buttercup (*Ranunculus repens*) and few other associates. There are one or two small zones where differences in topography produce hillocks or rising ground, which support a more diverse sward. Near the Hall is a steep bank of calcareous grassland with tor grass (*Brachypodium pinnatum*), upright brome (*Bromopsis erecta*), common knapweed (*Centaurea nigra*), ox-eye daisy (*Leucanthemum vulgare*), bird's-foot trefoil (*Lotus corniculatus*), meadow vetchling (*Lathyrus pratensis*), cowslip (*Primula veris*), salad burnet (*Sanguisorba minor*) and one or two plants of green hellebore (*Helleborus viridis*). By contrast, further down the slope within the cattle-grazed pastures is a stream, the banks of which have an acidic grassland sward.

The stream arises from a spring under shade of crack willows and meanders through a narrow band of cattle-poached areas of swamp and wet grassland with rushes and cuckoo flower (*Cardamine pratensis*), abundant fool's watercress (*Apium nodiflorum*), scattered common duckweed, soft and hard rush (*Juncus effusus* and *J. inflexus*), brooklime (*Veronica beccabunga*), locally-abundant creeping buttercup, scattered wavy bittercress (*Cardamine flexuosa*), plicate sweet-grass (*Glyceria notata*), greater bird's-foot trefoil (*Lotus pedunculatus*), bog stitchwort (*Stellaria alsine* (*uliginosa*)), and marsh foxtail (*Alopecurus geniculatus*).

The acidic grassland on the steeper banks is dominated by common bent (*Agrostis capillaris*), sheep's-fescue (*Festuca ovina*), heath grass (*Danthonia decumbens*) with sweet vernal-grass (*Anthoxanthum odoratum*), yellow oat grass (*Trisetum flavescens*), crested dog's-tail (*Cynosurus cristatus*). Herbs include locally-frequent cat's-ear (*Hypochaeris radicata*), tormentil (*Potentilla erecta*), harebell (*Campanula rotundifolia*), sheep's sorrel (*Rumex acetosella*), pignut (*Conopodium majus*), field woodrush (*Luzula campestris*), heath speedwell (*Veronica officinalis*), lesser stitchwort (*Stellaria graminea*), mouse-ear hawkweed (*Pilosella officinarum*) and bitter vetch (*Lathyrus linifolius*). Elsewhere the pasture is less steep and has been fertilized and highly improved and is dominated by perennial ryegrass and soft brome (*Bromus hordeaceus*) with very little else in the sward. An improved sward also dominated the grassland in the fields to the east of the Hickleton to Barnburgh Road.

The site also contains two areas of open water or wetland, identified on the map. The first of these, a circular ornamental pond near the Hall, has now been drained and grassed over and supports locally-abundant hairy sedge (*Carex hirta*), tufted hairgrass, cuckoo flower, jointed rush (*Juncus articulatus*), soft rush, creeping buttercup and square-stemmed St John's-wort (*Hypericum tetrapterum*). The second open water zone, identified as Loscoe Pond, is located within a zone of grazing pasture. Previous surveys found abundant broad-leaved pondweed (*Potamogeton natans*) and common duckweed (*Lemna minor*) in the open water itself, with a fringing extensive zone of emergent branched bur-reed (*Sparganium erectum*), scattered soft and hard rush and floating sweet-grass (*Glyceria fluitans*). The spring-fed water supply to the

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pond had very-recently been diverted away from the pond due to problems caused by unofficial angling and the pond is now dry. Litter and nuisance were becoming detrimental to the grazing stock. The water supply could be re-instated to re-fill the pond in future if the problems of trespassing can be overcome.

The area around the Hall itself is laid out in ornamental gardens and lawns. Some of the lawns to the east of the Hall have a variety of low-growing lime-loving herb species including yarrow (*Achillea millefolium*), wild strawberry (*Fragaria vesca*), rough hawkbit (*Leontodon hispidus*), common and greater knapweed (*Centaurea nigra* and *C. scabiosa*), common cat's-ear (*Hypochaeris radicata*), ox-eye daisy, bird's-foot trefoil, field woodrush, mouse-ear hawkweed, hoary plantain (*Plantago media*), cowslip, self-heal, orange hawkweed (*Pilosella aurantiaca*), bulbous buttercup (*Ranunculus bulbosus*), meadow buttercup, sweet violet (*Viola odorata*), early dog violet (*Viola reichenbachiana*) and grasses of calcareous swards, such as quaking grass (*Briza media*). Lady's mantle (*Alchemilla* sp.) was also found in previous surveys. A slightly-less diverse, more-neutral grassland is found around the Churchyard although the profusion of ox-eye daisy is allowed to flower in early summer.

Photos and Target Notes:

- TN1 Possible *Sium latifolia* (or *Berula*?) at SE4814804465
- TN2 Bitter vetch on unimproved grassy bank at SE4812304433
- TN3 Species-rich grassy bank at SE4805304488
- TN4 *Caltha palustris* in stream side wetlands at SE4787104566
- TN5 Mature hornbeam trees at SE4775704626
- TN6 *Hypericum pulchrum* at SE4766604252
- TN7 *Helleborus viridis* at SE4816604749
- TN8 *Helleborus viridis* at SE4816704782
- TN9 *Ranunculus auricomus* near ornamental pond at SE4814505085
- TN10 Japanese Knotweed near garden waste dumping area at SE4804505103

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Site Status	Local Wildlife Site		
Site Code	6.66	Grid Reference	SE 479057
Site Name	Hickleton Golf Course		
Site Owner	Private	Access	There is no presumption about Site Access
Site Area (ha)	49.59	Natural Area	Southern Magnesian Limestone
Geology	Permian/Jurassic/Eocene Limestone		
Soil Type	Well drained calcareous		
Aspect	Gentle slope	Exposed Strata	No
Audit Species Recorded (within 1km grid square)			
- Birds: Willow tit (<i>Parus montanus</i>) / Bullfinch (<i>Pyrrhula pyrrhula</i>) / Song thrush (<i>Turdus philomelos</i>)			
- Invertebrates: White Letter Hairstreak (<i>Satyrion w-album</i> (<i>Strymonidia w-album</i>))			
- Reptiles: Grass snake (<i>Natrix natrix</i> sub sp <i>helvetica</i>)			
- Vascular Plants: Tufted sedge (<i>Carex elata</i>) / Great horsetail (<i>Equisetum telmateia</i>)			
Habitats Recorded	NOT SURVEYED		
NVC Affiliation			
Criteria for LS Designation	WD2 / WD3 / WD5 / SW1 / SW2 / SM1		
Other Designations (on site or adjoining)	Greenspace		
Informative (on site or in locality)	Creeping Thistle (<i>Cirsium arvense</i>) Spear Thistle (<i>Cirsium vulgare</i>) Broad-Leaved Dock (<i>Rumex obtusifolius</i>) Common Ragwort (<i>Senecio jacobaea</i>)		
Boundaries (Link to interactive map if available)	URL		
Site Description at last visit	02/07/2013		
Date of visit – 02/07/2013			
<p>This site is a golf course formed over an extensive area of land consisting of original ridge and furrow, species-rich hedgerows and remnant parts of broadleaved woodland. Both the old meadow areas (now overplanted and 'rough' areas on the course) and the hedgerows still maintain a very mixed ground flora.</p> <p>The original areas on the golf course have ash (<i>Fraxinus excelsior</i>), hawthorn (<i>Crataegus monogyna</i>), oak (<i>Quercus robur</i>), alder (<i>Alnus glutinosa</i>), hazel (<i>Corylus avellana</i>) and holly (<i>Ilex aquifolium</i>). Many other species of trees have been planted on the golf course including various cultivars of rowan (<i>Sorbus aucuparia</i>), Swedish whitebeam (<i>Sorbus intermedia</i>) and cherries (<i>Prunus avium</i>). Many of these new plantations have mown grass beneath.</p> <p>On the western side of the golf course is sited a series small linear ponds, the lowest of which had been recently cleaned out. Construction of a replacement outlet channel was underway following the damage caused by flood events in recent years. The lower pond contains bulrush (<i>Typha latifolia</i>), soft, hard, jointed and compact rushes (<i>Juncus effusus</i>, <i>J. inflexus</i>, <i>J. articulatus</i> and <i>J. conglomeratus</i>) and water forget-me-not (<i>Myosotis scorpioides</i>). The upper two ponds have curled pondweed (<i>Potamogeton crispus</i>) and broadleaved pondweed (<i>Potamogeton natans</i>). Water crow foot (<i>Ranunculus aquatilis</i>) and lesser water parsnip (<i>Berula erecta</i>) have also been recorded here in previous surveys.</p> <p>Immediately behind the pond on the 1st fairway is a steep bank of unimproved neutral grassland which is a relict of species-rich pastures. It supports greater and common</p>			

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knapweed (*Centaruea nigra* and *C. scabiosa*), betony (*Betonica officinalis*), devil's-bit scabious (*Succisa pratensis*), tormentil (*Potentilla erecta*), great burnet (*Sanguisorba officinalis*) and an abundance of pignut (*Conopodium majus*). This herb-rich turf is also evident in the adjacent copse of young trees, suggesting that this has been planted over a similar fragment of species-rich turf.

The majority of the grassland on the site are derived from improved grass swards dominated by ryegrass (*Lolium perenne*), annual meadowgrass (*Poa annua*) with Yorkshire fog (*Holcus lanatus*) and false oat-grass (*Arrhanatherum elatius*) in some unmanaged areas of rough. Other areas of re-seeded grassland have a ridge and furrow topography and supports clovers (*Trifolium pratense* and *T. repens*), cowslip (*Primula veris*), oxeye daisy (*Leucanthemum vulgare*), meadow foxtail (*Alopecurus pratensis*), common sorrel (*Rumex acetosa*), self heal (*Prunella vulgaris*), daisy (*Bellis perennis*), meadow buttercup (*Ranunculus acris*) and yarrow (*Achillea millefolium*). A small bank of more-calcareous grassland is found on the northern perimeter of the golf course where upright brome (*Bromus erectus*) dominates the sward.

Relicts of the former farmed landscape survive in the form of several large mature hedgerow oak trees and old hedgelines which have been incorporated into the woodland planting. There are large, mature, white willow (*Salix alba*) at the head of the Thurnscoe Dike. The adjacent rough herbage is dominated by coarse grasses and tall ruderals including nettle (*Urtica dioica*) but also including some great burnet and greater willowherb (*Epilobium hirsutum*). Nearby is an area of scrub which still has some open grassy areas between. These grassy glades support locally-frequent common spotted orchid (*Dactylorhiza fuchsii*) and ox-eye daisy.

The central portion of Thurnscoe Dike flows through another separate woodland Local Wildlife Site known as Shrogs Plantation.

Species which were found in the woodland include, wood millet (*Milium effusum*), bluebell (*Hyacinthoides non-scripta*), bramble (*Rubus fruticosus*), wood sorrel (*Oxalis acetosella*), dog's mercury (*Mercurialis perennis*), cleavers (*Galium aparine*), herb Robert (*Geranium robertianum*), ivy (*Hedera helix*), cow parsley (*Anthriscus sylvestris*), yellow archangel (*Lamiastrum galeobdolon*), common dog violet (*Viola riviniana*), greater stitchwort (*Stellaria holostea*), lesser celandine (*Ficaria verna*), wild hop (*Humulus lupulus*), tufted hair grass (*Deschampsia cespitosa*), garlic mustard (*Alliaria petiolata*), water mint (*Mentha aquatica*), ramsons (*Allium ursinum*), honeysuckle (*Lonicera periclymenum*), meadowsweet (*Filipendula ulmaria*), bugle (*Ajuga reptans*), cuckoo pint (*Arum maculatum*), remote sedge (*Carex remota*), Yorkshire fog (*Holcus lanatus*) and dandelion (*Taraxacum officinale*).

Thurnscoe Dike is a wooded stream which flows in a deep gully. The banks are of firm clayey soils with shaley stones on the bottom of the channel. The shading of the channel means that there are no emergent or aquatic species. The banks are generally bare except for the trailing ivy and scattered broad buckler fern (*Dryopteris dilatata*), male fern (*Dryopteris filix-mas*), remote sedge and wavy bittercress (*Cardamine flexuosa*). A similar habitat occurs along the tributary stream which flows in a shallow wooded valley on the western edge of the golf course but here lady fern (*Athyrium filix-femina*) is locally-abundant. This western stream is bordered by a scrub woodland of hawthorn and the herb layer includes dog's-mercury, ivy, hedge woundwort (*Stachys sylvatica*), scattered garlic mustard, wild garlic and wood sorrel. The woodland in the upper reaches have a typically calcareous ground flora which includes wood frequent false brome (*Brachypodium sylvaticum*), wood anemone (*Anemone nemorosa*) and bluebell.

Another shallow dry drainage channel runs along the northern side of the adjacent Calf Croft LWS. This drain is heavily shaded by the adjacent woodland but includes species such as angelica (*Angelica sylvestris*), guelder rose (*Viburnum opulus*) and greater horsetail (*Equisetum telmateia*).

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APPENDIX 5

Results of Great Crested Newt eDNA Survey

Folio No: E8680
Report No: 1
Purchase Order: 424/1355
Client: SLR CONSULTING LTD
Contact: Gary Oliver

TECHNICAL REPORT

ANALYSIS OF ENVIRONMENTAL DNA IN POND WATER FOR THE DETECTION OF GREAT CRESTED NEWTS (TRITURUS CRISTATUS)

SUMMARY

When great crested newts (GCN), *Triturus cristatus*, inhabit a pond, they continuously release small amounts of their DNA into the environment. By collecting and analysing water samples, we can detect these small traces of environmental DNA (eDNA) to confirm GCN habitation or establish GCN absence.

RESULTS

Date sample received at Laboratory: 28/08/2020
Date Reported: 11/09/2020
Matters Affecting Results: None

Lab Sample No.	Site Name	O/S Reference	SIC	DC	IC	Result	Positive Replicates
5364	Pond, Goldthorpe	SE46601 03529	Pass	Pass	Pass	Negative	0
5365	Ditch, Goldthorpe	SE46575 03560	Pass	Pass	Pass	Negative	0

If you have any questions regarding results, please contact us: ForensicEcology@surescreen.com

Reported by: Chris Troth

Approved by: Jennifer Higginbottom



METHODOLOGY

The samples detailed above have been analysed for the presence of GCN eDNA following the protocol stated in DEFRA WC1067 'Analytical and methodological development for improved surveillance of the Great Crested Newt, Appendix 5.' (Biggs et al. 2014). Each of the 6 sub-sample tubes are first centrifuged and pooled together into a single sample which then undergoes DNA extraction. The extracted sample is then analysed using real time PCR (qPCR), which uses species-specific molecular markers to amplify GCN DNA within a sample. These markers are unique to GCN DNA, meaning that there should be no detection of closely related species.

If GCN DNA is present, the DNA is amplified up to a detectable level, resulting in positive species detection. If GCN DNA is not present then amplification does not occur, and a negative result is recorded.

Analysis of eDNA requires scrupulous attention to detail to prevent risk of contamination. True positive controls, negative controls and spiked synthetic DNA are included in every analysis and these have to be correct before any result is declared and reported. Stages of the DNA analysis are also conducted in different buildings at our premises for added security.

SureScreen Scientifics Ltd is ISO9001 accredited and participate in Natural England's proficiency testing scheme for GCN eDNA testing. We also carry out regular inter-laboratory checks on accuracy of results as part of our quality control procedures.

INTERPRETATION OF RESULTS

SIC: **Sample Integrity Check** [Pass/Fail]

When samples are received in the laboratory, they are inspected for any tube leakage, suitability of sample (not too much mud or weed etc.) and absence of any factors that could potentially lead to inconclusive results.

DC: **Degradation Check** [Pass/Fail]

Analysis of the spiked DNA marker to see if there has been degradation of the kit or sample between the date it was made to the date of analysis. Degradation of the spiked DNA marker may lead indicate a risk of false negative results.

IC: **Inhibition Check** [Pass/Fail]

The presence of inhibitors within a sample are assessed using a DNA marker. If inhibition is detected, samples are purified and re-analysed. Inhibitors cannot always be removed, if the inhibition check fails, the sample should be re-collected.

Result: **Presence of GCN eDNA** [Positive/Negative/Inconclusive]

Positive: GCN DNA was identified within the sample, indicative of GCN presence within the sampling location at the time the sample was taken or within the recent past at the sampling location.

Positive Replicates: Number of positive qPCR replicates out of a series of 12. If one or more of these are found to be positive the pond is declared positive for GCN presence. It may be assumed that small fractions of positive analyses suggest low level presence, but this cannot currently be used for population studies. In accordance with Natural England protocol, even a score of 1/12 is declared positive. 0/12 indicates negative GCN presence.

Negative: GCN eDNA was not detected or is below the threshold detection level and the test result should be considered as evidence of GCN absence, however, does not exclude the potential for GCN presence below the limit of detection.



EUROPEAN OFFICES

United Kingdom

AYLESBURY

T: +44 (0)1844 337380

BELFAST

T: +44 (0)28 9073 2493

BRADFORD-ON-AVON

T: +44 (0)1225 309400

BRISTOL

T: +44 (0)117 906 4280

CAMBRIDGE

T: + 44 (0)1223 813805

CARDIFF

T: +44 (0)29 2049 1010

CHELMSFORD

T: +44 (0)1245 392170

EDINBURGH

T: +44 (0)131 335 6830

EXETER

T: + 44 (0)1392 490152

GLASGOW

T: +44 (0)141 353 5037

GUILDFORD

T: +44 (0)1483 889800

LONDON

T: +44 (0)203 691 5810

MAIDSTONE

T: +44 (0)1622 609242

MANCHESTER

T: +44 (0)161 872 7564

NEWCASTLE UPON TYNE

T: +44 (0)191 261 1966

NOTTINGHAM

T: +44 (0)115 964 7280

SHEFFIELD

T: +44 (0)114 2455153

SHREWSBURY

T: +44 (0)1743 23 9250

STAFFORD

T: +44 (0)1785 241755

STIRLING

T: +44 (0)1786 239900

WORCESTER

T: +44 (0)1905 751310

France

GRENOBLE

T: +33 (0)4 76 70 93 41

Ireland

DUBLIN

T: + 353 (0)1 296 4667