SF 3387 | CMS ROCKINGHAM

PRELIMINARY ECOLOGICAL APPRAISAL

December 2023 | For Planning
Revision A

SMEEDEN FOREMAN

Landscape Architecture • Ecology • Arboriculture

Quality Assurance

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REVISION HISTORY

Original report issued March 2023.

Revision A issued December 2023 to reflect habitat classification following LPA feedback.

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EXECUTIVE SUMMARY

Smeeden Foreman Limited has been commissioned by Carnell Management Services Ltd. to undertake an ecological assessment of their site off Kestrel Way, Birdwell, Barnsley (central grid reference SE 3495 0052) proposed for commercial development.

A desk study of relevant information has been undertaken including designated nature conservation sites and existing records of protected species; and initial site survey (UK Habitats Classification System).

Designated sites

Two statutorily designated nature conservation sites, and five non-statutorily designated sites, lie within 2km of the proposals site boundary. The proposals site falls within the Impact Risk Zone for Dearne Valley Wetlands Site of Special Scientific Interest (SSSI).

The relevant Natural England (NE) Geographic Information System (GIS) dataset indicates that the nature and scale of the proposed works may have the potential to impact upon these sites in the following way:

- Water supply: Large infrastructure such as warehousing/industry where net additional gross internal floorspace is >1,000m^2 or any development needing its own water supply;
- Discharges: Any discharge of water or liquid waste of more than 2m^3/day to ground (ie to seep away) or to surface water, such as a beck or stream.

Attenuation measures will be adopted on site to ensure the rate of discharge from surface water drainage does not exceed the current peak run-off rate and due to the type of development a separate water supply will not be required. In addition, drainage systems (where required) will incorporate oil and grit interceptors, with surface water from site to outfall into an existing sewer network located to the north of site. Standard accident procedures and working methods will also be implemented during construction to avoid impacts on water quality.

To ensure all measures outlined to mitigate water quality impacts to the notified features of the SSSI are appropriately secured, the production of a Construction Environmental Management Plan (CEMP) is recommended. Dust impacts are considered a risk to ecological receptors within 200 metres. Mitigation measures outlined in the dust IAQM guidance should also be secured in the CEMP.

Five non-statutorily designated sites are present within 2km of site; the closest of which being Potter Holes Plantation LWS, located 1km SW. No adverse impact upon the designated sites as a result of the proposed development are therefore anticipated provided recommended mitigation measures are in place.

Habitats

The majority of the site comprises Open Mosaic Habitats on Previously Developed Land (OMH) which is a UK BAP Priority Habitat. Collectively, these habitats are known to support a high diversity of wildflowers and invertebrates. The loss of this high distinctiveness habitat will require compensation off site. Hedgerows with associated trees and mixed scrub within the site are considered to be of some conservation value, as these provide suitable habitat for

breeding and roosting bird species, terrestrial habitat for herptiles, and foraging/commuting/roosting opportunities for bats and mammals in general.

In order to protect habitats of ecological value present and ensure that the proposed development provides enhancement to wildlife, the following is recommended, and with respect to landscape and trees, has been included within the landscape proposals (*SF3387 LL02* and *LL03 – Landscape Proposals*), and arboricultural survey report (*SF3387 Arboricultural Survey Report Rev D*):

- The retention of trees/hedgerow on site where possible, or replacement planting using native species;
- Planting of new hedgerows to boundaries where none currently exist and the gapping up of the existing hedgerows present along the southwestern and southeastern boundaries with appropriate native species;
- Inclusion of appropriate native tree /shrub planting and areas of wildflower seeding within the landscape proposals, along with the use of a species rich lawn mix where grass areas are required to be more frequently mown;
- Use of temporary protective demarcation and root protection fencing to protect retained areas/features;
- Use of directional lighting during construction and post-development, which will not shine upon the site boundaries, adjacent woodland and areas of existing/new planting.

Protected/notable species
The potential for the following protected and notable species to be affected by the development has been assessed with potential mitigation and further survey work as follows:

- Bats: Roosting- Tree T4 (referenced as Tree T24 within the arboricultural survey report: *SF3387 Arb Survey Report Rev D)*, was assessed as having moderate potential to support roosting bats and is recommended for removal, owing to its poor condition and safety concerns regarding its association with the proposed development. A climb and inspect survey is not possible due to health and safety reasons, and therefore bat emergence/re-entry surveys carried out during the appropriate survey season (May to September) are recommended. In the event of a bat roost being found a licence from Natural England may be required, with appropriate mitigation and working methods.
- Bats: Foraging/commuting habitat- Hedgerows along the site boundaries and adjacent woodland to the southwest, are suitable for use by bats for foraging and commuting purposes. General mitigation to include a sympathetic lighting scheme, incorporation of appropriate native species planting where feasible, and installation of pole mounted bat boxes;
- Breeding birds – Mixed scrub, trees and hedgerows have the potential to support a range of bird species, including those of conservation concern, such as song thrush, tree sparrow and dunnock. To mitigate the loss of potential bird nesting habitat on site, recommendations to be adopted within the proposals include the retention and sympathetic management of hedgerows and existing vegetation to site boundaries, appropriate native tree and shrub planting, and the installation of a range of suitable nest boxes. Precautionary working methods recommended for any vegetation clearance to be undertaken outside of the nesting bird period (March – August inclusive) unless checks by an appropriately qualified ecologist finds no active nests

immediately prior to clearance works commencing. To ensure that habitat networks for willow tits and other breeding birds of the Dearne Valley SSSI assemblage feature are preserved, it is recommended that any habitat enhancements should emphasise scrub creation and/or maintenance.

- Badger and hedgehog – Precautionary working methods are recommended to be adopted during construction works, which will include the covering, or providing a means of escape from, any trenches and capping any open pipework at the end of each working day, to prevent accidental harm to badger or other mammals which may access the site. Any tree/shrub cuttings from site will be removed once vegetation is cut so as to avoid the creation of brash piles; these may be attractive to hedgehogs, which could subsequently be harmed if the brash pile is burnt or removed, and gaps (0.15m) to be left under sections of any new fencing/walls (where applicable) to allow continued passage of hedgehog and maintain connectivity across the site;
- Reptiles - Habitats within the site are considered to be suitable for use by reptiles with areas of bare ground, hedgerows, scrub and brash/rubble piles providing opportunities for basking, foraging, cover and hibernation. However owing to the distance and severance of existing records from site, and historical occurrence of the records, no adverse impact upon reptiles is anticipated as a result of the proposed development. No further survey for this species is therefore considered necessary.
- Great crested newt, water vole, otter and white-clawed crayfish – No impact upon these species is anticipated as a result of the proposed development;

Subject to further survey with respect to roosting bats, the development is considered feasible provided that mitigation and enhancement measures detailed within this report are incorporated within the site proposals and a bespoke compensatory solution to offset the loss of UK BAP Open Mosaic Habitat is agreed with local planning authority. Refer to the corresponding biodiversity net gain assessment for further details (*SF3387_Biodiversity Net Gain Assessment_CMS Rockingham_Rev B*, November 2023*).*

1.0 INTRODUCTION

1.1.1 Smeeden Foreman Limited has been commissioned by Carnell Management Services Ltd. to undertake an ecological assessment of their site off Kestrel Way, Birdwell, Barnsley (central grid reference SE 3495 0052), hereafter referred to as the 'site'.

1.1.2 This report will include the following information gathered by desk study and site survey (extended habitat survey utilising the UK Habitats Classification System):

- Proximity to statutory and non-statutory designated sites;
- Proximity to existing records of protected species; and,
- Site habitat appraisal and potential to support protected species.

1.1.3 A review of the above information will be made to identify any features or sites of ecological interest which may be affected by the development proposals. Where potential impacts or protected species are identified the need for mitigation measures and requirements for further surveys will be discussed.

1.1.4 The report has been commissioned to inform a planning application for the construction of 7NO. Factory Units for class Classes E(g) (office/research & development/light industry) with ancillary trade counter (use class sui generis) usage within the Town and Country (Use Classes) Order, B2 – General Industrial & B8 – Storage & Distribution, and including all associated external works.

1.1.5 The methodologies used to survey and assess the ecological value and potential impacts on the site are based upon guidelines produced by the Chartered Institute of Ecology and Environmental Management (CIEEM) (Guidelines for Preliminary Ecological Appraisal, 2017 and Guidelines for Ecological Impact Assessment, 2018).

2.0 SITE DESCRIPTION

2.1.1 The site is located to the east of Junction 36 of the M1, approximately 5.7km to the south of Barnsley town centre (refer to *Figure 01* below). The site itself is predominantly comprised of ruderal/ephemeral vegetation, with areas of mixed scrub, individual trees, hedgerows, bare ground and hardstanding.

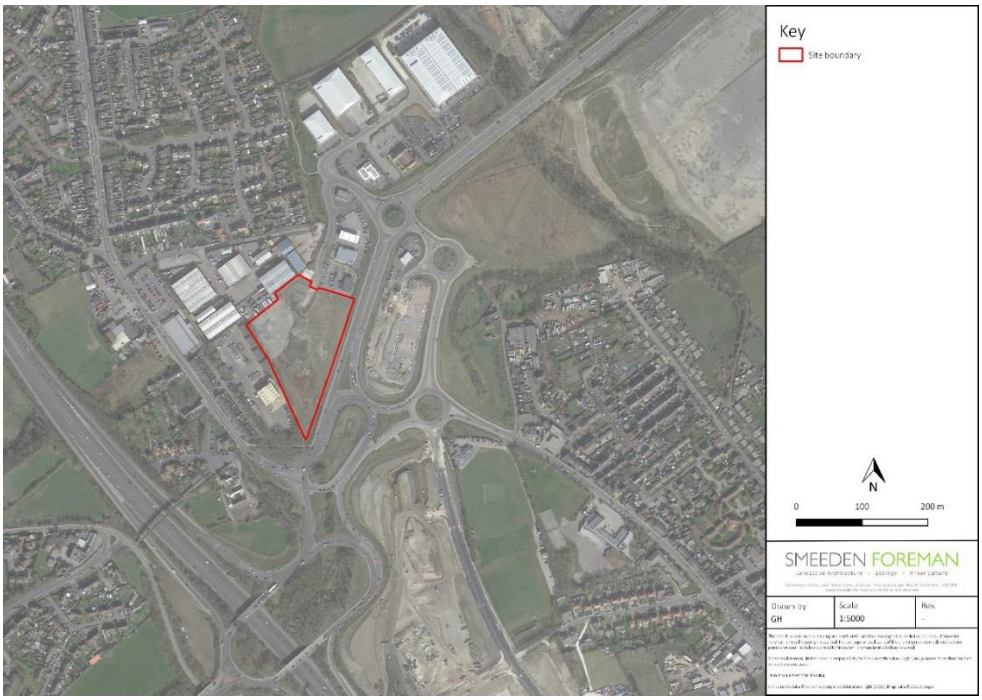

Figure 01: Aerial view of site location

2.1.2 Commercial and industrial units with associated access roads are adjacent to the north and west, with the A6195 Dearne Valley Parkway immediately adjacent to the east. An area of developing scrub/woodland is also located to the southwest of site.

2.1.3 Residential dwellings and commercial units are present within the surrounding landscape to the north, with additional areas of industrial/business development under construction, and occasional areas of farmland, woodland and tree belts to the south and east. The M1 is located approximately 0.3km west of site.

3.0 PRINCIPLE LEGISLATION AND POLICIES

3.1.1 The national nature conservation legislation and policies that may be relevant to the proposed development are listed below. A brief explanation of the principle legislation and policies relating to nature conservation, biodiversity and ecology is provided in Appendix 01.

Principle Legislation and Policies

- Wildlife and Countryside Act 1981 (*as amended*)
- EC Habitats Directive (92/43/EEC)
- EC Birds Directive (79/409/EEC)
- Conservation of Habitats and Species Regulations 2017 (*as amended*)
- Countryside and Rights of Way Act 2000
- Protection of Badgers Act 1992
- United Kingdom Biodiversity Action Plan (UKBAP)
- Natural Environment and Rural Communities Act (NERC), 2006 – Biodiversity Duty
- Hedgerow Regulations 1997
- National Planning Policy Framework (NPPF)

4.0 BASELINE INFORMATION

4.1 METHODOLOGY

4.1.1 The ecological interest of the site and its surroundings have been investigated by a combination of the following:

- Field survey of the site and immediate surroundings including a habitat survey;
- Consultation with relevant bodies to obtain existing protected species records and statutory / non-statutory designated sites information within 2km of the development site: Barnsley Biological Record Centre (BBRC) and South Yorkshire Bat Group (SYBG);
- The UK Biodiversity Action Plan (UKBAP);
- The Barnsley Local Biodiversity Action plan (LBAP);
- Magic map, a government website for nature conservation information; and,
- Aerial photographs.

4.2 NATURE CONSERVATION DESIGNATED SITES

Statutory Designations

4.2.1 Two statutorily designated nature conservation sites lie within 2km of the proposals site boundary including a site of special scientific interest (SSSI) and a local nature reserve (LNR). These sites are detailed within Table 01 below.

Table 01: Statutorily designated sites within 2km

Site Name	Designation	Grid reference	Location from site
Dearne Valley Wetlands	Site of special scientific interest (SSSI)	SE35290129	0.5km N, 1.5km N and 1.9km NW
Potter Holes Plantation	Local nature reserve (LNR)	SE34310001	0.8km SW

Site of special scientific interest (SSSI): A statutorily designated site – SSSI's provide statutory protection for sites considered to be of national importance for their wildlife and natural heritage value, following evaluation against published guidelines. They are originally designated by English Nature under the National Park and Access to the Countryside Act 1949 and re-notified under the Wildlife and Countryside Act 1981. Improved provisions for their protection and management were introduced in the Countryside and Rights of Way Act 2000.

Local Nature Reserve (LNR): A statutorily designated site - LNR's are designated by local authorities under the National Parks and Access to the Countryside Act 1949. They cover sites of local significance in terms of their nature conservation value and can contribute to opportunities for public education and enjoyment of wildlife. Local Authorities are required to consult English Nature regarding such designation and the criteria for site selection is published by them in 'Local Nature Reserves in England'.]

4.2.2 This site falls within the impact risk zone of Dearne Valley SSSI, with the closest point located 0.5km NE of the site centre.

4.2.3 The relevant Natural England (NE) Geographic Information System (GIS) dataset indicates that the nature and scale of the proposed works may have the potential to impact upon this statutory site within the following criteria:

Site Check Report Report generated on Mon Dec 05 2022
You selected the location: Centroid Grid Ref: SE34940037
The following features have been found in your search area:

Water Supply	Large infrastructure such as warehousing / industry where net additional gross internal floorspace is > 1,000m² or any development needing its own water supply .
Discharges	Any discharge of water or liquid waste of more than 2m³/day to ground (ie to seep away) or to surface water, such as a beck or stream.

4.2.4 Attenuation measures will be adopted on site to ensure the rate of discharge from surface water drainage does not exceed the current peak run-off rate and due to the type of development a separate water supply will not be required. In addition, drainage systems (where required) will incorporate oil and grit interceptors, with surface water from site to outfall into an existing sewer network located to the north of site. Standard accident procedures and working methods will also be implemented during construction to avoid impacts on water quality.

4.2.5 Natural England advises that dust impacts are a risk to ecological receptors within 200 metres. The Air Quality Assessment (dated July 2023) states that the mitigation outlined in the dust IAQM guidance will be used.

4.2.6 No other European or national statutory designated sites are present within 2km of the proposed development site such as Ramsar Sites, Special Protection Areas (SPA),

Special Areas of Conservation (SAC), National Nature Reserves (NNR), Areas of Outstanding Natural Beauty (AONB) and National Parks.

Non-statutory Designations

4.2.7 Barnsley Biological Records Centre provided information on five non-statutorily designated sites within 2km of the proposals site. These sites are detailed in Table 02 below with additional descriptions of their corresponding designations.

Table 02: Non-statutorily designated sites within 2km

Site Name	Designation	Grid reference	Location from site
Barrow Colliery Site	LWS 51	SE3604802803	2km NE
Potter Holes Plantation	LWS 56	SK3422099876	1km SW
Rockley Woods	LWS 23	SE3323601574	2km NW
Short Wood & Hay Green	LWS 30	SE3547401697	1.3km NE
Sowell Pond	LWS 43	SK3363499474	1.7km SW
Local wildlife site (LWS): A non-statutorily designated site- LWS's areas identified and selected locally for their wildlife value. The designation is non-statutory but is recognition of a site's significance with many LWS being of county and often regional importance for wildlife. Examples range from field ponds, streams and reed beds, to ancient woodlands, flower-rich meadows and hedgerows. This designation is equivalent to a SINC. This designation is used by local authorities to allow the ecological value of a site to be considered within the planning system.			

4.2.8 Refer to *Appendix 02* which shows the locations of the designated sites in relation to the site.

4.3 EXISTING SPECIES RECORDS

4.3.1 Existing biological records were provided following consultation with Barnsley Biological Records Centre (BBRC) and South Yorkshire Bat Group (SYBG). The records detailed in the following tables are those in closest proximity to the proposed development site within the 2km search area. The raw data provided by the records centre was extensive and is therefore not appended to the report but a copy can be provided on request.

Table 03: Protected species records within 2km (SBRC)

Species	Grid reference	Notes
Adder *Vipera berus*	SK340988	Four (historic) records. (1983-1990). The most recent record (01/01/1990) is located approximately 2km SW of site. The closest record (01/01/1988) is located near Potter Holes Plantation, approximately 1.8km SW of site.

Grass snake *Natrix natrix*	SE356015	Seven records. (1976-2016). The most recent and closest record (05/06/2016) is located near Shortwood Waste Ground, approximately 1.2km NE of site.
Great crested newt *Triturus cristatus*	SK3359999431	Seventy-three records. (1989-2017). The most recent record (04/05/2017) is located approximately 1.7km SW of site. The closest record (27/03/2011) is located approximately 1.3km SW of site.
Smooth newt *Lissotriton vulgaris*	SE35330081	Fifty-eight records. (1989-2020). The most recent and closest record (21/04/2020) is located near Dearne Valley Parkway (A6195), approximately 0.5km NE of site.
Barn owl *Tyto alba*	SE3600	Three records. (2006-2011). The most recent record (22/04/2011) is located approximately 1.1km SE of site. The closest record (15/06/2008) is located approximately 1km W of site.
Brambling *Fringilla montifringilla*	SE3501	Three records. (1997). The most recent and closest record (23/04/1997) is located approximately 0.4km N of site.
Common Quail *Coturnix coturnix*	SE353024	Two records. (2010) The closest and most recent record (16/07/2010) is located near Back Lane, Worsbrough Village, approximately 1.9km N of site.
Fieldfare *Turdus pilaris*	SE347023	Five records. (1996-2020). The most recent and closest record (01/07/2020) is located near Worsbrough Village Cemetery, approximately 1.8km N of site.
Garganey *Anas querquedula*	SE352014	Single record. (01/04/2017). This record is located approximately 0.9km NE of site.
Little ringed plover *Charadrius hiaticula*	SE358014	Five records. (2009-2010). The most recent record (29/04/2010) is located near Shortwood Way, approximately 1.2km NE of site. The closest record (01/01/2009) is located approximately 0.5km N of site.
Merlin *Falco columbarius*	SE3301	Single record. (12/09/1999). This record is located approximately 2km NW of site.
Redwing *T. iliacus*	SE361019	Seven records. (2004-2020). The most recent record (04/03/2020) is located near Shortwood Area, approximately 1.8km NE of site. The closest record (25/01/2009) is located near Barnsley, approximately 0.3km NW of site.
Brown long eared bat *Plecotus auritus*	SE35380091	Eight records. (2009-2019). The most recent and closest record (25/09/2019) is located

		near Dearne Valley Parkway, approximately 0.6km NE of site.
Common pipistrelle *Pipistrellus pipistrellus*	SE35820090	Ninety-two records. (2004-2020). The most recent record (18/05/2020) is located near land south of Dearne Valley Parkway (A6195), approximately 0.9km NE of site. The closest record (21/06/2018) is located near land west of Shortwood Business Park, approximately 0.4km N of site.
Daubenton's bat *Myotis daubentonii*	SE338021	Single record. (15/05/2013). This record is located near Rockley Furnace, approximately 2km NW of site.
Leisler's bat *Nyctalus leisleri*	SE3300	Three records. (1985-1986). The most recent and closest record (30/09/1986) is located approximately 2km SW of site.
Natterer's bat *M. nattereri*	SE33800215	Ten records. (1996-2014). The most recent and closest record (01/01/2014) is located near Rockley Furnace, approximately 2km NW of site.
Noctule *N. noctula*	SE35380108	Twenty-five records. (2004-2020). The most recent and closest record (18/05/2020) is located near Shortwood Business Park, approximately 0.7km NE of site.
Nyctalus species *N. sp.*	SE35380108	Five records. (2018-2020). The most recent and closest record (18/05/2020) is located near Shortwood Business Park, approximately 0.7km NE of site.
Pipistrelle species *P. sp.*	SE34760127	Fourteen records. (2000- 2019). The most recent and closest record (18/09/2019) is located near Hay Green Lane, Birdwell, approximately 0.7km NW of site.
Soprano pipistrelle *P. pygmaeus*	SE36070115	Eighteen records. (2018-2020). The most recent record (15/05/2020) is located near land south of Dearne Valley Parkway (A6195), approximately 1.3km NE of site. The closest record (15/04/2020) is located NE of Rockingham roundabout, approximately 0.5km NE of site.
Unidentified bat *Chiroptera*	SK36279985	Seven records. (1981-2020). The most recent record (01/06/2020) is located near Bluebell Close, approximately 1.5km SE of site. The closest record (24/08/1990) is located near Rockley Lane, approximately 0.9km NW of site.
Whiskered bat *M. mystacinus*	SK3487999720	Two records. (2019). The most recent and closest record (17/06/2019) is located near Tankersley House, Tankersley, approximately 0.8km S of site.

Table 04: Bat species records within 2km (SYBG)

Species	Grid reference	Notes
Brown long-eared bat	SE330020	Twenty-six records. (2001-2019). The most recent record (31/03/2019) is located near Boom Royd Wood, approximately 2km NW of site. The closest record (11/08/2009) is located near Tankersley Lane, approximately 0.7km S of site.
Common pipistrelle	SE345014	Fifty-one records. (2004-2021). The most recent record (24/08/2021) is located near Birdwell Primary School, Barnsley, approximately 1km NW of site. The closest record (20/08/2020) is located near Tankersley House, Tankersley, approximately 0.8km S of site.
Daubenton's bat	SE330020	Forty-three records. (1988-2019). The closest and most recent record (31/03/2019) is located near Broom Royd Wood, approximately 2km NW of site.
Leisler's bat	SE347016	Four records. (1986-2014). The closest and most recent record (07/07/2014) is located approximately 1.1km N of site.
Myotis species *M.sp.*	SE338021	Two records. (1996-2017). The closest and most recent record (15/12/2017) is located near Rockley Engine House, approximately 1.9km NW of site.
Natterer's bat	SE337021	Sixty-four records. (1988- 2021). The closest and most recent record (10/06/2021) is located near Rockley Engine House, approximately 1.9km NW of site.
Noctule	SE333019	Fourteen records. (1981-2020). The closest and most recent record (27/04/2020) is located near Rockleydyke Bridge, approximately 2km NW of site.
Noctule/ Leisler/ Serotine *N. noctula/leisleri/ Eptesicus serotinus*	SE343011	Two records. (1990). The closest and most recent record (1990) is located approximately 0.8km NW of site.
Nyctalus species	SE350029	Five records. (1979-1993). The most recent record (01/02/1993) is located near Hall Close, approximately 2km NW of site. The closest record (17/07/1986) is located approximately 1.7km NW of site.

Pipistrelle species	SE361005	Twenty-six records. (1981-2016). The most recent record (15/07/2016) is located approximately 1.1km E of site. The closest record (26/07/2007) is located near Walker Road, approximately 0.6km SW of site.
Soprano pipistrelle	SE33019	Twenty-three records. (1993-2020). The most recent record (26/08/2019) is located near Rockleydyke Bridge, approximately 2km NW of site. The closest record (02/03/2012) is located approximately 0.9km NW of site.
Unidentified bat	SE327019	Sixty-four records. (1977-2019). The most recent record (26/08/2019) is located near Wentworth Castle Gardens, approximately 2km NW of site. The closest record (28/06/2005) is located near Carr Lane, approximately 0.5km SE of site.
Whiskered bat	SE348997	Thirty-six records. (1989-2020). The most recent and closest record (24/08/2020) is located near Tankersley House, approximately 0.8km S of site.
Whiskered/ Brandt's bat M. *mystacinus/brandtii*	SE343986	Fifteen records. (2015). The most recent and closest record (13/06/2015) is located near Westwood Country Park, approximately 2km S of site.

4.3.2 Three European Protected Species Mitigation (ESPM) Licences were identified within the 2km search area. These are detailed within Table 05 below.

Table 05: EPSM licences granted within 2km

Licenced species	Location	Details including amendments
Bats: Brown long-eared bat, common pipistrelle, Whiskered bat	SE34789970, approximately 0.8km S.	2020-48285-EPS-MIT 31/07/2020- 30/11/2025 Damage of a resting place
Bats: Soprano pipistrelle, Natterer's bat	SE33980164, approximately 1.4km NW.	EPSM2013-6384 13/11/2013- 31/08/2015, Destruction of a resting place
Newts: Great crested newt	SK33699956, approximately 1.5km SW.	EPSM2009-1366 05/11/2010-30/11/2012 Destruction of a resting place

4.3.3 Two ponds located 1.8km south-west of site have returned positive results for the presence of great crested newt following environmental DNA surveys carried out by

Natural England to inform the District Level Licencing Scheme. The survey was undertaken in May 2017 (SE335994).

4.3.4 Badger have also been recorded within 1.5km of the proposals site.

4.3.5 No non-native invasive species included on Schedule 9 of the Wildlife and Countryside Act 1981 have been recorded within 2km of the proposals site.

4.3.6 Records of priority UK Biodiversity Action Plan species within 2km of the study area were provided for the following species:

Amphibians: common toad;

Birds: cuckoo, grey partridge, house sparrow, lapwing, reed bunting, tree pipit, tree sparrow, yellowhammer;

Insects: cinnabar, dingy skipper, latticed heath, small heath, wall brown, white-letter hairstreak;

Plants: cornflower, marsh stitchwort;

Mammals: European hedgehog, brown hare.

4.4 BIODIVERSITY ACTION PLANS

National Biodiversity Action Plan

4.4.1 The UK Biodiversity Action Plan (UK BAP) identifies priority species and habitats which are those considered to be the most threatened and therefore most in need of conservation action. The lists were updated in 2007 to include 1150 species and 65 habitats.

4.4.2 The UK Post-2010 Biodiversity Framework (July 2012) has succeeded the UKBAP, however priority species and habitats listed under the UKBAP remain a valuable reference source and have been used to inform statutory lists at a national level including Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 (England).

4.4.3 Priority habitats known to occur within 2km of the site include:

- Ancient woodland/ Semi – ancient woodland
- Broadleaved plantation
- Semi natural broadleaved woodland
- Semi-improved neutral grassland

4.4.4 During the walkover survey, hedgerows with associated trees located along the eastern and western site boundaries constitute priority habitat.

Local Biodiversity Action Plan

4.4.5 Habitat types for which action plans have been prepared for Barnsley Local Biodiversity Action Plan include:

- Amenity grassland and verges;
- Arable field margins;
- Blanket bog;
- Built-up areas and gardens;

- Floodplain grazing marsh;
- Hedgerow;
- Lowland dry acid grassland;
- Lowland fen;
- Lowland heathland;
- Mixed deciduous woodland;
- Neutral grassland or lowland meadow;
- Open mosaic on previously developed land;
- Parkland and wood pasture;
- Reedbed;
- Running water, rivers and streams;
- Rush pasture;
- Scrub;
- Standing water;
- Traditional orchards;
- Upland flushes, fens and swamps;
- Upland heathland;
- Upland oakwood, and;
- Wet woodland.

4.4.6 The dominant habitat on site is ruderal/ephemeral vegetation. Scattered scrub, standing water and hedgerows are also present.

4.4.7 Species for which action plans have been prepared for Barnsley Local Biodiversity Action Plan include:

- Amphibians;
- Birds;
- Fish;
- Invertebrates;
- Mammals;
- Plants, and;
- Reptiles.

4.4.8 Hedgerows with associated trees to site boundaries provide suitable foraging, commuting, and nesting opportunities for birds and mammals in general, with mixed scrub and brash piles providing potential opportunities for amphibians/birds/reptiles and mammals.

4.5 SITE SURVEY – HABITAT SURVEY

Methodology

4.5.1 A walk over survey was undertaken by ecologist Jarred Johnson BSc (Hons) MSc on 24th November 2022. A further walkover survey was undertaken by Barnsley County Ecologist Claire Wilson in October 2023.

4.5.2 Habitat types and key species were noted and are presented in accordance with the UK Habitats Classification System (Butcher *et al,* 2020a). This classification system includes the use of primary and secondary (2°) codes to provide further information on the habitat parcels present, where relevant, as described in more detail within individual habitat descriptions. Associated condition assessments were also undertaken for each habitat, in accordance with the Natural England technical supplement (Panks *et al,* 2022). Condition assessments have been used to inform the latest version of the Defra Metric (Version 3.1) with information detailed within the corresponding Biodiversity Net Gain Assessment.

Results

4.5.3 Habitats are referenced by number to correspond with locations and area/length measurements shown in *Figure 02.* Relative occurrences of botanical species present are provided within *Appendix 03,* with habitat photographs and details of the condition assessment criteria for each relevant habitat provided within *Appendix 04.*

4.5.4 Habitats on site have been assessed using the UKHabs Classification System and referenced for input within the corresponding Biodiversity Net Gain Tool. This system includes the use of secondary (2°) codes to provide further information on the habitat parcels present, where relevant, as listed below and described in more detail to follow:

Habitats

- Ref 1: u1a Open Mosaic Habitats on Previously Developed Land.
- Reference 2: Developed land; sealed surface - Hardstanding

Individually mapped

- w 1170 – Individual trees

Linear features

- H1: h2a – Hedgerows (priority habitat)
- H2: h2a – Hedgerows (priority habitat)
- H3: h2a – Hedgerows (priority habitat)

Habitat 1: u1a – Open Mosaic Habitat on Previously Developed Land

4.5.5 ***Habitat description****:* Sparsely vegetated land, comprised of early successional communities including open grassland, mosses, ephemeral and inundation vegetation, with areas of bare substrate. Areas of taller vegetation are present to the east of site, with shorter, more ephemeral vegetation associated with waste/disturbed habitats and to the west in association with bare ground. These areas of bare ground also contain ephemeral standing water and associated ruderal plant species to the west of site. Scattered, self-seeded native tree and shrub saplings are also present throughout this habitat. Scattered, developing native scrub is present to the south and west of site

with associated tall ruderals and rushes and brash/rubble piles. Areas to the south are heavily waterlogged with ephemeral standing water.

This mosaic of habitats occupy an area of 1.6 ha across site. Looking at historic aerial imagery, it is apparent that there has been disturbance and movement of soil across site. Although each of the five condition criteria for Open Mosaic Habitats are met resulting in a score indicating good habitat condition, this ground disturbance has only been taking place since 2018, resulting in a relatively young developing habitat with a low diversity of annual and ephemeral species. The walkover survey by the County Ecologist (Claire Wilson, Barnsley MBC) in early October 2023 revealed a higher diversity of species than the survey by the Smeeden Foreman ecologist in late November 2022. This is a result of the OMH becoming more established in the interim period, the less sub-optimal timing of an October site visit and a more mild autumn having been experience in 2023. Neither the 2022 or the 2023 site visits identified any rare species indicative of a developed Open Mosaic Habitat. A survey at a more suitable time of year would be required to reveal any rarer species. Such lack of established diversity for a UK BAP Priority Habitat would reduce the overall biodiversity value, despite a figuratively high condition score.

Given the above, and following dialogue with the LPA ecologist, it is considered appropriate to conclude the on-site OMH is of moderate condition. This is considered to better align with the current habitat condition, taking into account the reduced diversity of the component habitats present within the redline boundary.

Species composition: Grass/rush species are limited, with tufted hair grass *Deschampsia cespitosa,* cocksfoot *Dactylis glomerata,* creeping soft grass *Holcus mollis,* an oat grass *Arrhenatherum sp.,* and compact rush *Juncus conglomeratus* present. Tall ruderal areas consist of teasel *Dipsacus fullonum,* broadleaved dock *Rumex obtusifolius,* ragwort *Senecio jacobaea,* creeping thistle *Cirsium arvense,* spear thistle *Cirsium vulgare,* cow parsley *Anthriscus sylvestris,* mugwort *Artemisia vulgaris,* prickly sowthistle *Sonchus asper,* foxglove *Digitalis purpurea* and yellow melilot *Melilotus officinalis.* Species recorded within ephemeral areas comprise red clover *Trifolium pratense,* white clover *Trifolium repens*, black medic *Medicago lupulina*, creeping buttercup *Ranunculus repens*, dandelion *Taraxacum agg;* tufted vetch *Vicia cracca*, prickly sow thistle, ribwort plantain *Plantago lanceolata,* yarrow *Achillea millefolium,* coltsfoot *Tussilago farfara,* bush vetch *Vicia sepium* and scentless mayweed *Tripleurospermum inodorum.* Saplings and native shrubs present within these areas comprise of cherry *Prunus spp.,* silver birch *Betulus pendula,* rowan *Sorbus aucuparia,* goat willow *Salix caprea,* hawthorn *Crataegus monogyna,* gorse *Ulex europaeus* and broom *Cytisus scoparius.* Scattered bramble *Rubus fruticosus* seedlings are also present.

Condition Assessment Result: Moderate condition.

<u>Habitat 2: u1b – Developed land; sealed surface</u>

4.5.6 ***Habitat description:*** Areas of tarmacking situated to the west and north.

Condition Assessment Result: N/A- Other.

<u>Individually mapped: w 1170 – Individual trees</u>

(2° code: 1170 – individual tree)

4.5.7 ***Habitat description****:* Individual trees on and immediately adjacent to site not associated with hedgerows/lines of trees.

Species composition: Species present include ash *Fraxinus excelsior,* cherry, hawthorn, Italian alder *Alnus cordata,* Norway maple *Acer platanoides,* whitebeam *Sorbus aria,* field maple *Acer campestre* and silver birch. A single ash tree (T4) was assessed as having bat roost potential, refer to section 4.7.

Condition Assessment Result: Poor-moderate.

Linear Feature H1: h2a – Hedgerows (priority habitat)

4.5.8 ***Habitat description****:* Remnant, unmanaged, mixed native species hedgerow associated with ruderal embankment to the east, comprised of hawthorn, hazel *Coryllus avellana,* guelder rose *Viburnum opulus*, blackthorn *Prunus spinosa,* ash and dog rose *Rosa canina.* The hedgerow is approximately 3m in height, 1m in width and 90m in length. Limited ground flora is present to the base of the hedgerow which mainly comprises tall ruderal species and rubble/brash piles.

Linear Feature H2: h2a – Hedgerows (priority habitat)

4.5.9 ***Habitat description****:* Remnant hawthorn hedgerow with scrub understorey and brash/rubble piles in association to the east. The hedgerow is unmanaged, reaching a height of 3m and 1m in width, with multiple gaps also present along its length of approximately 40m. Ground flora is limited to neophytes/ruderal docks, thistles and nettles.

Linear Feature H3: h2a – Hedgerows (priority habitat)

4.5.10 ***Habitat description****:* Remnant hawthorn hedgerow with scrub understorey and brash/rubble piles in association to the east. The hedgerow is unmanaged, reaching a height of 3m and 1m in width, with multiple gaps also present along its length of approximately 40m. Ground flora is limited to neophytes/ruderal docks, thistles and nettles.

Condition Assessment Result: All 3 hedgerows are Poor-moderate.

Fauna

4.5.11 During the survey the following bird species were recorded: blackbird *Turdus merula,* blue tit *Cyanistes caeruleus,* chaffinch *Fringilla coelebs,* dunnock *Prunella modularis,* feral pigeon *Columba livia domestica,* great tit *Parus major,* grey wagtail *Motacilla cinerea,* herring gull *Larus argentatus,* jackdaw *Corvus monedula,* kestrel *Falco tinnunculus,* pied wagtail *Motacilla alba,* redwing *Turdus iliacus,* robin *Erithacus rubecula,* siskin *Spinus spinus,* song thrush *Turdus philomelos,* woodpigeon *Columba palumbus* and wren *Troglodytes troglodytes.*

Conclusion

4.5.12 Habitats on site were predominantly considered to be of limited ecological value, with brash/rubble piles and mixed scrub providing hibernation potential for herptiles and mammals, and hedgerows with associated trees bounding the site offering foraging, commuting and breeding opportunities for birds and wildlife in general. None of the

habitats within the site are of significant interest (in terms of the plant species composition). The plant communities at the site are of widespread occurrence and are characteristic of the habitats present in the wider area and common nationally.

4.5.13 The Dearne Valley Wetlands SSSI supports a nationally important assemblage of breeding birds. Some of the habitats on site may be used by SSSI bird populations or some individuals of the population. These supporting habitats can play an essential role in maintaining SSSI species populations, and proposals affecting them may therefore have the potential to affect the SSSI. The site is in close proximity to an area known to support willow tit, which are part of the breeding bird assemblage feature of the SSSI. Willow tit populations declined by 94% between 1970 and 2012, with habitat fragmentation a key contributor to their decline.

4.6 SITE SURVEY – HABITAT SUITABILITY INDEX SURVEY

Methodology – Habitat Suitability Index

4.6.1 An area of bare ground with ephemeral standing water is present on site. From consulting OS and MAGIC maps of the local area, no waterbodies were identified within a 250m radius of site, with one waterbody located within a 500m radius of the site, refer to *Figure 03* below for locations and Table 06 for brief descriptions.

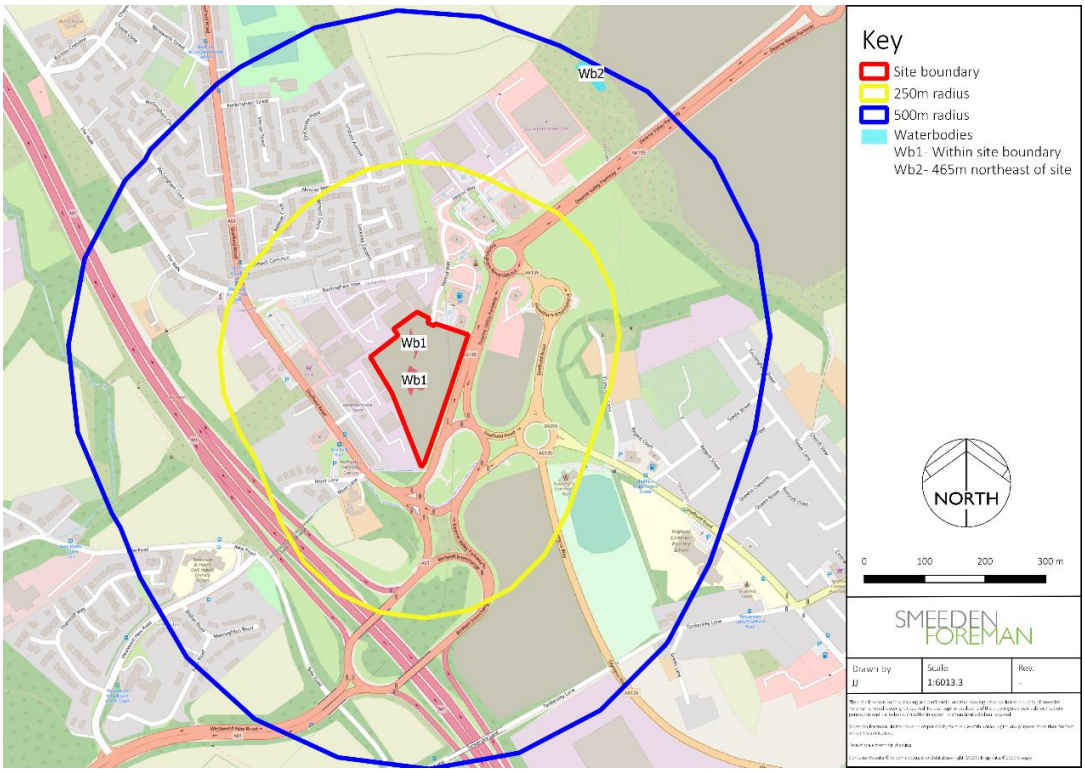

Figure 03: Watercourse/body locations on site and within 500m

Table 06: Watercourse/body descriptions on site and within 500m

Waterbody 1 (Wb1) Ephemeral standing water located on site. An area of approximately 1400m^2, marginal vegetation is dominated by reedmace *Typha latifolia,* with tall ruderal willowherb species *Epilobium spp.* and thistles in close association.	
Waterbody 2 (Wb2) Located 465m northeast of the proposals site. Access to survey this waterbody was not sought at time of survey.	

4.6.2 Waterbody 1 was assessed using the Habitat Suitability Index (HSI) survey methodology to consider its suitability for great crested newts and the requirement for further assessment and appropriate mitigation in regards to the proposed development.

4.6.3 The HSI survey is a method produced by Oldham *et al.* (2000) to assess the suitability of ponds for great crested newts by quantifying ten factors (suitability indices) which can affect great crested newt occurrence, such as the presence of fish and wildfowl, shading, coverage of aquatic vegetation, etc. and provides a score which can indicate the suitability of a pond to support breeding great crested newts. The HSI is calculated as a geometric mean of the ten suitability indices using the formula below:

4.6.4 HSI = (SI1 x SI2 x SI3 x SI4 x SI5 x SI6 x SI7 x SI8 x SI9 x SI10)1/10

4.6.5 The score can range from 0 to 1, 0 indicating low suitability and 1 indicating a high suitability. The HSI has been adapted by the National Amphibian and Reptile Recording Scheme (NARRS) who have categorised the suitability of a pond to support great crested newts by the HSI obtained, which is as follows:

Table 07: HSI scoring system

HSI Score	*Pond Suitability*
<0.5	Poor
0.5-0.59	Below average
0.6-0.69	Average
0.7-0.79	Good
>0.8	Excellent

Results

4.6.6 Waterbody 1 has been assessed using the Habitat Suitability Index (HSI) survey methodology as described above.

4.6.7 Waterbody 2 is located approx. 465m northeast of the proposals site. It is considered that there is a low risk of GCN from Wb2 utilising the site for foraging or hibernation purposes if present in the local area due to distance and severance of the waterbody from site.

4.6.8 The results of the HSI survey are detailed in the table below:

Table 08: Habitat Suitability Index Survey

	Waterbody 1 (Wb1)	
SI_1 Location	A	1
SI_2 Pond area#	1400m2	0.88
SI_3 Pond drying	Annually	0.1
SI_4 Water quality	Poor	0.33
SI_5 Perimeter Shade	<20%	1
SI_6 Fowl	Minor	0.67
SI_7 Fish	Possible	0.67
SI_8 Ponds within 1km	2	0.61
SI_9 Terrestrial habitat (within 250m)	Moderate	0.67
SI_{10} Macrophytes*	50%	0.8
HSI Score	**0.58 'Below average'**	

Conclusions

4.6.9 **Waterbody Wb1** obtained a suitability score of **0.58**, indicating that it holds '**below average'** suitability for great crested newts.

4.7 SITE SURVEY – TREE ASSESSMENT FOR BAT ROOST POTENTIAL

Methodology

4.7.1 Trees on site were surveyed during the walkover survey in order to identify if they had features present with the potential to support roosting bats. All aspects of the trees were surveyed using close focusing binoculars and high powered torch light. The surveyor looked for features which are commonly used by bats for roosting or shelter, such as natural holes, woodpecker holes, cracks and splits, cavities, epicormic growth and bat boxes; and, for signs of bats utilising a tree for roosting purposes such as scratches on the bark at entry points, staining, droppings, audible noise, distinctive smells and the smoothing of surfaces near to cavities.

4.7.2 The trees potential to support roosting bats has been categorised to relate to the value of identified features. These categories are provided by the Bat Conservation Trust (BCT) *Bat Surveys for Professional Ecologists: Good Practice Guidelines 3rd edition* (2016) and are summarised in the table below.

Table 09: Summary of BCT structure (tree/building) categories

BCT Category	*Description*
High	One or more highly suitable features capable of supporting larger roosts on a regular basis and for long periods of time.
Moderate	One or more suitable features but unlikely to support a roost of high conservation status.

Low	One or more suitable features suitable for low numbers of bats e.g. individual bats opportunistically.
Negligible	Negligible features likely to be used by roosting bats.

Results

4.7.3 During the walkover survey a single tree was considered to have bat potential, refer to *Figure 02 (appended)* for approximate location. The tree is labelled as T4 and marked as a green dot surrounded by a black circle. Refer to Table 10 below for details of potential roost features (PRFs) identified.

Table 10: Trees identified with bat roost potential

Existing Habitats Plan Reference	Tree Survey Plan Reference (SF3387 TS01)	Species	Comments	Bat Potential
T4	T24	Ash	Mature specimen present along western site boundary. Tree causing structural damage to wall. Decay and cavity present along stem (eastern elevation). Major deadwood in crown.	Moderate

5.0 IMPLICATIONS/RECOMMENDATIONS

5.1 NATURE CONSERVATION DESIGNATED SITES

5.1.1 Two statutorily designated nature conservation sites, and five non-statutorily designated sites, lie within 2km of the proposals site boundary. The proposals site falls within the Impact Risk Zone for Dearne Valley Wetlands Site of Special Scientific Interest (SSSI).

5.1.2 The relevant Natural England (NE) Geographic Information System (GIS) dataset indicates that the nature and scale of the proposed works may have the potential to impact upon these sites in the following way:

- **Water supply:** Large infrastructure such as warehousing/industry where net additional gross internal floorspace is >1,000m^2 or any development needing its own water supply;
- **Discharges:** Any discharge of water or liquid waste of more than 2m^3/day to ground (ie to seep away) or to surface water, such as a beck or stream.

5.1.3 Comments received from Natural England in October 2023 confirmed that they consider that without appropriate mitigation the application would damage or destroy (through water and air pollution) the interest features for which Dearne Valley Wetlands Site of Special Scientific Interest (SSSI) has been notified. In order to mitigate these adverse effects and make the development acceptable, water and air pollution prevention measures should be secured to ensure that construction and operational activities do not release pollutants into Dearne Valley Wetlands SSSI.

5.1.4 Attenuation measures will be adopted on site to ensure the rate of discharge from surface water drainage does not exceed the current peak run-off rate and due to the type of development a separate water supply will not be required. In addition, drainage systems (where required) will incorporate oil and grit interceptors, with surface water from site to outfall into an existing sewer network located to the north of site. Standard accident procedures and working methods will also be implemented during construction to avoid impacts on water quality. To ensure all measures outlined to mitigate water quality impacts to the notified features of the SSSI are appropriately secured in any planning permission given, the production of a Construction Environmental Management Plan (CEMP) is recommended prior to commencement of the development. No adverse impact upon the designated sites as a result of the proposed development are therefore anticipated provided recommended mitigation measures are in place.

5.1.5 Natural England advises that dust impacts are a risk to ecological receptors within 200 metres. Section 5.2.16 of the Air Quality Assessment (dated July 2023) states that the mitigation outlined in the dust IAQM guidance will be used. However, these measures should also be secured in the CEMP.

5.1.6 It is considered that there will be no adverse impact upon non-statutory and statutorily designated sites as a result of the development providing recommended mitigation measures are in place.

5.2 HABITATS

5.2.1 The individual habitat componants within the proposals site are generally considered to be of limited conservation value, comprising open grassland, ruderal/ephemeral vegetation, bare ground and hardstanding. However, it is considered these habitats

collectively meet certain criteria, and have been assessed to comprise to Open Mosaic Habitat on Previously Developed Land which is a UK BAP Priority Habitat known to support a high diversity of wildflowers and invertebrates. As there is little known about the amount of this high distinctiveness habitat in the UK, and limited available habitat assigned protection within Special Sites of Scientific Interest, the loss of this Priority Habitat on site will require a bespoke compensation solution off-site, to be agreed with the Local Planning Authority.

5.2.2 Hedgerows with associated trees and mixed scrub within the site are considered to be of some conservation value, as these provide suitable habitat for breeding and roosting bird species, terrestrial habitat for herptiles, and foraging/commuting/roosting opportunities for bats and mammals in general.

5.2.3 In order to protect habitats of ecological value present and ensure that the proposed development provides enhancement to wildlife, the following is recommended, and with respect to landscape and trees, has been included within the landscape proposals (*SF3387 LL02* and *LL03– Landscape Proposals*), and arboricultural survey report (*SF3387 Arb Survey Report Rev D*):

- The retention of the trees and boundary hedgerow at the site where feasible, or replacement planting using native species;
- The gapping up and appropriate management of hedgerows bounding the site to the west and east with appropriate native species;
- Inclusion of appropriate native tree/shrub planting and areas of wildflower seeding within the landscape proposals, along with the use of a species rich lawn mix where grass areas are required to be more frequently mown;
- Use of temporary protective demarcation fencing and root protection fencing to protect retained areas/features. The fencing must be in accordance with BS5837:2012 'Trees in Relation to Design, Demolition and Construction', extend outside the canopy of the retained trees, and remain in position until construction is complete;
- Use of directional lighting during construction, which will not shine upon the site boundaries, hedgerows or trees within the site;
- Implementation of a sympathetic lighting scheme within proposals that minimises illumination of trees and areas of new planting to the boundaries of the site. Incorporation of appropriate luminaire specifications and locations should be considered in the interest of minimising impacts on ecological receptors, including light sensitive species i.e. bats.

5.3 PROTECTED SPECIES

5.3.1 Existing records data and site survey have noted the potential for various protected species to occur within the search area or on site, upon which the potential effects of the proposed development are discussed in the following sections.

5.3.2 Refer to *Appendix 05* for relevant species legislation.

Great Crested Newts

5.3.3 An area of ephemeral standing water is present on site, and areas of mixed scrub and hedgerow provide potential opportunities for amphibian/great crested newts during their terrestrial phase, such as refuge, cover and hibernation habitat. However, habitats present are largely considered to be unsuitable for amphibian species during

their terrestrial phase, predominantly comprising bare ground, ruderal/ephemeral vegetation and hardstanding, and the ephemeral nature of the standing water is considered to severely limit its suitability to support successful breeding. From consulting an OS base of the site, a single additional waterbody is present within 500m of the site, located approximately 465m northeast.

5.3.4 Due to the limited number of existing records and their distance and severance from the proposals site, the potential for habitat on site to support great crested newts is considered to be low to negligible and therefore no adverse impact upon this species is anticipated as a result of the proposed development works and no further assessment for this species is considered necessary.

Bats – commuting/foraging habitat

5.3.5 Bat species recorded within 2km of the proposals site include field and roost records relating to brown long-eared, common pipistrelle, Daubenton's bat, Leisler's bat, Natterer's bat, Noctule, *Myotis* species, *Nyctalus* species, Noctule/Leisler/Serotine, pipistrelle species, soprano pipistrelle, unidentified bat, whiskered bat and whiskered/Brandt's bat, with the closest of these records being for common pipistrelle located 0.4km north of site.

5.3.6 Hedgerows and associated trees along site boundaries provide suitable habitat for foraging and commuting bats, acting as potential flight corridors to the wider landscape. It is recommended that these features are retained within the development, where feasible, or replaced and enhanced with appropriate native species. It is also recommended that proposals include the planting of native wildflower grassland and shrubs in association with these areas. This will ameliorate opportunities for commuting and foraging bats within the area. Providing a variety of berry, nut-bearing and flowering trees, shrubs and plants would offer year-round interest for a range of invertebrates, and as such provide feeding opportunities for the local bat population.

5.3.7 Any new lighting should be appropriately designed including directional and low wattage luminaires to avoid illuminating the boundary hedgerows and existing areas of woodland adjacent to the south-western site boundary, and any new areas of structure planting. A lux contour plan and lighting specifications should be reviewed by an appropriately qualified ecologist to minimise impacts on light sensitive bat species and ecological receptors on/adjacent to site. Reference should be made to the Bat Conservation Trust publication '*Bats and Artificial Lighting in the UK'* (2018) which includes the following guidelines:

- Using warm white, narrow spectrum lights with little or no UV;
- Low wattage (eg 20W);
- Directional lighting with near full horizontal cut off, mounted at a low height;
- Minimum height columns at maximum spacing.

Bats – potential tree roosts

5.3.8 Tree T4 (referenced as Tree T24 within the arboricultural survey report: *SF3387 Arb Survey Report Rev D)* was assessed as having moderate potential to support roosting bats and following arboricultural assessment, has been highlighted for removal within the context of the development, owing to its poor condition. A climb and inspect survey is not possible due to health and safety reasons, and therefore bat emergence/re-entry survey will be carried out at the tree during the appropriate survey season (May to

September) are recommended. In the event of a bat roost being found a licence from Natural England may be required, with appropriate mitigation and working methods.

5.3.9 In the event of a bat roost being found a licence from Natural England may be required, with appropriate mitigation and working methods.

5.3.10 The provision of additional roosting features via pole-mounted boxes is also recommended irrespective of whether roosts are found to enhance site biodiversity in line with the National Planning Policy Framework (NPPF).

Breeding Birds

5.3.11 Bird species recorded during the walkover survey included: blackbird, blue tit, chaffinch, dunnock, feral pigeon, great tit, grey wagtail, herring gull, jackdaw, kestrel, pied wagtail, redwing, robin, siskin, song thrush, woodpigeon and wren. Hedgerows, trees and scrub on site are likely to be used by all these species and local breeding and roosting bird populations in general.

5.3.12 All wild birds are protected under the Wildlife and Countryside Act 1981 (as amended) during breeding. It is therefore recommended that any vegetation clearance takes place outside the core bird nesting period (March – August inclusive) unless checks by an appropriately qualified ecologist find active nests to be absent immediately prior to clearance works. If nesting birds are identified advice will be sought. The advising ecologist will issue guidance in relation to the protection of the nesting birds in conjunction with the scheduled works. Measures such as applying a set boundary around the nest may be necessary until the young birds have fledged.

5.3.13 Schedule 1 bird species are afforded additional protection from disturbance while breeding. Records of multiple Schedule 1 species were provided within 2km of the site. Habitats on the site do not complement those typically utilised by these species/ the designated site where records are from and therefore no adverse impacts on these species is anticipated as a result of the development.

5.3.14 The site is in close proximity to an area known to support willow tit, which are part of the breeding bird assemblage feature of the Dearne Valley SSSI. Habitat fragmentation has been a key contributor to the decline of willow tit populations. To ensure that habitat networks for willow tits and other breeding birds of the Dearne Valley SSSI assemblage feature are preserved around the Dearne Valley Wetlands SSSI, it is recommended that any habitat enhancements should emphasise scrub creation and/or maintenance.

5.3.15 Consideration for the enhancement of the site in relation to birds could include appropriate native species planting and the sowing of a wildflower seed mix. The installation of species-specific boxes upon suitable trees (where feasible) adjacent to site/within retained and/or new hedgerow planting/pole-mounted boxes would aim to provide roosting/breeding opportunities for breeding birds in general.

5.3.16 Planting of berry bearing tree/shrub species will provide foraging and breeding habitat for Red Listed thrush species as well as overwintering birds. Particular consideration should be given to the incorporation of native berry-bearing species such as elder, rowan, guelder-rose, holly, hawthorn and blackthorn with ivy as a climber.

5.3.17 Sympathetic management of existing and newly planted hedgerows should be considered to avoid disturbance to breeding birds. This involves the avoidance of management during the core active season March – August and preferably only to be

carried out during January and February when the berry crop is mostly finished to benefit species during winter.

Badger

5.3.18 No signs of badger were recorded within or adjacent to the site during the survey, though records have been provided within a 2km radius of the site. Habitats on site are considered suboptimal for badger, though due to presence of suitable habitat in the surrounding local area it is anticipated that this species may access the site for foraging and commuting purposes. Precautionary working methods are therefore recommended to be adopted during construction works, which will include the covering, or providing a means of escape from, any trenches and capping any open pipework at the end of each working day, to prevent accidental harm to badger or other mammals which may access the site.

Reptiles

5.3.19 Habitats within the site are considered to be suitable for use by reptiles with areas of bare ground, scrub and brash/rubble piles providing opportunities for basking, foraging, cover and hibernation.

5.3.20 From consultation with the local records centre, there are records of adder and grass snake within 2km of the proposals site; however, the closest is located approximately 1.2km northeast of site and being predominantly historic (pre-1990).

5.3.21 Owing to the distance and severance of the records from site, and historical occurrence of records, presence of reptiles is considered unlikely with no adverse impact upon reptiles anticipated as a result of the proposed development. No further survey for this species is therefore considered necessary.

Other protected species

5.3.22 Due to the lack of records for otter/water vole/white-clawed crayfish within the surrounding area, and the lack of suitable river/pond habitat, the presence of these species is considered unlikely. No adverse impact upon such species is anticipated as a result of the proposed development.

5.4 NOTABLE SPECIES

Hedgehog

5.4.1 Records within 2km of the site included hedgehog and some habitats on site, such as mixed scrub and brash/rubble piles are considered to be suitable for this species. Precautionary working methods as recommended for badger above will therefore be adopted to ensure hedgehogs are not harmed/killed during works.

5.4.2 In addition, any tree/shrub cuttings from site will be removed once vegetation is cut so as to avoid the creation of brash piles; these may be attractive to hedgehogs, which could subsequently be harmed if the brash pile is burnt or removed with machinery.

5.4.3 It is recommended that small gaps (0.15m) are left under sections of any new fencing/walls (where applicable) within the development to allow continued passage of hedgehog and maintain connectivity across the site.

UKBAP Priority Bird Species

5.4.4 Dunnock and song thrush recorded during site survey have been afforded national priority within the UK Biodiversity Action Plan. Dunnock, grey wagtail, herring gull, kestrel, redwing, song thrush, woodpigeon and wren have also been assigned red or amber status on the UK Red List (BoCC, 2021) and are considered species of

conservation concern. Species feature on this list as a result of historical declines in numbers, trends in population and range, rarity, localised distribution and international importance.

5.4.5 To enhance the site for colony nesters such as house sparrow and hedgerow/tree nesters such as song thrush, dunnock and tree sparrow, consideration should be given to the installation of species-specific bird boxes onto retained trees/hedgerows/pole mountings within the site.

5.5 OTHER SPECIES

5.5.1 Evidence of rabbit *Oryctalagus cuniculus* activity was identified, with foraging/burrowing signs, and individuals seen throughout the survey.

5.5.2 Construction works in close proximity to these have the potential to harm this species and due care should be taken in the interests of animal welfare.

5.6 IMPACT ASSESSMENT SUMMARY

5.6.1 A summary of the resulting impact assessment based upon CIEEM guidelines (see *Appendix 06* for methodology) is provided in Table 11. With the mitigation and enhancement measures detailed within this report incorporated within the site proposals, there are anticipated to be no significant residual ecological impacts.

Table 11: Ecological Impacts: Summary

Ecological Feature (to be affected by the proposals)	Geographical level of importance (of local level and above)	Identified impacts	Magnitude Of impact	Duration of impact (reversibility)	Impact significant without mitigation	Mitigation and enhancement proposals	Residual impact.
Designated sites							
Dearne Valley Wetlands SSSI	National	Potential effects on water quality	Negative	Permanent	Yes	Attenuation measures adopted to ensure rate of discharge from surface water drainage does not exceed current peak run-off rate. Incorporation of oil and grit interceptors within drainage systems Surface water to outfall into existing sewer network located to north of site. Employment of standard accident procedures and working methods during construction to avoid impacts on water quality. Water quality and dust impact mitigation should be outlined within a CEMP.	Neutral
Potter Holes Plantation LNR LWS	National	None	N/A	N/A	N/A	N/A	N/A
Non-designated sites							
Barrow Colliery Site LWS	County	None	N/A	N/A	N/A	N/A	N/A
Potter Holes Plantation LNR LWS	County	None	N/A	N/A	N/A	N/A	N/A
Rockley Woods LWS	County	None	N/A	N/A	N/A	N/A	N/A
Short Wood and Hay Green LWS	County	None	N/A	N/A	N/A	N/A	N/A
Sowell Pond LWS	County	None	N/A	N/A	N/A	N/A	N/A
Habitats							
Open Mosaic Habitat	Site	Direct loss	Negative	Permanent	Yes	Landscape proposals to include wildflower grassland and species-rich lawn mix in association with mixed scrub planting. Bespoken off-site compensatory solution to be agreed with LPA to mitigate habitat loss.	Loss of irreplaceable habitat.
Hardstanding and bare ground	Site	Direct loss	Neutral	Permanent	No	N/A	Neutral
Trees	Site/local	Direct loss Accidental damage	Negative	Permanent	Yes	Retention of trees where possible. Temporary protective fencing. Replacement planting of appropriate native species within the landscape proposals.	Neutral - minor beneficial
Hedgerows	Site/local	Direct loss Accidental damage	Negative	Permanent	Yes	Retention of majority of hedgerows on site. Temporary protective fencing.	Neutral- minor beneficial

						Replacement planting/gapping up of hedgerows with native species within the landscape proposals, and seeding beneath hedgerow canopy with wildflower grassland seed mix.	
Species							
Bats (foraging)	Site/local	Loss of foraging / commuting habitat and effects of light pollution.	Negative	Permanent	Yes	Retention of hedgerow to eastern boundary and re-instatement of hedgerow along southwestern boundary. Inclusion of native species tree/shrub planting and wildflower grassland seeding within the landscape proposals. Sympathetic lighting design.	Neutral
Bats (roosting)	Site/local (to be confirmed)	Loss of potential roost sites Effects of light pollution.	Negative	Permanent	Yes	Retention of trees where possible. Temporary protective fencing. Replacement planting of appropriate native species within the landscape proposals. Provision of bat roost features on suitable retained trees/pole mountings. Further survey of tree with bat roost potential (Tree T4/T24) to be undertaken prior to removal, with EPSM licence to be obtained if roost identified. Providing the tree is protected with HERAS fencing, and lighting recommendations are followed, works can be undertaken around the tree prior to surveys and tree removal.	Neutral-minor beneficial
Birds	Site/local	Loss of habitat.	Negative	Permanent/ temporary	Yes	Vegetation clearance outside the nesting season (or following checks for active nests). Replacement planting to include appropriate native species. Installation of nest boxes in retained trees/pole mountings. Any habitat enhancements should emphasise scrub creation and/or maintenance for the preservation of habitat networks of the Dearne Valley SSSI bird assemblage	Neutral-minor beneficial
Reptiles	Site	Loss of habitat Increased harm /injury.	Negative	Permanent	No	Provision of native species tree/shrub planting, wildflower grassland and hedgerow planting within landscape proposals.	Neutral
Badger	Site	Loss of habitat Increased harm /injury.	Minor negative	Permanent/ temporary	Yes	Working methods during construction to avoid harm/killing this species.	Neutral
Hedgehog	Local	Loss of habitat Increased harm /injury.	Minor negative	Permanent	Yes	Working methods during construction and measures to maintain habitat connectivity and quality. Provision of native species tree/shrub planting, wildflower grassland and hedgerow planting within landscape proposals.	Neutral

6.0 CONCLUSIONS

6.1.1 The predominant habitat within the proposal site is Open Mosaic Habitat on previously developed land which is a UK BAP Priority Habitat known to support a high diversity of wildflowers and invertebrates. As this is a high distinctiveness habitat in the UK, mitigation will require bespoke compensation agreed off-site.

6.1.2 Hedgerows with associated trees and mixed scrub within the site are considered to be of some conservation value, as these provide suitable habitat for breeding and roosting bird species, terrestrial habitat for herptiles, and foraging/commuting/roosting opportunities for bats and mammals in general.

6.1.3 No adverse impacts on designated nature conservation sites are anticipated as a result of the proposed development provided that recommended attenuation measures, standard accident procedures and working methods are implemented to avoid impact on water quality.

6.1.4 Further survey work of Tree T4 (Tree T24 within the arboricultural survey report: *SF3387 Arb Survey Report Rev D)* is recommended to further assess the potential impact of the proposals in respect of roosting bats. Providing the tree is protected with HERAS fencing, and lighting recommendations are followed, works can be undertaken around the tree prior to surveys and tree removal.

6.1.5 Recommendations for general site enhancements include appropriate native species planting, retention and enhancement of trees and hedgerows or replacement planting, wildflower seeding, sympathetic lighting and incorporation of bird/bat nesting/roosting features.

6.1.6 Precautionary working methods and/or mitigation have been recommended for badger, hedgehog and breeding birds.

6.1.7 Subject to further survey with respect to roosting bats, it is anticipated that the development of the site is feasible with minimal impact to biodiversity and potential for biodiversity gains, provided that the recommended mitigation and enhancement measures are incorporated within the scheme. The residual ecological impacts are not anticipated to be significant.

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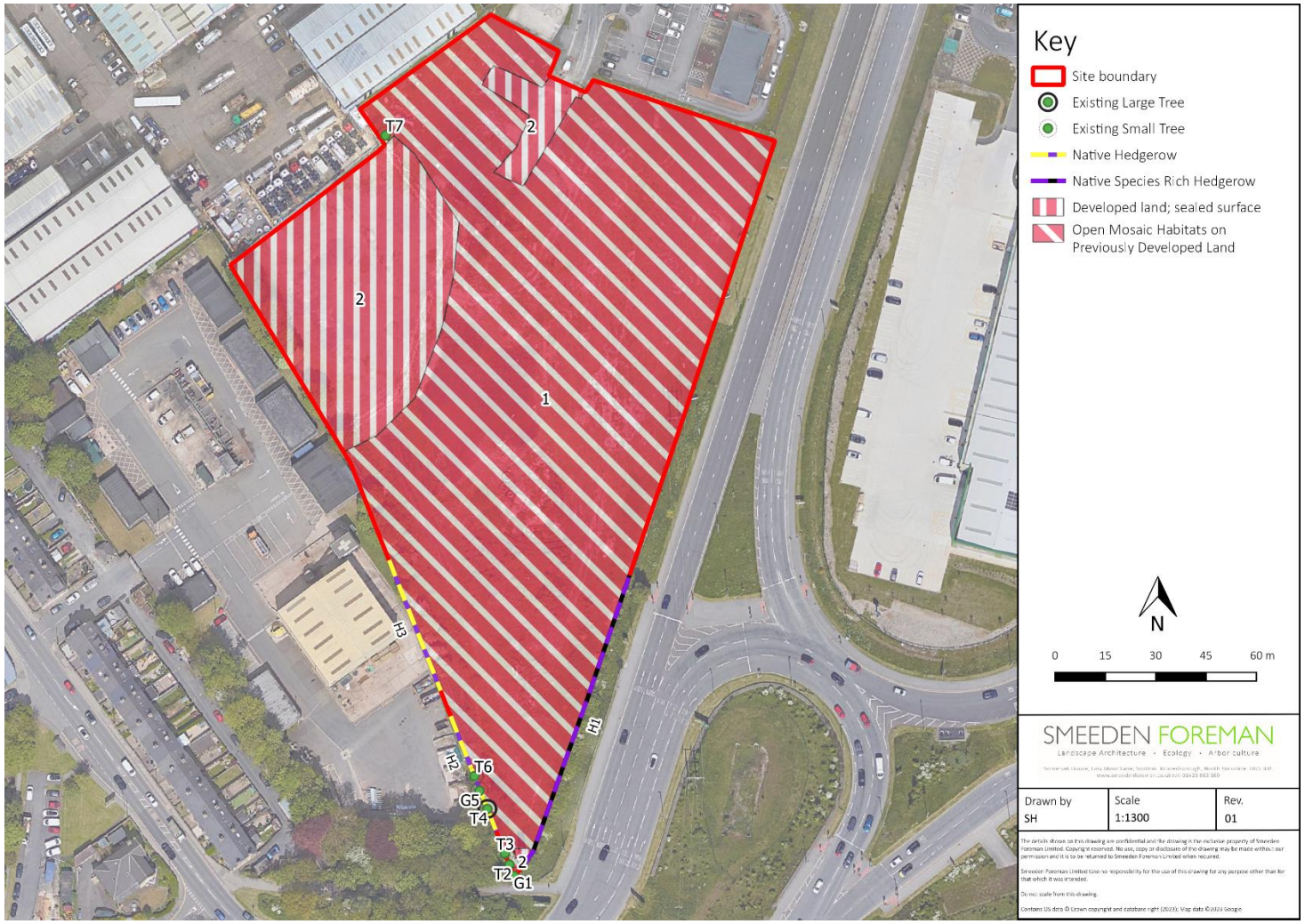
FIGURES

FIGURE 02: EXISTING HABITATS PLAN



APPENDICES

Appendix 01: Principle Legislation and Policies

Appendix 02: Designated Sites Map

Appendix 03: Plant Species List

Appendix 04: Habitat Condition Assessments

Appendix 05: Protected Species Legislation

Appendix 06: Ecological Assessment Methodology

APPENDIX 01: PRINCIPLE LEGISLATION AND POLICIES

Principle Legislation

Wildlife and Countryside Act 1981 (as amended)

This is the primary legislation for nature conservation in England and Wales. It confers varying degrees of protection on selected species according to their conservation status, ranging from making it an offence to take a species from the wild for profit, to full protection of a species and its habitat. The Act also gives guidance and instruction on statutory sites, such as sites of Special Scientific Interest (SSSI). License exempting specific works can be granted by Natural England. Such licenses are only granted once a full assessment has been made and an appropriate, sustainable mitigation package devised.

Protection of Badgers Act 1992

Allied to the Wildlife and Countryside Act, 1981 are subsidiary Acts such as the Protection of Badgers Act, 1992 which consolidated and added to previous legislation. According to the PBA it is an offence to wilfully kill, injure or maim a badger. Badger setts are also protected from interference unless such activities are licensed through Natural England. Any mitigation packages devised for badgers found on development sites must be agreed by Natural England and all mitigation activities must be fully licensed.

Countryside and Rights of Way Act 2000

As well as providing measures to improve countryside access for walkers, ramblers and horse riders, this Act also strengthens the protection of species and designated sites made in the Wildlife and Countryside Act 1981. This Act also gives the importance of biodiversity conservation statutory basis requiring government departments to have regard for biodiversity in carrying out their functions, and to take positive steps to further the conservation of listed species and habitats.

Natural Environment and Rural Communities Act (NERC), 2006 – Biodiversity Duty

NERC received royal assent in March 2006. Section 40 of the Act replaces and extends a duty, from Section 74 of the Countryside and Rights Of Way Act 2000, on Ministers and Government which already requires them to have regard to the purpose of conserving biodiversity. Section 40(1) states that, "*Every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity*."

EC Habitats Directive (92/43/EEC)

This Directive aims to give Europe-wide protection to certain rare and threatened habitats on land and at sea. It builds on legislation already established under the Birds Directive of 1979, and aims to establish a series of protected sites known as Natura 2000 series. These sites are intended to protect the unique and special wildlife of Europe and to preserve it for future generations. In Britain these Natura 2000 sites include those areas designated as Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).

The Habitats Directive is implemented in the UK through the Conservation of Habitats and Species Regulations 2017.

EC Birds Directive (79/409/EEC)

The Directive provides a framework for the conservation and management of, and human interactions with, wild birds in Europe. It sets broad objectives for a wide range of activities, although the precise legal mechanisms for their achievements are at the discretion of each Member State (in the UK delivery is via several different statutes). The Directive applies to the UK and to its overseas territory of Gibraltar.

The main provisions of the Directive include:

The maintenance of the favourable conservation status of all wild bird species across their distributional range with the encouragement of various activities to that end;

The identification and classification of Special Protection Areas (SPAs) for the rare and vulnerable species listed in Annex I of the Directive, as well as for all regularly occurring migratory species, paying particular attention to the protection of wetlands of international importance;

The establishment of a general scheme of protection for all wild birds; Restrictions on the sale and keeping of wild birds.

The Hedgerow Regulations 1997

The Hedgerow Regulations 1997 were made under Section 97 of the Environment Act 1995 and came into force in 1997. They introduced new arrangements for local planning authorities in England and Wales to protect important hedgerows in the countryside, by controlling their removal through a system of notification. Important hedgerows are defined by complex assessment criteria, which draw on biodiversity features, historical context and the landscape value of the hedgerow.

For species-specific legislation, please refer to *Appendix 05* for further information.

Policy

National Planning Policy Framework (2018)

The National Planning Policy Framework replaces Planning Policy Statement 9 (PPS 9) Biodiversity and Geological Conservation but the accompanying guidance document (ODPM 06/2005: Biodiversity and Geological Conservation-Statutory Obligations and their impact within the Planning System) has not been withdrawn.

The NPPF sets out the Government's policies on the protection of biodiversity and sites of geological interest through the planning system. It required local planning authorities, when taking decisions, to ensure that appropriate weight is attached to designated sites of international, national and local importance, protected species and to biodiversity and sites of recognised geological interest within the wider environment. It states:

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

- protecting and enhancing values landscapes, geological conservation interests and soils;
- recognising the wider benefits of ecosystem services;
- recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;
- maintaining the character of the undeveloped coast, while improving public access to it where appropriate;
- minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;
- preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and,
- remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.

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

- if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;
- 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;
- 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 reasons58 and a suitable compensation strategy exists; and,
- 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."

Biodiversity Action Plan (BAP)

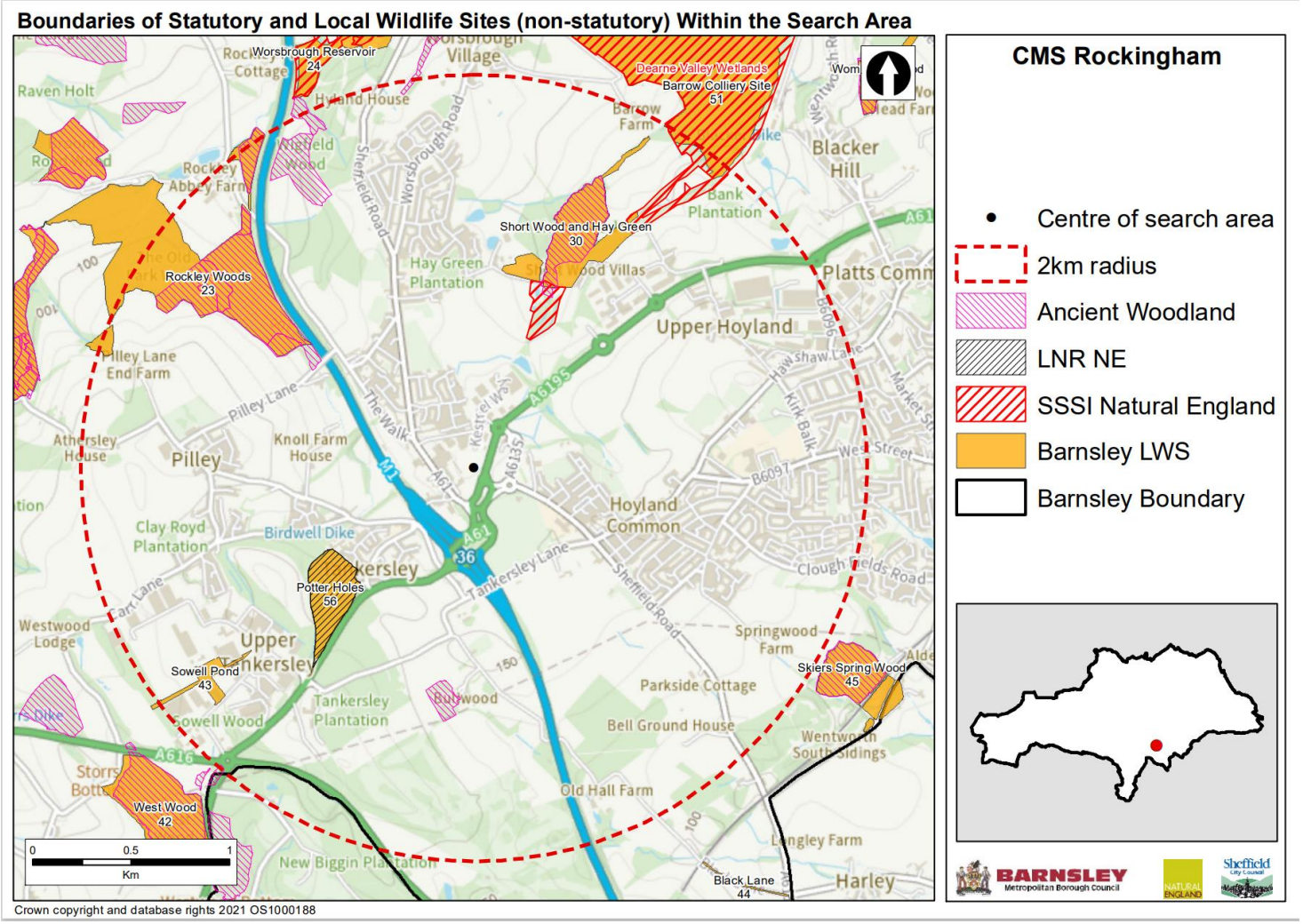
In 1993, the UK government consulted over three hundred organisations throughout the UK and held a two day seminar to debate the key issues raised at the Convention of Biological Diversity. The product of this was the launch of Biodiversity: the UK Action Plan in 1994 which outlined the UK Biodiversity Action Plan for dealing with biodiversity conservation in response to the Rio Convention.

The UK Biodiversity Steering Group was created in 1994 and published Biodiversity: the UK Steering Group Report – meeting the Rio challenge. This established the framework and criteria for identifying species and habitat types of conservation concern.

From this list, action plans for 391 species and 45 broad habitat types were produced. As well as having national priorities and targets, action was also taken at a local level. The Steering Group drew up as set of guidelines that were discussed with the Local Authority Association and the Local Government Board.

Today there are 162 Local Biodiversity Action Plans in the UK. A review of the UK BAP was undertaken between 2003 and 2006.

APPENDIX 02: DESIGNATED SITES MAP



APPENDIX 03: PLANT SPECIES LIST

GRASSES, RUSH AND FORB SPECIES				
DAFOR SCALE CODE: Dominant Abundant Frequent Occasional Rare		Habitats identified		
		Ruderal/ephemeral	Mixed scrub	Hedgerows
Common name	Scientific name			
Tufted hair grass	*Deschampsia cespitosa*	F	O	O
Cock's-foot	*Dactylis glomerata*	F	O	O
Creeping soft grass	*Holcus mollis*	O	R	R
Oat grass	*Arrhenatherum spp.*	O	R	R
Compact rush	*Juncus conglomeratus*	O	O	
Teasel	*Dipsacus fullonum*	O	R	
Broadleaved dock	*Rumex obtusifolius*	F		O
Ragwort	*Senecio jacobaea*	F	F	O
Creeping thistle	*Cirsium arvense*	A	F	F
Spear thistle	*Cirsium vulgare*	O	O	
Cow parsley	*Anthriscus sylvestris*	F	O	O
Mugwort	*Artemisia vulgaris*	F	F	F
Prickly sowthistle	*Sonchus asper*	O	O	
Foxglove	*Digitalis purpurea*	O	R	
Yellow melilot	*Melilotus officinalis*	R		
Red clover	*Trifolium pratense*	A		
White clover	*Trifolium repens*	A		
Black medic	*Medicago lupulina*	F	O	O
Creeping buttercup	*Ranunculus repens*	F	O	O
Dandelion	*Taraxacum agg.*	A	F	F
Tufted vetch	*Vicia cracca*	O		
Ribwort plantain	*Plantago lanceolata*	F	O	O
Yarrow	*Achillea millefolium*	O		
Coltsfoot	*Tussilago farfara*	F	F	
Bush vetch	*Vicia sepium*	O		
Scentless mayweed	*Tripleurospermum inodorum*	R		

APPENDIX 04: HABITAT CONDITION ASSESSMENTS

HABITATS

Ref 1: Sparsely vegetated land: Open Mosaic Habitat u1a (Condition Sheet 21)

Condition Sheet 21 - Urban		
Condition Assessment Criteria		**Passed/Failed Criteria**
1	Vegetation structure is varied, providing opportunities for insects, birds and bats to live and breed. A single structural habitat component / vegetation type should not account for more than 80% of the total habitat area.	**Pass**
2	There is a diverse range of flowering plant species, providing nectar sources for insects. These species may be either native, or non-native but beneficial to wildlife. NB - To achieve GOOD condition, criterion 2 must be satisfied by native species only (rather than non-natives beneficial to wildlife). Note that Biodiverse green roofs are exempt from this requirement, and can include non-native sedums, as set out in footnote 1.	**Pass**
3	Invasive non-native species (Schedule 9 of WCA) cover less than 5% of total vegetated area. NB - To achieve GOOD condition, criterion 3 must be satisfied by a complete absence of invasive non-native species (rather than <5% cover).	**Pass**
ADDITIONAL CRITERION - only applicable to **Open mosaic on previously developed land** habitat type:		
4	The site shows spatial variation, forming a mosaic of at least four early successional communities (a) to (h) PLUS bare substrate AND pools. (a) annuals; (b) mosses/liverworts; (c) lichens; (d) ruderals; (e) inundation species; (f) open grassland; (g) flower-rich grassland; (h) heathland.	**Pass**
Number of Criteria Passed		**0**
Condition		**Good***
Assessment Result		**Condition**
If 4 criteria assessed:		
Passes 3 of 3 core criteria; AND Meets the requirements for good condition within criteria 2 and 3; AND Passes additional criterion 4		**Good (3)**
Passes 2 or 3 of 4 criteria; OR Passes 4 of 4 criteria but does not meet the requirements for good condition within criteria 2 and 3		**Moderate (2)**
Passes 0 or 1 of 4 criteria		**Poor (1)**

* Site fulfils all criteria to qualify as OMH, however, combined professional judgement from Smeeden Foreman and Barnsley MBC Ecologist Claire Wilson have agreed **Moderate condition** to be a truer reflection of the collective component habitats present on site, due to a combination of young age and limited diversity.

Ref 5: Developed land; sealed surface- Hardstanding: u1b (No condition assessment required; condition fixed at N/A – Other)	

Ref 6 and 7: Individual trees – w 1170 (Condition sheet 22)

Tree number	*Species*	*Native tree Y = Yes N = No*	*Tree size class Table 7.2 BNG User Guide*	*Maturity (Condition table 22) Mature = EM/M Young = Y/SM*	*Condition Assessment (see table below)*
G1	*2 NO. Ash*	*Y*	*Small*	*Y*	*Poor*
T2	*Ash*	*Y*	*Small*	*Y*	*Moderate*
T3	*Hawthorn*	*Y*	*Small*	*Y*	*Moderate*
T4	*Ash*	*Y*	*Large*	*EM/M*	*Moderate*
G5	*3 NO. hawthorn*	*Y*	*Small*	*Y*	*Poor*
T6	*Ash*	*Y*	*Small*	*Y*	*Moderate*
T7	*Cherry*	*Y*	*Small*	*Y*	*Moderate*

Condition Assessment Criteria		G1	T2	T3	T4	G5	T6	T7
1	The tree is a native species (or more than 70% within the block are native species).	Y	Y	Y	Y	Y	Y	Y
2	Tree canopy is predominantly continuous, with gaps in canopy cover making up <10% of total area and no individual gap being >5 m wide (individual trees automatically pass this criterion).	N	Y	Y	Y	N	Y	Y
3	The tree is mature[2] or veteran[3] (or more than 50% within the block are mature[2] or veteran[3]).	N	N	N	N	N	N	N
4	There is little or no evidence of an adverse impact on tree health by anthropogenic activities such as vandalism or herbicide use. There is no current regular pruning regime so the trees retain >75% of expected canopy for their age range and height.	N	N	N	N	N	N	N
5	Micro-habitats for birds, mammals and insects are present e.g. presence of deadwood, cavities, ivy or loose bark	N	N	N	Y	N	N	N
6	More than 20% of the tree canopy area is oversailing vegetation beneath.	Y	Y	Y	Y	Y	Y	Y
	SCORE	**P**	**M**	**M**	**M**	**P**	**M**	**M**

Passes 5 or 6 of 6 criteria	Good (3)	**G**
Passes 3 or 4 of 6 criteria	Moderate (2)	**M**
Passes 0, 1, or 2 of 6 criteria	Poor (1)	**P**

Ref H1, H2 and H3: Native hedgerow h2a (Condition Sheet 8)

Condition Assessment Criteria			PASSED/FAILED CRITERIA		
			H1	H2	H3
A1	Height	>1.5 m average along length	Pass	Pass	Pass
A2	Width	>1.5 m average along length	Fail	Fail	Fail
B1	Gap - hedge base	Gap between ground and base of canopy <0.5 m for >90% of length (unless 'line of trees')	Fail	Fail	Fail
B2	Gap - hedge canopy continuity	· Gaps make up <10% of total length and · No canopy gaps >5 m	Pass	Fail	Fail
C1	Undisturbed ground and perennial vegetation	>1 m width of undisturbed ground with perennial herbaceous vegetation for >90% of length: · measured from outer edge of hedgerow, and · is present on one side of the hedge (at least)	Pass	Pass	Pass
C2	Undesirable perennial vegetation	Plant species indicative of nutrient enrichment of soils dominate <20% cover of the area of undisturbed ground	Pass	Fail	Fail
D1	Invasive and neophyte species	>90% of the hedgerow and undisturbed ground is free of invasive non-native and neophyte species	Fail	Fail	Pass
D2	Current damage	>90% of the hedgerow or undisturbed ground is free of damage caused by human activities	Fail	Fail	Pass
Additional group - applicable to hedgerows with trees only					
E1	Tree age	At least one mature tree per 30m stretch of hedgerow. A mature tree is one that is at least 2/3 expected fully mature height for the species.	N/A	N/A	N/A
E2	Tree health	At least 95% of hedgerow trees are in a healthy condition (excluding veteran features valuable for wildlife). There is little or no evidence of an adverse impact on tree health by damage from livestock or wild animals, pests or diseases, or human activity.	N/A	N/A	N/A
		TOTAL PASSED CRITERIA	4	2	4
		CONDITION	Moderate	Poor	Moderate

For hedgerows without trees	
No more than 2 failures in total; AND No more than 1 in any functional group.	Good (3)
No more than 4 failures in total; AND Does not fail both attributes in more than one functional group (e.g. fails attributes A1, A2, B1 & C2 = Moderate condition).	Moderate (2)
Fails a total of more than 4 attributes; OR Fails both attributes in more than one functional group (e.g. fails attributes A1, A2, B1 & B2 = Poor condition).	Poor (1)
For hedgerows with trees	
No more than 2 failures in total; AND No more than 1 failure in any functional group.	Good (3)
No more than 5 failures in total; AND Does not fail both attributes in more than one functional group (e.g. fails attributes A1, A2, B1, C2 & E1 = Moderate condition).	Moderate (2)
Fails a total of more than 5 attributes; OR Fails both attributes in more than one functional group (e.g. fails attributes A1, A2, B1 & B2 = Poor condition).	Poor (1)

Hedgerow 1

Hedgerow 2

Hedgerow 3

APPENDIX 05: PROTECTED SPECIES LEGISLATION

Bats

Bats and their roosts are afforded full legal protection under both UK and European legislation. Conservation of Habitats and Species Regulations 2017 transpose the Habitats Directive into UK law, making it an offence to:

- deliberately disturb a bat;
- deliberately kill, injure or capture a bat;
- damage, destroy or obstruct access to a breeding site or resting place (note this applies to both deliberate and reckless actions).

The Wildlife and Countryside Act 1981 (as amended) (Schedule 5) made it an offence to:

- intentionally kill, injure or take a bat ;
- damage, destroy or obstruct a bat roost *;
- disturb a bat at a roost *;
- possess or control a bat or any part thereof;
- sell, offer for sale, possess or transport for sale any bat or part thereof;
- set traps for catching, killing or injuring bats;
- possess articles for the purposes of committing offences against bats;

[*= intentional and reckless offences covered].

Legal protection under the Habitats Directive applies to the animals and their breeding sites and resting places. This means that bat roosts are fully protected, whether they are in use at the time or not. Where roosts or resting/breeding sites are identified, any works which may contravene the protection afforded to them require derogation from the provisions of the legislation in the form of a licence from Natural England..

Great crested newts

The Wildlife and Countryside Act 1981 (as amended) transposes into UK law and the Convention on the Conservation of European and Wildlife and Natural Habitats (commonly referred to as the 'Bern Convention'). The 1981 Act was amended by the Countryside and Rights of Way ['CRoW'] Act 2000.

The great crested newt is listed on Schedule 5 of the 1981 Act, and is therefore subject to the provisions of Section 9, which make it an offence to:

- Intentionally kill, injure of take a great crested newt [Section 9 (1)];
- Possess or control any live or dead specimen or anything derived from a great crested newt [Section 9 (2)];
- Intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection by a great crested newt [Section 9 (4)(a)];
- Intentionally or recklessly disturb a great crested newt while it is occupying a structure or place which it uses for that purpose [Section 9(4)(b)].

The Conservation of Habitats and Species Regulations 2017 transpose into the UK law Council Directive 92/43/EEC of 21st May 1992 on the conservation of Natural Habitats and of Wild Fauna and Flora (often referred to as the 'Habitats [and Species] Directive'). The great crested newt is listed on Annex II and Annex IV of the Directive. The former Annex relates to the designation of Special Areas of Conservation (SACs) for this species; even where great crested newts occur outside SACs, the inclusion on Annex II serves to underline their conservation significance. Inclusion of the Annex IV ('European Protected Species') means that member states are required to put in place a system of strict protection as outlined in Article 12, and this is done through inclusion on Schedule 2 of the Regulations. Regulation 43 makes it an offence to:

- Deliberately capture or kill a great crested newt [Regulation 43(1)(a)]
- Deliberately disturb a great crested newt [Regulation 43(1)(b)]
- Deliberately take or destroy the eggs of a great crested newt [Regulation 43(1)(c)]
- Damage or destroy a breeding site or resting place of a great crested newt [Regulation 43(1)(d)]

The legislation applies to all life stages of great crested newts.

Breeding birds

The Wildlife and Countryside Act 1981 (as amended) makes it an offence to:

- kill, injure, or take any wild bird;
- take, damage or destroy the nest of any wild bird while that nest is in use or being built or,

- take or destroy an egg of any wild bird.

This protection applies from the moment the nest is being built. Additional protection against disturbance on the nest or of dependent young is provided for birds included on Schedule 1.

Badger

Badgers and their setts are protected by the Protection of Badgers Act 1992. Under the Act it is illegal to:

- Wilfully kill, injure or take a badger or attempt to do so;
- Cruelly ill-treat a badger; and,
- Interfere with a sett by doing any of the following:

  (i) damaging a badger sett or any part of it;

  (ii) destroying a badger sett;

  (iii) obstructing access to a badger sett;

  (iv) causing a dog to enter a sett; and,

  (v) disturbing a badger while it is occupying a sett.

Reptiles

The Wildlife and Countryside Act 1981 makes it an offence to intentionally kill any of our native snakes and lizards. The sand lizard and smooth snake receive additional protection; for these species, it is unlawful to capture or possess them, or to damage/obstruct access to places they use for shelter or protection, or to disturb them whilst in such a place.

APPENDIX 06: ECOLOGICAL ASSESSMENT METHODOLOGY

The assessment of the impact of the proposed development on ecological features is based upon the Chartered Institute of Ecology and Environmental Management publication Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (2018).

The baseline condition of the site is established through a combination of desk study and site survey.

This identifies the ecological features present on and within the vicinity of the site. These features are evaluated to establish their level of importance and their potential to be significantly affected by the proposed development. Features which are judged to be important and likely to be significantly affected by the proposed development are assessed.

The importance of an ecological feature is based upon consideration of the following:

- *Designation: European, national and local designated wildlife sites;*
- *Listing: Country Biodiversity, Biodiversity Action Plan, Red Listed, Rare and Legally Protected Species;*
- *Function: e.g. as a buffer, corridor or 'stepping stone' etc.;*
- *Characteristics: naturalness, rarity, diversity, connectivity, trend, assemblage, typicality, range.*

The guidelines suggest that the importance of the ecological feature is considered within a defined geographical context. The following frame of reference is recommended:

- *International and European e.g Ramsar sites;*
- *National e.g. Sites of Special Scientific Interest;*
- *Regional e.g. North West England;*
- *Metropolitan, County vice-county or other local authority wide area e.g. West Yorkshire;*
- *Local.*

The following table illustrates how the concept of importance of the ecological features has been applied to assess the impacts of the development.

Level of importance	*Description of ecological features*
International	*Internationally designated sites (Special Protection Area (SPA), Ramsar, Special Area for Conservation (SAC))* *Habitats listed on Annex 1 of the Habitats Directive.* *Species listed on Annexes II, IV and V of the Habitats directive.* *Species listed on Annex 1 of the Birds Directive.*
	e.g. A significant population of a European protected species in this geographical region (a population of bird species representative of more than 1% of the international population).
National	*Nationally designated sites (Site of Special Scientific Interest (SSSI), National Nature Reserve).* *Habitats listed as habitats of principle importance under section 41/42 of the NERC Act 2006.* *Species listed as species of principle importance under section 41/42 of the NERC Act 2006.*
	e.g. A significant population of a more common and widespread European protected species in this geographical region (a population of bird species representative of more than 1% of the national population). *e.g. A significant population of a protected species under all parts of Schedule 1, 5 or 6 of the Wildlife and Countryside Act 1981 e.g. water vole.*
Regional	*e.g. A good/typical example of a UK BAP Priority Habitat that satisfies all the criteria in the Priority Habitat definition but is in some way slightly enhanced (e.g. presence of a species that is localised in the region).* *e.g. A regularly occurring, locally significant population of a species listed as being nationally scarce.*
County	*Sites of county importance (non-statutory) designated by local authorities to allow their importance to be considered within the planning system. Names vary between authorities including Local Wildlife Sites (LWS), Sites of Interest for Nature Conservation (SINC).* *Local Biodiversity Action Plan (LBAP) Priority Habitats and Species considered to be exceptional or of significance in the local (county/district) geographical area.*
Local	*Populations of BAP Priority Species which are not considered to be exceptional or of significance in the local geographical area.* *Areas of habitat which contribute towards habitat resources at the local level but are not of significant ecological importance e.g. local greenspaces and wildlife corridors within an urban area.* *Priority habitats and species listed on the LBAP (but not already listed under UK BAP).*
Negative	*Presence of a legally controlled animal or plant species listed under Schedule 9 of the wildlife and Countryside Act 1981 or other non-native invasive/injurious species that have potential to have a significant impact on the native flora and fauna and could be considered to have an ecological commercial or social adverse effect, usually at the local or site level.*

Site level has been used for ecological features of less than local importance such as:

- species-poor vegetation communities;
- typical populations of common and widespread mammal, bird, amphibian and/or invertebrate species;
- habitats common and abundant within the local area, where that within the site does not represent a significant concentration.

Once the important ecological features are identified, consideration is given to the likelihood of change to these features as a result of the development and associated activities i.e. the predicted impacts of the development.

This change may be either positive or negative and includes consideration of the following characteristics of the impact:

- *Extent*
- *Magnitude*
- *Duration*
- *Timing*
- *Frequency*
- *Reversibility*

Positive and negative effects are defined as follows:

- *Positive impact: a change that improves the quality of the environment e.g. by increasing species diversity, extending habitat or improving water quality; halting or slowing an existing decline.*
- *Negative impact: a change which reduces the quality of the environment e.g. destruction of habitat, removal of species foraging habitat, habitat fragmentation, pollution.*

The identification of whether these effects are significant is based upon whether the effect supports or undermines biodiversity conservation objectives of the features which have been judged to be 'important' and is considered at the relevant geographical scale. It is generally the case that no significant effect can occur to features of less than local importance, other than in exceptional circumstances such as where a feature has high social or economic value, or the magnitude of effect is particularly high.

The identification of a significant effect then forms the basis for further consideration of the effects on the feature concerned and the potential to reduce effects by employing appropriate mitigation measures or providing compensation. The 'mitigation hierarchy' is applied to reduce identified impacts, and provide enhancements, by avoidance in the first instance, then mitigation and finally compensation.

The overall effects of the proposed development with appropriate mitigation and/or compensation incorporated within the project proposals provide the residual impacts of the scheme.

UK Biodiversity Action Plan
Priority Habitat Descriptions

Open Mosaic Habitats on Previously Developed Land
(Updated July 2010)

From:
UK Biodiversity Action Plan; Priority Habitat Descriptions. BRIG (ed. Ant Maddock) 2008.

This document is available from:
http://jncc.defra.gov.uk/page-5706

For more information about the UK Biodiversity Action Plan (UK BAP) visit
http://www.jncc.defra.gov.uk/page-5155

Please note: this document was uploaded in November 2016, and replaces an earlier version, in order to correct a broken web-link. No other changes have been made. The earlier version can be viewed and downloaded from The National Archives:
http://webarchive.nationalarchives.gov.uk/20150302161254/http://jncc.defra.gov.uk/page-5706

Open Mosaic Habitats on Previously Developed Land

Correspondence with existing habitats

- UK BAP broad habitat: Built up areas and gardens.
- Phase 1: Quarry, Spoil, Mine, Ephemeral/short perennial, Bare Ground.
- NVC: Overall there is a poor fit to described communities and this weakness is identified in the review of coverage of the NVC communities (Rodwell *et al*., 2000). Although some components of the habitat are characterised by annual/open vegetation plant communities described in the NVC (Rodwell *et al*., 2000) others are allied to sclerotic associations better described in continental Europe. Grassland communities associated with this habitat complex include MG1–2, MG9, MG10, MG11, MG13; CG10 (Rodwell *et al*., 1992); and U1–2, whilst the scrub communities W6 and W23 are also commonly encountered (Rodwell *et al*., 1991). Complexes and mosaics can also include a range of aquatic plant communities (see Rodwell *et al*., 1995) and swamp communities (Rodwell *et al*., 1995).
- Annex I: None (Calaminarian grasslands are covered by another priority habitat proposal).
- Other: Poor fit to Shimwell (1983), but includes 3B and artificial-substrate equivalents of 7A
- The priority habitat is delimited by edaphic and other site conditions, and specific sites are likely to include elements of other priority habitats as minor components of the overall mosaic. With the specific exception of post-industrial substrates that are rich in heavy metal which would qualify as the proposed Calaminarian grassland priority habitat, sites with such mosaics will be considered as qualifying as 'open mosaic habitats on previously developed land' priority habitat.

Definition and criteria for field recognition of the habitat

The main source of evidence for this definition came from a Defra research project, Riding *et al*. (2009). Their proposed definition was very slightly amended by the inter-agency working group, in consultation with Defra and some members of their project steering group.

Each of these criteria must be met.

	Criterion
1.	The area of open mosaic habitat is at least 0.25ha in size.
2.	Known history of disturbance at the site or evidence that soil has been removed or severely modified by previous use(s) of the site. Extraneous materials/substrates such as industrial spoil may have been added.
3.	The site contains some vegetation. This will comprise early successional communities consisting mainly of stress-tolerant species (e.g. indicative of low nutrient status or drought). Early successional communities are composed of (a) annuals, or (b) mosses/liverworts, or (c) lichens, or (d) ruderals, or (e) inundation species, or (f) open grassland, or (g) flower-rich grassland, or (h) heathland.
4.	The site contains unvegetated, loose bare substrate and pools may be present.
5.	The site shows spatial variation, forming a mosaic of one or more of the early successional communities (a)–(h) above (criterion 3) plus bare substrate, within 0.25ha.

Definition: explanatory notes

The criteria are for guidance but cannot cover all potential scenarios and an element of expert judgement is therefore needed. It is assumed that the user will be able to recognise plant communities and the key component species.

1. The minimum size refers to the potential open mosaic habitat (OMH), which might be a part of a larger site containing other habitats such as woodland or developed land.

2. Disturbance refers to that resulting from major historical industrial use or development.
   2.1 Extraneous materials refer to extensive additions of spoil rather than incidental dumping of litter, broken glass, etc.
   2.2 There might be evidence of heavy metal contamination but extensive stands of Calaminarian grasslands are specifically excluded as that is a distinct Priority Habitat.

3. Brief descriptions of the early successional communities:
   (a) Annual communities are those comprised mainly of stress tolerant ruderals, which are short in stature and suited to low nutrient availability. Typical examples would be *Arenaria serpyllifolia*, *Centaurium erythrea*, *Linum catharticum* or *Trifolium arvense*.
   (b) Moss/liverwort communities can contain both acrocarpous (i.e. usually unbranched, tufted) and pleurocarpous (usually branched, carpeted) mosses and are usually relatively open and less luxuriant than in more mature habitats, often with bare ground present in a fine-grained mosaic. They can occur in discrete patches or interspersed in other communities such as open grassland or heathland. Common species are usually present such as the mosses *Brachythecium rutabulum*, *Dicranum scoparium* or *Hypnum cupressiforme*, and the liverworts *Lophocolea heterophylla* or *Ptilidium ciliare*.
   (c) Lichen communities are likely to occur in extensive patches or interspersed with other communities such as open grassland or heathland. Species with a range of growth forms might be present, for example foliose (leaf-like), crustose (crust) or fruticose (shrubby and branched).
   (d) Ruderal communities are those composed mainly of taller annuals, biennials or short-lived perennials and typical of slightly more nutrient-rich, or less disturbed conditions than the annual communities. Typical examples would be *Daucus carota*, *Linaria vulgaris*, *Medicago lupulina* or *Reseda luteola*.
   (e) Inundation communities are comprised of species suited to periodic, often seasonal flooding. Vegetation is usually interspersed with bare areas of mud which can have a caked surface during dry periods and can result in annuals establishing. Typical species would be *Alopecurus geniculatus*, *Juncus bufonius*, *Persicaria maculosa* or *Ranunculus flammula*.
   (f) Open grassland is comprised mainly of perennial, stress-tolerant species of short stature with patches of bare ground at very fine-grained scale and often with a significant number of annual species or lichens in the sward. Typical species would be *Festuca ovina*, *Hypochaeris radicata*, *Pilosella officinarum* or *Rumex acetosella*.
   (g) Flower-rich grassland is a more typical, mature community with fewer gaps and characterised by more robust mesotrophic forbs such as *Centaurea nigra*, *Lotus corniculatus*, *Ranunculus acris* or *Trifolium pratense*.
   (h) Heathland communities are composed mainly of dwarf shrubs, often interspersed or in mosaics with graminoids, bryophytes or lichens. On OMH they tend to have a more open structure with less plant litter and other organic matter build up on the substrate than in more typical heathlands. Typical species include *Calluna vulgaris*, *Deschampsia flexuosa*, *Festuca ovina* or *Nardus stricta*.
   3.1 Annex I shows species of vascular plant known to be associated with, but not confined to, the habitat in certain areas and/or substrates.
   3.2 Other plant species associated with the particular edaphic conditions might also be present, for example ericaceous species on acidic sites. Species composition will also vary with geographic location and site age.
   3.3 One of the principal reasons for the habitat being a priority is its importance for invertebrates. Many have very precise requirements for habitat 'niches' within their landscape. As well as areas of bare ground and food plants, these may be for sheltered places at various times of the year, or for rough vegetation or cover at others. At any particular site, features such as scrub may be essential to maintain the invertebrate value of the main habitat. Therefore, scattered scrub (up to 10–15% cover) may be present and adds to the conservation value of the site. Other communities or habitats might also be present (e.g. reed swamp, open water), but early successional communities should comprise the majority of the area.

4. 'Loose bare' substrate is intended to separate substrate potentially colonisable by plants from large expanses of sealed surface (concrete, tarmac, etc) where vegetation could only establish if it is broken up or heavily weathered.
   4.1 Bare substrate can occur at a range of spatial scales, from unvegetated patches easily seen from a distance, to small, open spaces between individual plants within a community. On some substrates, for example coal spoil, the patches of bare ground may be 10cm across or less. A site with a wide variety of patch sizes could also qualify.
   4.2 Bare substrate also implies absence of organic matter accumulation.

5. A mosaic is defined as an area where a range of contiguous plant community types occur in transition with one another, usually with ecotone habitat gradients and repeated occurrences of each community, and often at a small scale.
   5.1 The mosaic could comprise either:
      - a mixture of one of the habitats (a)–(c) or (e)–(h) plus bare ground together forming a mosaic;
      - a mixture of two or more of the habitats (a)–(h) in a mosaic, with adjacent bare ground;
      - a mixture of two or more of the habitats (a)–(h) plus bare ground together forming a mosaic.
   5.2 Continuous blocks of a closed plant community greater than 0.25ha would be classified as a habitat other than OMH, although those containing very fine-grained mosaics might qualify.

Background Information

The information in this section comes from the submission to the BAP species and Habitats review in 2006–07 (http://jncc.defra.gov.uk/PDF/UKBAP_Species-HabitatsReview-2007.pdf). It has been edited.

These are generally primary successions, and as such unusual in the British landscape, especially the lowlands. The vegetation can have similarities to early/pioneer communities (particularly grasslands) on more 'natural' substrates but, due to the edaphic conditions, the habitat can often persist (remaining relatively stable) for decades without active management (intervention). Stands of vegetation commonly comprise small patches and may vary over relatively small areas, reflecting small-scale variation in substrate and topography.

Plant assemblages are unusual, selected by propagule supply as well as site conditions (Ash *et al*. (1991) for several waste types, Shaw (1994) on Pulverized Fuel Ash (PFA)). The habitat supports a range of notable vascular plant, moss and lichen species. These often include species declining in the wider countryside such as *Ophrys apifera*, *Gymnadenia conopsea* (alkaline wastes), *Epipactis youngiana* (acid waste), *Osmunda regalis* (acid sandstone quarries), *Peltigera rufescens* (lime waste, PFA), *Cladonia pocillum* (calcareous wastes), *Diploschistes muscorum* (PFA) and a UK BAP priority liverwort, *Petalophyllum ralfsii* (PFA). Exotic plant species, which are well adapted to the prevailing environmental conditions, are a characteristic component of associated plant assemblages.

Invertebrate faunas can be species-rich and include many uncommon species (Eyre *et al*., 2002, 2004). Between 12% and 15% of all nationally-rare and nationally-scarce insects are recorded from brownfield sites, which will include many post-industrial examples (Gibson, 1998; Jones, 2002) (see below). Exotic plants provide for an extended flowering season and, with the floristic and structural diversity of the habitat mosaic, contribute to the value of the habitat for invertebrates (see Bodsworth *et al*., 2005).

Some areas are important for birds that are primarily associated with previously developed or brownfield land, such as little ringed plover (in 1984 97% of LRP nests in England were in 'man-made' habitats), as well as more widespread, but UK BAP priority species, including skylark and grey partridge. The habitat provides secure breeding and feeding areas commonly absent from land under agricultural management.

The heterogeneity within the habitat mosaic reflects chemical and physical modification by former development or previous industrial processes, including the exposure of underlying substrates and the tipping of wastes and spoils. Features such as ditches, other exposures, spoil mounds and even the relicts of built structures provide topographical heterogeneity at the macro- and micro-scale. Sealed surfaces and compaction add further variation and contribute to the modified hydrology of such habitats resulting in areas of impeded and accelerated drainage. Stochastic factors also have a significant influence in shaping the habitat.

Edaphic conditions for this habitat are severely limiting on plant growth. Examples are substrates with extreme pH, whether alkaline (e.g. chemical wastes) or acid (e.g. colliery spoils); deficiency of nitrogen (PFA), or available phosphate (highly calcareous Leblanc waste, blast furnace slag and calcareous quarry spoil); or water-deficient (dry gravel and sand pits). Other typical situations where such conditions arise include disused quarries, former railway sidings, extraction pits and landfill sites.

The habitat is concentrated in urban, urban fringe and large-scale former industrial landscapes, especially in the lowlands, though more isolated examples can be found on previously developed land in more remote rural areas.

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ANNEX 1: CHARACTERISTIC SPECIES

NOTE: these are provisional working lists, from February 2010. As more sites are surveyed and mapped, more up-to-date lists are likely to become available. Please check the UK BAP website http://jncc.defra.gov.uk/page-5155 for updates.

Species	Common Name	Southern	N. England	Scotland	S. Wales colliery sites	Thames area (species important for invertebrates)
Achillea millefolium	Yarrow					x
Agrimonia eupatoria	Agrimony					x
Agrostis vineale	Brown Bent				x	
Aira caryophyllea	Silver Hair-grass				x	
Aira praecox	Early Hair-grass				x	
Anthemis arvensis*	Corn Chamomile				x	
Anthemis cotula*	Stinking Chamomile				x	
Anthyllis vulneraria	Kidney Vetch					x
Arctium lappa*	Greater Burdock				x	
Arctium minus	Lesser Burdock				x	
Armeria maritima	Thrift					x
Artemisia absinthium*	Wormwood	x			x	
Artemisia verlotiorum*	Chinese Mugwort	x				
Artemisia vulgaris*	Mugwort	x	x	x		
Aster novi-belgii*	Confused Michaelmas-daisy	x	x	x		
Atriplex patula	Common Orache				x	
Atriplex prostrata*	Spear-leaved Orache				x	
Ballota nigra*	Black Horehound				x	
Barbilophozia floerkei	Common Pawwort				x	
Beta vulgaris	Beet				x	
Blackstonia perfoliata	Yellow-wort	x	x			
Calluna vulgaris	Heather				x	
Campanula glomerata	Clustered Bellflower					x
Campanula rotundifolia	Harebell					x
Carduus crispus	Welted Thistle				x	
Carduus nutans	Musk Thistle				x	
Carduus tenuiflorus	Slender Thistle				x	
Carex arenaria	Sand Sedge				x	
Carex otrubae	False Fox-sedge				x	
Carex pilulifera	Pill Sedge				x	
Catapodium rigidum	Fern-grass				x	
Centaurea cyanus	Cornflower				x	
Centaurea nigra	Common Knapweed	x	x	x		x
Centaurium erythraea	Common Centaury	x	x			
Centranthus ruber*	Red Valerian					x
Cerastium fontanum	Common Mouse-ear	x	x	x		
Chaenorhinum minus*	Small Toadflax				x	
Chenopodium album	Fat-hen				x	
Chenopodium bonus-henricus*	Good-King-Henry					x
Chenopodium ficifolium*	Fig-leaved Goosefoot					x
Chenopodium hybridum*	Maple-leaved Goosefoot					x
Chenopodium polyspermum*	Many-seeded Goosefoot					x
Chenopodium rubrum	Red Goosefoot					x
Chrysanthemum segetum*	Corn Marigold					x
Cichorium intybus*	Chicory	x	x	x	x	
Clinopodium acinos	Basil Thyme					x
Clinopodium vulgare	Wild Basil					x
Conium maculatum*	Hemlock	x	x	x		
Conyza canadensis*	Canadian Fleabane	x				
Conyza sumatrensis*	Guernsey Fleabane	x				
Crepis biennis	Rough Hawk's-beard	x	x		x	
Crepis capillaris	Smooth Hawk's-beard	x	x	x	x	
Dactylorhiza praetermissa	Southern Marsh-orchid	x	x			
Daucus carota* ssp. *sativus*	Carrot	x	x			
Deschampsia flexuosa	Wavy Hair-grass	x	x		x	
Dianthus armeria	Deptford Pink					x
Dianthus deltoides	Maiden Pink					x
Diplotaxis tenuifolia*	Perennial Wall-rocket	x				
Dipsacus fullonum	Wild Teasel				x	
Echium vulgare	Viper's-bugloss	x	x	x		x
Equisetum arvense	Field Horsetail	x	x	x		
Erica cinerea	Bell Heather				x	
Erigeron acer	Blue Fleabane	x	x			x
Erodium cicutarium	Common Stork's-bill					x
***Euphrasia* spp.**	Eyebright	x	x			
Festuca ovina	Sheep's-fescue				x	
Filago minima	Small Cudweed				x	
Filago vulgaris	Common Cudweed				x	
Galega officinalis*	Goat's-rue	x				
Galeopsis bifida	Bifid Hemp-nettle				x	
Galeopsis speciosa*	Large-flowered Hemp-nettle				x	
Galeopsis tetrahit	Common Hemp-nettle				x	
Galium verum	Lady's Bedstraw					x
Geranium molle	Dove's-foot Crane's-bill					x
Glaucium flavum	Yellow Horned-poppy					x
Gnaphalium uliginosum	Marsh Cudweed				x	
Helianthemum nummularium	Common Rock-rose					x
Hieraceum aurantiacum*	Fox-and-cubs					x
Hieracium sabaudum	Autumn Hawkweed	x	x			
Hypericum perforatum	Perforate St John's-wort	x	x	x		x
Hypochaeris radicata	Cat's-ear	x	x	x		
Juncus inflexus	Hard Rush	x	x	x		

Kickxia elatine*	Sharp-leaved Fluellen				x		
Kickxia spuria*	Round-leaved Fluellen				x		
Knautia arvensis	Field Scabious					x	
Lactuca serriola*	Prickly Lettuce				x		
Lactuca virosa	Great Lettuce				x		
Lamium amplexicaule*	Henbit Dead-nettle				x		
Lamium hybridum*	Cut-leaved Dead-nettle				x		
Lathyrus latifolius*	Broad-leaved Everlasting-pea					x	
Leontodon autumnalis	Autumn Hawkbit					x	
Leontodon hispidus	Rough Hawkbit					x	
Lepidium ruderale*	Narrow-leaved Pepperwort	x					
Leucanthemum vulgare	Oxeye Daisy					x	
Linaria purpurea*	Purple Toadflax	x	x			x	
Linaria repens*	Pale Toadflax	x	x		x		
Linaria vulgaris	Common Toadflax	x	x	x	x	x	
Linum catharticum	Fairy Flax	x	x	x			
Lophozia ventricosa	A liverwort				x		
Lotus corniculatus	Common Bird's-foot-trefoil				x	x	
Lotus glaber	Narrow-leaved Bird's-foot-trefoil	x					
Malva moschata	Musk-mallow					x	
Marrubium vulgare*	White Horehound				x		
Matricaria matricarioides	Pineapple Weed	x	x	x			
Matricaria recutita*	Scented Mayweed				x		
Medicago lupulina	Black Medick	x	x	x		x	
Medicago sativa	Lucerne	x					
Melilotus altissimus*	Tall Melilot	x	x				
Melilotus officinalis*	Ribbed Melilot	x	x				
Mentha arvensis	Corn Mint				x		
Misopates orontium*	Weasel's-snout				x		
Nardus stricta	Mat-grass	x	x				
Odontites vernus	Red Bartsia	x	x	x			
Oenothera spp.*	Evening Primrose	x	x				
Ononis spinosa	Spiny Restharrow					x	
Onopordum acanthium*	Cotton Thistle				x		
Ophrys apifera	Bee Orchid	x	x				
Origanum vulgare	Wild Marjoram					x	
Orobanche minor	Common Broomrape				x		
Parentucellia viscosa	Yellow Bartsia				x		
Picris echioides*	Bristly Oxtongue	x	x		x		
Picris hieracioides	Hawkweed Oxtongue	x	x				
Pilosella officinarum agg	Mouse-ear-hawkweed				x	x	
Pilosella praealta*	Tall Mouse-ear-hawkweed	x					
Plantago coronopus	Buck's-horn Plantain				x		
Plantago lanceolata	Ribwort Plantain	x	x	x			
Plantago media	Hoary Plantain					x	
Poa compressa	Flattened Meadow-grass				x		
Primula veris	Cowslip					x	
Prunella vulgaris	Selfheal					x	
Ptilidium ciliare	Ciliated Fringewort				x		
Pulsatilla vulgaris	Pasqueflower						x
Ranunculus acris	Meadow Buttercup						x
Ranunculus bulbosus	Bulbous Buttercup						x
Reseda lutea	Wild Mignonette	x	x	x			x
Reseda luteola*	Weld	x	x	x			
Rumex acetosa	Common Sorel					x	
Salvia pratensis	Meadow Clary						x
Sanguisorba minor	Salad Burnet						x
Saponaria officinalis*	Soapwort	x	x	x			
Scabiosa columbaria	Small Scabious						x
Scrophularia nodosa	Common Figwort					x	
Senecio squalidus*	Oxford Ragwort	x	x	x			
Silene vulgaris	Bladder Campion	x	x	x			x
Spergularia rubra	Sand Spurrey					x	
Tanacetum vulgare	Tansy					x	
Teucrium scorodonia	Wood Sage					x	
Thymus polytrichus	Wild Thyme					x	x
Thymus serpyllum	Breckland Garden						x
Tragopogon pratensis	Goat's-beard	x	x	x	x		
Trifolium arvense	Hare's-foot Clover	x	x	x			x
Trifolium campestre	Hop Trefoil	x	x	x		x	x
Trifolium dubium	Lesser Trefoil	x	x	x			
Trifolium hybridum*	Alsike Clover	x	x	x			
Trifolium medium	Zigzag Clover	x	x	x			
Trifolium micranthum	Slender Trefoil					x	
Trifolium pratense	Red Clover	x	x	x			
Trifolium scabrum	Rough Clover					x	
Trifolium striatum	Knotted Clover					x	
Trisetum flavescens	Yellow Oat-grass	x	x	x			
Tussilago farfara	Colt's-foot	x	x	x		x	
Vaccinium myrtillus	Bilberry					x	
Valerianella carinata*	Keeled-fruited Cornsalad					x	
Valerianella locusta	Common Cornsalad					x	
Verbascum nigrum	Dark Mullein	x				x	x
Verbascum thapsus	Great Mullein					x	
Veronica agrestis*	Green Field-speedwell					x	
Vicia cracca	Tufted Vetch	x	x	x			
Vicia hirsuta	Hairy Tare	x	x	x			
Vicia tetrasperma	Smooth Tare	x					
Vulpia bromoides	Squirreltail Fescue					x	
Vulpia myuros*	Rat's-tail Fescue					x	

*introduced species of lower biodiversity value but still characteristic of OMH sites. Species lists from Riding *et al*. (2009) (*Open Mosaic Habitats on Previously Developed Land, site identification guide* December 2009 ADAS UK Ltd). Sources of information about status: species represented in columns 2–4 – ADAS 2009 as above; other vascular species – status from BSBIs New Atlas CD-ROM, species always introduced in Wales (col 5) or in England (col 6).