



Site: Cawthorne WwTW

Survey: Preliminary Ecological Appraisal
Report

Client: Yorkshire Water

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Author	Date
Sam Bland BSc (Hons) Assistant Ecologist	31 st May 2023
Reviewed	Date
Ben Brown BSc (Hons) ACIEEM Senior Ecologist	2 nd June 2023
Approved	Date
Bill Lever BSc (Hons) MCIEEM Director	2 nd June 2023

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BL Ecology Ltd, 1st Floor, Office 2, Briar Rhydding House, Otley Road, Shipley, BD17 7JW
Tel: 01274 816 800 Email: samb@bl-ecology.info Web: www.bl-ecology.co.uk

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1 Summary

1.1.1 This PEA report has been produced to inform the works to Cawthorne Wastewater Treatment Works. Table 1 below highlights the constraints identified and the actions required.

Table 1 – Summary

Factor	Presence within Zone of Influence		Recommended Action
Sites of Nature Conservation Interest	On site	Within 1km	
Statutory sites	NO	NO	No action required.
Non-statutory sites	NO	YES	No action required.
Botany			
Biodiversity Action Plan (BAP) Habitat	NO		No action required.
Invasive non-native species (INNS)	NO		No action required.
Faunal Species			
Badger	POTENTIAL (foraging only)		See general below.
Bats	POTENTIAL		Precautionary works around T1, T2, G1 and B1. Further surveys required on BT1 and BT2 should they require removal. See general below.
Birds	POTENTIAL		Removal of mature scattered trees, scrub, arable land and grassland should take place outside the breeding bird season (or after a check by a suitably qualified ecologist).
Great crested newts	NO		No action required.
Otters	NO		No action required.
Amphibians and reptiles	POTENTIAL		Staged vegetation removal required and short grass length maintained.
Water vole	NO		No action required.
White-clawed crayfish	NO		No action required.
Migratory and coarse fish	NO		No action required.
BAP species	POTENTIAL		See general below.
General			
General actions which cover multiple botanical and faunal factors	• If tree removal is required additional tree planting should be considered. • Protect retained trees in line with BS:5387 (2012) guidelines. • Security fencing (if required) should ideally allow a 20-30cm gap around the base to allow the passage of mammals. • If vegetation removal or soil stripping is required the area should ideally be sown with a wildflower mix. • Excavations left open overnight should have a means of escape for trapped fauna. • Avoid night working and using security lighting during construction phase if possible. If lighting is required mitigation should be implemented to reduce the impacts to faunal species. • Avoid long-term security lighting where possible, if lighting is required, reduce light spill onto boundaries and particularly T1, T2, G1 and B1.		

1.1.2 In conclusion, the development of this site for Cawthorne Treatment Works could be undertaken with minimal impacts to habitats and faunal species if the recommended mitigation is implemented.

2 Introduction

2.1 Background to Development

2.1.1 Yorkshire Water (YW) are planning to undertake improvements to their Cawthorne Wastewater Treatment Works (WwTW) located off Dark Lane in Cawthorne, South Yorkshire, at Ordnance Survey grid reference SE 28266 08143. Works will also commence within an area of arable land located to the west of the WwTW. The area of land under consideration for this report shall hereby be referred to as 'the site'.

2.1.2 The works will involve:

- New utilities – installation of a new access stair and platform providing access to a balance tank located in the south of the WwTW.
- New pump – A new recirculation pump sump, FFT pump sump and a primary de-sludge pump will be installed in various locations within the WwTW.
- Access track – a temporary access track will be installed across an area of arable land and woodland to provide access to the WwTW from The Park.

2.1.3 The works will hereby be referred to as 'the development'. The proposals are provided in Appendix 1.

2.2 Ecological Background

2.2.1 BL Ecology carried out a Preliminary Ecological Appraisal (PEA) at Cawthorne WwTW in May 2020 (report reference 006_20_07_RE01). This survey covered the entire WwTW complex for an unrelated phosphorous removal scheme. No signs of any notable or protected species were recorded during the survey.

2.2.2 Arcus Consultancy Services carried out a Preliminary Roost Assessment on behalf of Eric Wright Water Ltd. at Cawthorne WwTW in January 2022. This survey assessed all trees within the WwTW for potential roost features (PRFs) suitable for roosting bats. The survey revealed four trees of moderate roosting potential and two trees of low roosting potential.

2.3 Objectives

2.3.1 The purpose of this report is to identify any ecological constraints to the development at Cawthorne WwTW. The assessment therefore sought to classify habitats within the site, establish the presence or likely absence of species protected by UK legislation and policy, establish the value of the species/habitats identified, assess the potential impacts, and likely further surveys or mitigation required.

2.4 Agreed Brief

2.4.1 BL Ecology was commissioned on 15th March 2023 to undertake a preliminary ecological appraisal of the site. The agreed brief was to:

- Undertake a desk study to ascertain protected species and nature conservation sites known within 2km of the site;
- Complete a UK Habitat Classification survey of the areas likely to be affected by works including a Condition Assessment for use with Biodiversity Metric 3.1;
- Assess the habitat suitability for protected and BAP species;
- Determine the Nature Conservation Value of floral habitats and fauna;

- Undertake an impact assessment based on the Overall Site Layout Plan produced by Eric Wright (drawing reference CAW03-ERW-WWT-WWT-DR-C-0001); and
- Submit a report with associated mapping, outlining the likely mitigation for the site including the need for additional surveys.

3 Methodologies

3.1 General

3.1.1 A survey area was defined which is shown on Figure 1 (hereafter named 'the survey area'). The walkover was undertaken on 25th April 2023 by Ben Brown BSc (Hons) ACIEEM, who has been an ecologist for 6 years. The survey was assisted by Sam Bland BSc (Hons) who is in his first year of ecological consultancy.

3.1.2 This chapter describes the methodologies involved for each stage of the assessment. Standard stages undertaken for this type of assessment include a desk study, UK Habitat Classification Survey, and an assessment of habitats available for the potential presence of protected faunal species. This methodology follows the CIEEM 'Guidelines for Preliminary Ecological Appraisal' (December 2017).

3.2 Desk Study

3.2.1 A standard 'study area' was defined which encompassed an area up to 2km from the site. The following sources were used in order to provide data:

- Protected sites and notable/protected faunal records from Yorkshire Water's data agreement with relevant local record centres;
- Multi-Agency Geographic Information for the Countryside (MAGIC) (www.magic.gov.uk) – to ascertain whether there are any statutory sites designated for nature conservation any recently granted (since 2009) European Protected Species (EPS) licences within 2km of the site; and
- Aerial photos – in order to aid preliminary ecological and overall assessment of the site.

3.3 UK Habitat Classification Survey

3.3.1 A walkover survey was undertaken in accordance with the 'UK Habitat Classification User Manual' (UKHab, 2020). This methodology provides a standard technique for recording, identifying, and mapping habitats. The approach is based upon differentiating between various vegetation and other topographical and substrate features such as watercourses. Each habitat type is described in terms of size, condition, and characteristic plant species present. UK Habitat Classification maps are produced to illustrate the results.

3.3.2 All animal and plant names are referred to in the text under their common names and scientific names. All nomenclature for vascular plants follows Stace (1997). Floral diversity and broad NVC of plant communities has been recorded wherever possible.

3.3.3 Any plant species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) that may be present, particularly Japanese knotweed (*Fallopia japonica*), giant hogweed (*Heracleum mantegazzianum*) and Himalayan balsam (*Impatiens glandulifera*), have been recorded and mapped.

3.4 Condition Assessment

3.4.1 Habitat condition assessments have been carried out for all applicable habitats using the Biodiversity Metric 4.0 guidance, those excluded from the condition assessment are those not required by the Biodiversity Metric 4.0 Condition Assessment Sheets (Natural England, 2023).

3.5 Faunal Surveys

Badger Survey

- 3.5.1 Badgers (*Meles meles*) can be found on a variety of habitat types. They generally prefer to create setts in undisturbed areas and within topography that is sloped. Preferred habitats for foraging include woodlands and grassland (Woods, 1995). The site was searched for any signs of badger presence. Signs searched for included entrance holes (setts), dung pits, hair, footprints, badger footpaths, scratching posts, and snuffle holes.

Bat Habitat Assessment

Daytime Inspection for Signs of Roosting Bats

- 3.5.2 The survey included any trees within the site considered likely to be impacted by the proposed development. Trees were assessed for signs of roosting bats from ground level using binoculars. Signs searched for included bat droppings, scratch and grease marks around entrances, dead juvenile bats, and noises of bats calling from within the roost.

Daytime Inspection for Bat Roost Potential

- 3.5.3 An assessment was also made of the potential for the trees to support bats at other times of year. Suitable bat roosting features were searched for on the trees; features searched for included loose bark, woodpecker holes, rot holes, mature ivy, dead wood, and stress splits and cracks.
- 3.5.4 The trees were then awarded a level of potential to support roosting bats in summer, the breeding period, transitionally and in winter. The level of potential is defined by the presence of suitable roosting features together with the locality, environmental conditions, age and proximity to suitable bat foraging habitat. The levels of potential are defined below:
- **Negligible** – Tree with no roosting potential and located in poor bat foraging habitat;
 - **Low** – Tree with limited roosting potential with limited suitable bat foraging habitat. No suitability for breeding and/or hibernating bats;
 - **Moderate** – Tree with some roosting potential of varying types and sizes, connected to some optimal bat foraging habitat. Some suitability for breeding bats and/or hibernating bats;
 - **High** – Tree with multiple potential roosting cavities of varying types and sizes. High suitability for breeding bats and/or hibernating bats and connectivity to a range of optimal bat foraging habitats; and
 - **Confirmed roost** – Presence of droppings found internally, underneath roost access points or the presence of bats confirmed.

Breeding Bird Habitat Assessment

- 3.5.5 Nesting sites for birds depends on the species involved and can be created within structures (buildings, bridges, cliffs etc.), trees, shrubs, within ground vegetation and on bare ground, providing that suitable foraging habitat is adjacent. Habitats within the site were assessed for their suitability for breeding birds.

Great Crested Newt Habitat Assessment

- 3.5.6 Great crested newts (*Triturus cristatus*) require standing water on the site or on adjacent land. Any ponds within 250m of the site were considered
- 3.5.7 Great crested newts require different habitats at different times of the year; the site was searched for terrestrial habitat most suitable for newts including scrub, unimproved grassland, woodland and gardens (Oldham *et al.*, 2000).

Otter Habitat Assessment

- 3.5.8 Otters (*Lutra lutra*) require freshwater habitat in the form of standing or running water. The water must contain prey species, such as fish, crustaceans or amphibians. Suitable riparian habitat is required that can support resting sites and natal dens, the latter of which are created within secure, undisturbed sites such as within exposed tree roots adjacent to the water, or within disused rabbit entrances. Habitats within the site were assessed for their suitability for otters.

Reptile Habitat Assessment

- 3.5.9 The habitat requirements of this group depend on the species involved. The most likely species to be encountered in the UK are common lizard (*Zootoca vivipara*), barred grass snake (*Natrix helvetica*), slow worm (*Anguis fragilis*) and adder (*Vipera berus*). Reptiles require a heterogeneous habitat with different vegetation types and structures, including bare ground patches for basking. Habitats within the site were assessed for their suitability for reptiles.

Water Vole Habitat Assessment

- 3.5.10 Water voles (*Arvicola amphibius*) require freshwater habitat that has a relatively stable water level. Undisturbed riparian habitat is required that has an abundance of vegetation species such as grasses and rushes that provide both cover from predators and act as a food source (Strachan, 2011). Habitats within the site were assessed for their suitability for water voles.

White-Clawed Crayfish Habitat Assessment

- 3.5.11 This species of crayfish (*Austropotamobius pallipes*) requires calcareous streams with an abundance of suitable refuges, such as a rocky substrate, tree roots and leaf litter (Holdich, 2003). Habitats within the site were assessed for their suitability for crayfish.

Invertebrate Habitat Assessment

- 3.5.12 Invertebrates are a large and diverse group that inhabit a wide range of habitats. Habitats with the greatest potential to support important invertebrate species or assemblages include: aggregates and quarries; brownfield sites; flower-rich grasslands; ponds and wetlands; scrubland, hedgerows and scrubby grassland; and mature and decaying trees. The most important sites will usually be where there are mosaics and combinations of these habitats. The site was assessed for its suitability for invertebrates.

3.6 Impact Assessment

- 3.6.1 An impact assessment of the proposed development was undertaken following the 'Guidelines for Ecological Impact Assessment in the UK and Ireland (Second Edition, 2016)' by the Chartered Institute for Ecology and Environmental Management. Further details of the assessment methodology are provided in Appendix 2.

3.7 Limitations

- 3.7.1 The data collected and presented within this report is considered valid for a period of two years, after which update surveys are likely to be required to re-assess the conditions.

4 Results and Impacts

4.1 Desk Study

4.1.1 Table 2 below provides the results of the faunal data search, which are mapped onto Figure 1.

Table 2: Faunal Data Search Results

Distance	Records
On site	One bird record on site, dated 2018. Record consisted of the BoCC red listed yellowhammer (<i>Emberiza citrinella</i>) species. In addition to the single bird record returned within the desk study, a search of the MAGIC online database revealed that the site falls within the County Stewardship (CS) Priority Species targeting area for the BoCC red listed curlew (<i>Numenius arquata</i>) and lapwing (<i>Vanellus vanellus</i>). The site also lies within areas highlighted as suitable for breeding and farmland bird assemblages of the BoCC red listed grey partridge (<i>Perdix perdix</i>), lapwing and tree sparrow (<i>Passer montanus</i>).
Within 500m	16 amphibian records, all consisting of the common toad (<i>Bufo bufo</i>) species. All records dated from 2016-2017 and located to the west of the site along Daking Brook LWS. Four bat records, most recent dated 2021 consisting of common pipistrelle (<i>Pipistrellus pipistrellus</i>), brown long-eared bat (<i>Plecotus auritus</i>), Daubenton's bat (<i>Myotis daubentonii</i>) and whiskered bat (<i>Myotis mystacinus</i>) species. Ten bird records, most recent dated 2019. Records consisted of the BoCC red listed grey partridge and the amber listed greylag goose (<i>Anser anser</i>), kingfisher (<i>Alcedo atthis</i>), pintail (<i>Anas acuta</i>) and reed bunting (<i>Emberiza schoeniclus</i>). Eight crustacean records, all consisting of white clawed crayfish (<i>Austropotamobius pallipes</i>), most recent dated 2010. Records located along Daking Brook LWS with three records located 20m north of the site. Five records of protected or endangered plant species, all consisting of bluebell (<i>Hyacinthoides non-scripta</i>) species located along Daking Brook LWS, all dated 2016. Five counts of terrestrial mammals, all consisting of European hedgehog (<i>Erinaceus europaeus</i>), most recent dated 2019. 36 records of faunal invasive non-native species (INNS) consisting of signal crayfish (<i>Pacifastacus leniusculus</i>), Canada geese (<i>Branta canadensis</i>), eastern grey squirrel (<i>Sciurus carolinensis</i>) and mandarin duck (<i>Aix galericulata</i>) species. Six records of floral INNS consisting of Himalayan balsam (<i>Impatiens glandulifera</i>), rhododendron (<i>Rhododendron ponticum</i>), evergreen oak (<i>Quercus ilex</i>), Turkey oak (<i>Quercus cerris</i>) and American skunk-cabbage (<i>Lysichiton americanus</i>) species.
Within 2km	27 amphibian records, consisting of 16 common toad records, most recent dated 2019 and 11 great crested newt records, most recent dated 2016. All amphibian records located to the west of the site. 70 bat records within 2km of the site, most recent dated 2021. Records consisted of common pipistrelle, soprano pipistrelle (<i>Pipistrellus pygmaeus</i>), brown long-eared bat, whiskered bat, lesser noctule (<i>Nyctalus leisleri</i>) and noctule bat (<i>Nyctalus noctula</i>) species. 71 bird records, most recent dated 2021. Records consisted of the BoCC red listed curlew, fieldfare (<i>Turdus pilaris</i>), grey partridge, hawfinch (<i>Coccothraustes coccothraustes</i>), house sparrow (<i>Passer domesticus</i>), lapwing, lesser redpoll (<i>Acanthis cabaret</i>), redwing (<i>Turdus iliacus</i>), skylark (<i>Alauda arvensis</i>) and yellowhammer and the amber listed greylag goose, kingfisher, reed bunting and pintail and the Schedule 1 listed brambling (<i>Fringilla montifringilla</i>), common crossbill (<i>Loxia curvirostra</i>) firecrest (<i>Regulus ignicapilla</i>), hobby (<i>Falco subbuteo</i>), osprey (<i>Pandion haliaetus</i>), peregrine falcon (<i>Falco peregrinus</i>) and red kite (<i>Milvus milvus</i>) species. 16 crustacean records, all consisting of white-clawed crayfish, most recent dated 2020. Records located along Daking Brook LWS both to the east and west of the site. 48 records of protected or endangered plant species within 2km of the site, all consisting of bluebell species, most recent dated 2018. 13 counts of terrestrial mammals consisting of four European badger records, most recent dated 2018, nine brown hare (<i>Lepus europaeus</i>) records, most recent dated 2021, three European hedgehog records and one otter record, dated 2019. Due to the continued persecution of European badgers their location has not been disclosed. Otter record located 2km east of the site.

	35 records of faunal INNS consisting of signal crayfish, Canada goose, eastern grey squirrel and American mink (<i>Neovison vison</i>) species. 30 records of floral INNS consisting of Himalayan balsam, rhododendron, evergreen oak, Turkey oak and Japanese knotweed species.
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4.1.2 Table 3 below provides a list of all protected nature conservation sites within 2km of the site and the potential impact from the development.

Table 3: Nature Conservation Sites within 2km

Receptor	Details	Impact	Legislation (if relevant)
Statutory Nature Conservation Sites			
There are no Statutory Nature Conservation Sites within 2km of the site however the site does lie within a Site of Special Scientific Interest (SSSI) Impact Risk Zone (IRZ).			
Pye Flatts Meadows SSSI IRZ	2.9km south of the site, designated due to the presence of the best example of neutral hay meadows in the locality. This site holds ' <i>national</i> ' nature conservation value (NCV).	The development is expected to be small scale and does not meet the criteria for developments likely to impact the SSSI - <i>neutral impact</i>	WCA 1981 ¹ CRoW Act 2000 ²
Non-Statutory Nature Conservation Sites			
There are three Non-Statutory Nature Conservation Sites within 2km of the site			
Daking Brook Local Wildlife Site (LWS)	0.06km north of the site, designated due to the presence of running water, woodland and grassland habitats with white-clawed crayfish and yellow waterlily also noted. This site holds ' <i>regional</i> ' nature conservation value (NCV).	Potential pollution of the watercourse if construction works are required at Tanyard Beck which is a tributary of Daking Brook – <i>moderate adverse impact</i> .	Barnsley Local Plan
Margery Wood LWS	1.1km north-west of the site. Designated due to woodland, grassland and open water habitats with great horsetail, thin-spiked wood-sedge and pendulous sedge also noted. This site holds ' <i>regional</i> ' NCV.	No anticipated impact due to the distance from the site, lack of connectivity, dissimilar habitats and small scale of the development – <i>neutral impact</i> .	
Deffer Wood LWS	1.6km north-west of the site. Designated due to species rich acid woodland with native vascular plant diversity. This site holds ' <i>regional</i> ' NCV.		

4.2 UK Habitat Classification Survey

4.2.1 Habitats found during the UK Habitat Classification Survey are shown on Figures 2a and 2b. All are common habitats found across the UK, with no rare flora or communities recorded during the survey. Table 4 below details the habitats found on the site and consideration of the faunal groups/species that could be present. Habitats have been divided into two areas. Area 1 details all habitats found located within the WwTW boundary and are shown on Figure 2a, Area 2 shows all habitats located outside of this boundary and are shown on Figure 2b.

¹ The Wildlife and Countryside Act 1981 (as amended)

² The Countryside Rights of way Act 2000

- 4.2.2 The site is 5.57ha in size, with 0.37ha falling within the WwTW boundary. The remaining 5.2ha is located to the west of the WwTW. Habitats within the WwTW boundary are predominantly comprised of other neutral grassland with developed urban areas (WwTW infrastructure) and areas of scrub. Outside the WwTW boundary, habitats are predominantly comprised of arable land with areas of grassland and broad-leaved woodland. A ditch runs through the area of woodland located to the west of the WwTW site. The wider landscape is largely rural with arable land located to the east and west of the site. Tanyard Beck is located immediately to the east of the site while the village of Cawthorne is found to the south of the site.

Table 4: Survey Results and Potential Impacts

Receptor	Details	Potential Impact	Legislation (if relevant)
Habitats			
Area 1			
g3c – other neutral grassland	0.22ha of grassland was found to be present within the WwTW boundary (Figure 3 Photograph 1). Grassland was found to be irregularly managed with frequent patches of bare ground. This habitat was dominated by cock's-foot (<i>Dactylis glomerata</i>), Yorkshire-fog (<i>Holcus lanatus</i>), red fescue (<i>Festuca rubra</i>) and meadow foxtail (<i>Alopecurus pratensis</i>). An abundance of daisy (<i>Bellis perennis</i>) and common dandelion (<i>Taraxacum officinale</i>) were discovered across this habitat with frequent common nettle (<i>Urtica dioica</i>) and cleavers (<i>Galium aparine</i>). Occasional common ragwort (<i>Senecio jacobaea</i>), rosebay willowherb (<i>Chamerion angustifolium</i>), herb-robert (<i>Geranium robertianum</i>) cinquefoil (<i>Potentilla so.</i>), cow parsley (<i>Anthriscus sylvestris</i>) and groundsel (<i>Senecio vulgaris</i>) were also discovered within this grassland. This habitat was considered to be of 'poor' condition. Failing all criteria but No. 3 (cover of bare ground is between 1-5%) and No. 4 (cover of bracken is less than 20%) (See Appendix 3). This habitat was classed as holding 'local' nature conservation value (NCV).	Loss of 0.006ha of grassland for the installation of a new FFT pump sump in the east of the site, a new access stairs and platform in the south of the site and a new primary de-sludge pump in the west of the site – slight adverse impact. Temporary loss of approximately 0.012ha of grassland for the digging and trenching of new utilities – slight adverse impact.	N/A
u1b6 – other developed land	0.08ha present throughout the WwTW in the form of treatment works infrastructure (Figure 3 – Photograph 2). All urban habitats are automatically assigned a 'N/A – other' condition. This urban habitat was classed as holding 'Negligible' NCV.	No anticipated impact. The current plans indicate that areas of WwTW infrastructure will not be impacted by the development – neutral impact.	N/A
u1e – built linear features	0.05ha of road and 320m of security fencing present within the WwTW boundary. This road runs from the gate located to the north of the WwTW, leading to the centre of the treatment works. Fencing is present along the entire WwTW boundary, with access gates located to the north and the southwest of the treatment works. All urban habitats are automatically assigned a 'N/A – other' condition. This urban habitat was classed as holding 'Negligible' NCV.	Temporary loss of up to 0.01ha for the digging and trenching of new utilities. Habitat is of no ecological value – neutral impact.	N/A

u1b – developed land, sealed surface	0.015ha present to the southwest of the WwTW. This habitat is comprised of a built, hard-standing area, providing access to water tanks and other WwTW infrastructure. All urban habitats are automatically assigned a 'N/A – other' condition. This urban habitat was classed as holding 'Negligible' NCV.	Loss of 0.002ha to allow for the installation of a new recirculation pump sump. Habitat is of no ecological value – neutral impact .	N/A
h3h – mixed scrub	0.012ha present to the northwest of the WwTW (Figure 3 – Photograph 3) This area of scrub was found to contain an abundance of elder (<i>Sambucus nigra</i>), bramble (<i>Rubus fruticosus agg.</i>), common nettle and cleavers with no single dominant species present within this habitat. This area of scrub was considered to be of 'poor' condition, failing all criteria but No. 1 (at least 80% native species) and No. 3 (absence of invasive non-native species). This habitat was classed as holding 'local' NCV.	No anticipated impact. The current plans indicate that this area of mixed scrub will not be impacted by the development – neutral impact .	N/A
h3d – bramble scrub	0.003ha present to the east of the WwTW, behind buildings B1 and B2 (Figure 3 – Photograph 4). This area of scrub was dominated by bramble, with frequent ground-ivy (<i>Glechoma hederacea</i>) and common nettle present. Bramble scrub is automatically assigned a 'N/A – other' condition. This habitat was classed as holding 'local' NCV.	No anticipated impact. The current plans indicate that this area of bramble scrub will not be impacted by the development – neutral impact .	N/A
u1b5 - buildings	Two buildings (B1 and B2) were discovered to the east of the WwTW, as described below: - B1 – small 0.0006ha brick building with sloping corrugated roof and wooden barge boards (Figure 3 – Photograph 5). - B2 – small 0.0004ha pre-fabricated paneled control room with flat roof (Figure 3 – Photograph 6). All urban habitats are automatically assigned a 'N/A – other' condition. This urban habitat was classed as holding 'Negligible' NCV.	No anticipated impact. The current plans indicate that the buildings will not be impacted by the development – neutral impact .	N/A
w1g6 – line of trees	110m present to the west of the WwTW, running along the edge of the treatment works boundary (Figure 3 – Photograph 7). This line of trees consisted entirely of planted, mature cypress (<i>Cupressus sp.</i>) trees. This line of trees was considered to be of 'poor' condition, failing all criteria but No. 2 (tree canopy is predominantly continuous) and No. 5 (at least 95% of trees in healthy condition).	No anticipated impact. The current plans indicate that this line of trees will not be impacted by the development – neutral impact .	N/A

	This habitat was classed as holding ' local ' NCV.		
11 – scattered trees	A number of scattered trees were discovered within the WwTW boundary, with the majority being present within areas of other neutral grassland. Tree species present within this habitat consisted of semi-mature wild cherry (<i>Prunus avium</i>) and a single willow (<i>Salix sp.</i>) sapling both located to the northwest of the WwTW. A single mature golden-chain laburnum (<i>Laburnum anagyroides</i>) was also discovered to the west of this grassland habitat. A group of five semi-mature trees were discovered to the east of this habitat, consisting of elder, hawthorn and cherry trees alongside a single mature elder located within the northeast area of other neutral grassland. A single, mature crab-apple (<i>Malus sylvestris</i>) tree was also discovered within the area of mixed scrub to the northwest of the WwTW, Each of the cherry, crab-apple, and elder trees were found to be of 'good' condition with both the cherry and the elder trees passing every single criteria. The crab-apple tree passed all criteria but No. 5 (natural ecological niches for vertebrates and invertebrates present). Both the golden-chain laburnum and the group of trees were found to be of 'moderate' condition. The golden-chain laburnum was found to have passed all criteria but no. 1 (native tree species) and No. 2 (continuous tree canopy) whilst the group of trees was found to have passed all criteria but No. 2 and No. 3 (tree is mature). This habitat was classed as holding 'local' NCV.	Loss of small group of semi-mature trees to the east of the site to allow for the installation of new FFT pump sump – slight adverse impact .	N/A
Target notes	TN1 – Debris pile of discarded wooden pallets and concrete posts located to the southeast of the WwTW (Figure 3 – Photograph 8). TN2 – Debris pile of discarded wooden branches located to the south of the WwTW (Figure 3 – Photograph 9).		
Area 2			
c1 – arable and horticulture	2.7ha present, located within the eastern half of a large field discovered to the west of the WwTW (Figure 3 – Photograph 10). This area of arable land is unmanaged and was found to be dominated by wilting rape (<i>Brassica napus</i>) with an abundance of dandelion. Frequent broad-leaved dock (<i>Rumex obtusifolius</i>), cleavers, creeping buttercup (<i>Ranunculus repens</i>), creeping thistle (<i>Cirsium arvense</i>) and white clover (<i>Trifolium repens</i>) were also found to be present with occasional cut-leaved crane's-bill (<i>Geranium dissectum</i>), wall speedwell (<i>Veronica arvensis</i>) and red dead-nettle (<i>Lamium purpureum</i>). This arable habitat is automatically assigned a 'N/A – other' condition. This habitat was classed as holding 'local' NCV.	Temporary loss of approximately 0.1ha of arable land for the creation of a temporary access road to the WwTW. Habitat is expected to be returned to its initial state following the commencement of the works – slight adverse impact .	N/A

c1b – temporary grass and clover leys	2.1ha present, located within the western half of a large field discovered to the west of the WwTW (Figure 3 – Photograph 11). This area of arable land is unmanaged and is dominated by dandelion with an abundance of red clover (<i>Trifolium pratense</i>) and frequent speedwell (<i>Veronica sp.</i>) and cranesbill (<i>Geranium sp.</i>). Occasional hairy bitter-cress (<i>Cardamine hirsuta</i>) and shepherd's cress (<i>Teesdalia nudicaulis</i>) were also found to be present. This arable habitat is automatically assigned a 'N/A – other' condition. This habitat was classed as holding 'local' NCV.	Temporary loss of approximately 0.05ha of arable land for the creation of a temporary access road to the WwTW. Habitat is expected to be returned to its initial state following the commencement of the works – slight adverse impact.	N/A
w1g – other woodland – broadleaved	0.17ha present, located immediately to the west of the WwTW boundary (Figure 3 – Photograph 12). Woodland consisted mostly of mature and semi-mature trees. Tree species included horse-chestnut (<i>Aesculus hippocastanum</i>), sycamore (<i>Acer pseudoplatanus</i>), holly (<i>Ilex aquifolium</i>), hawthorn (<i>Crataegus monogyna</i>), ash (<i>Fraxinus excelsior</i>) and oak (<i>Quercus sp.</i>). Bare ground was found to be dominant beneath the tree canopy, with limited ground flora present. Ground flora consisted of occasional cleavers and common nettle. The majority of the vegetation within this area of woodland was within the ditch running through this habitat (see r1e – ditch below). This habitat was considered to be of 'poor' condition, achieving a total condition assessment score of 23. This habitat scored particularly poorly on criteria No. 6 (open space within woodland), No. 8 (tree health), No. 9 (vegetation and ground flora), No. 12 (amount of deadwood) and No. 13 (woodland disturbance). Mixed deciduous woodland is listed within the Barnsley Local Biodiversity Action Plan (BAP). Therefore, this habitat was classed as holding 'regional' NCV.	Loss of approximately 0.016ha of woodland for the creation of a temporary access road to the WwTW. Habitat is listed within Barnsley Local BAP – moderate adverse impact.	Barnsley Local Plan
g3c – other neutral grassland	0.08ha present, located to the southwest of a large field discovered to the west of the WwTW (Figure 3 – Photograph 13). Grassland was found to be irregularly managed and dominated by cock's-foot. An abundance of dandelion and ribwort plantain and frequent cow parsley, daisy and field forget-me-not (<i>Myosotis arvensis</i>) were present within this habitat. Occasional common nettle and red clover were also found to be present within this area of grassland. This habitat was found to be of 'poor' condition, failing all criteria but No. 3 and No. 4. This habitat was classed as holding 'local' NCV.	Temporary loss of approximately 0.005ha of grassland for the creation of a temporary access road to the WwTW. Habitat is expected to be returned to its initial state following the commencement of the works – slight adverse impact.	N/A

u1e – built linear features	0.08ha of road (Dark Lane) present to the west of the WwTW. Road provides access to the WwTW (Figure 3 – Photograph 12). All urban habitats are automatically assigned a 'N/A – other' condition. This urban habitat was classed as holding 'Negligible' NCV.	No anticipated impact. The current plans indicate that Dark Lane will not be impacted by the development – neutral impact .	N/A
r1e – ditch	200m shallow earth ditch present within the area of woodland located to the west of the WwTW (Figure 3 – Photograph 14). The ditch was found to contain pools of water and was dominated by lesser celandine (<i>Ranunculus ficaria</i>) in dry areas. Frequent amounts of cleavers, cow parsley, common nettle, daffodil () and ground ivy were also found to be present with occasional elder saplings also discovered within the ditch. This habitat was found to be of 'poor' condition, failing all criteria but No. 1 (ditch is of good water quality), No. 3 (less than 10% cover of filamentous algae), No. 5 (physical damage is less than 5% of the ditch) and No. 8 (absence of non-native plant species.). This habitat was classed as holding 'local' NCV.	Loss of approximately 15m of this ditch to allow for the construction of a temporary access road to the WwTW. Ditch is of poor condition and not listed within local plans – slight adverse impact .	N/A
Faunal Species			
Amphibians	The desk study returned 16 common toad records within 500m of the site. Great crested newts are considered unlikely to be present due to a lack of records returned in the desk study, no aquatic habitat on site (ditch to the west of the WwTW considered to only occasionally hold water and lacks aquatic vegetation) and no suitable waterbodies within 500m of the site. This species will no longer be considered as part of this report. Potential terrestrial habitat for amphibians was present within woodland and scrub areas found on site and within piles of debris located in the southeast of the WwTW (Figure 2a – TN1, TN2 and Figure 3 – Photographs 8 and 9). Suitable aquatic habitat for species such as common toads and common frogs was identified within the ditch found to the west of the WwTW and within Tanyard beck. This habitat is limited however, due to low water levels whilst it is likely that this ditch is dry during periods of low rainfall. The site was considered to hold 'local' NCV for BAP amphibians.	Loss of up to 15m of potential suitable aquatic habitat for BAP amphibians for the construction a temporary access road. Habitat is deemed to be of limited suitability – slight adverse impact. Killing/injury of Biodiversity Action Plan (BAP) amphibians (such as toads) during the construction phase through machinery movement, excavations for cables or soil stripping/levelling (if required).	The Habitat Regs. 2017³ WCA 1981⁴ CRoW Act 2000⁵

³ The Conservation of Habitats and Species Regulations 2017 (as amended)

⁴ Wildlife and Countryside Act 1981 (as amended)

⁵ The Countryside and Rights of Way Act 2000

Badger	The desk study returned four records of badger within 2km of the site. The WwTW site is well secured with metal fencing which would prevent access for badger into the site. Their presence on site, for foraging of sett creation, is highly unlikely. Woodland and field boundaries immediately surrounding the site, and along the footprint of the temporary access track, were searched for signs of badger presence. No active signs were recorded during the walkover. Potential sett creation habitat is present within areas of broad-leaved woodland however this habitat is limited due to small size and frequent human disturbance. Potential foraging habitat was also found to be present within areas of open grassland and arable land to the west of the WwTW. This site was considered to hold 'local' NCV for badgers.	Temporary loss of up to 0.15ha of foraging habitat for the construction of a temporary access road. Habitat is widespread and the works are only expected to impact a small area of this habitat. No signs of current badger usage were observed and therefore this is unlikely to have a significant impact on badgers – slight adverse impact. Loss of limited potential sett creation habitat – larger woodland areas are present within the nearby landscape therefore this loss is not considered to have a significant impact to this species – slight adverse impact. Potential disturbance during the construction phase and during operation if night working is undertaken – slight adverse impact.	Protection of Badger Act 1992
Bats	The desk study returned four bat records within 500m of the site. A preliminary roost assessment report was previously conducted at Cawthorne WwTW by Arcus in January 2022. Two individual trees (one alder and one golden-chain laburnum) and a group of trees (all hawthorn) listed within this report fell within the survey area during the walkover of the site (see Arcus report – T1, T2 and G1). These trees were inspected to determine whether any additional potential roost features (PRF's) had formed and to determine whether the trees still hold the same level of suitability for roosting bats. Upon further inspection it was decided that each of the trees assessed during the walkover of the site still held the same level of suitability for roosting bats (see Arcus report for further details). Two additional trees located within the area of woodland to the west of the WwTW were also deemed to hold potential for roosting bats: - BT1 – mature oak tree located at OS grid reference SE 28246 08111 (Figure 3 – Photograph 15). PRF's discovered on all aspects at various heights along the tree – high bat roosting potential. - BT2 – mature ash tree located at OS grid reference SE 28250 08087 (Figure 3 – Photograph 16). Deep cavity discovered approximately 4m up on the northern aspect of the tree. Tree is cluttered with hawthorn saplings and so it could not be fully accessed during the walkover of the site – low bat roosting potential. Of the two buildings discovered within the WwTW boundary building B1 was deemed to hold limited bat roosting potential, as detailed below:	BT1 and BT2 may require removal during the construction of a temporary access road. The presence of bats within each of these trees is unknown and their removal may result in the killing of bats roosting within these trees – moderate adverse impact and a contravention of legislation. Loss of potential future roosts/PRFs during the felling of 0.016ha of woodland for temporary access road to the site – slight adverse impact. Works within the vicinity of trees and buildings with bat roost potential have the potential to disturb roosting bats temporarily during the construction phase through increased light, noise and dust. Should this cause the abandonment of roosts this would be a - moderate adverse impact and a contravention of legislation. Disturbance to foraging bats during the construction phase through increased light, noise and dust, night working and changes to site layout – slight adverse impact in the short-term.	The Habitat Regs. 2017⁶ WCA 1981 CRoW Act 2000 Barnsley BAP

⁶ The Conservation of Habitats and Species Regulations 2017

	- B1 – small gaps in brickwork and under barge boards provide suitable roosting opportunities for small numbers of crevice dwelling species such as common pipistrelles – low bat roosting potential. The site also offers suitable foraging and commuting habitat for bats over arable land, woodland and grassland areas. Nine species of bat are listed within Barnsley local BAP, therefore the site is considered to hold 'regional' NCV for bats.		
Birds	The desk study returned a single record of the BoCC red listed yellowhammer on site and ten bird records within 500m of the site. Yellowhammer favour areas of farmland and grassland and are known to nest on or within 2m of the ground and so their presence may be likely on site. High levels of human presence within these areas however, may limit the suitability of this habitat. Potential breeding bird habitat is also present within woodland, scattered trees and areas of grassland, scrub and arable land on site. This site was considered to hold 'local' NCV for birds.	Destruction/damage to nests and hence killing/injury of birds during the construction phase if undertaken during the breeding bird season (between March and September inclusive dependent on weather conditions). This would constitute a moderate adverse impact and contravention of wildlife legislation.	WCA 1981
Otter	The desk study returned a single otter record within 2km of the site. No signs of otter presence were revealed within the walkover of the site. Although no suitable aquatic habitat was identified within the survey area, potential aquatic habitat is present within Tanyard beck, located immediately to the east of the site. Suitable habitats for holts and resting sites may be present however within areas of broad-leaved woodland located within the survey area. This is deemed unlikely however due to high levels of human disturbance within this habitat. This site was considered to hold 'negligible' NCV for otter.	No anticipated impact.	The Habitat Regs. 2017 WCA 1981 CRoW Act 2000 Barnsley BAP
Reptiles	The desk study revealed no records of reptiles within 2km of the site. The arable, scrub and grassland habitats across the site provide suitable habitat for common species of reptile such as grass snake (<i>Natrix helvetica</i>), slow worm (<i>Anguis fragilis</i>) and common lizard (<i>Lacerta vivipara</i>). Hard standing habitats and piles of debris located in the south and southeast of the WwTW also provide habitats suitable for basking and hibernation of reptile species (Figure 2a – TN1, TN2 and Figure 3 – Photographs 8 and 9). The site was considered to hold 'local' NCV for reptiles.	Loss of small area of suitable habitat. Habitat for reptiles exists within the wider landscape therefore not considered to be a major impact – slight adverse impact. Killing/injury of reptiles during the construction phase through machinery movement and excavations. This would be a moderate adverse impact and contravention of wildlife legislation.	WCA 1981
Water vole	The desk study revealed no water vole records within 2km of the site.	No anticipated impact.	WCA 1981

	Although no suitable habitats were identified during the walkover of the site, potential habitat may be present within Tanyard beck located immediately to the east of the WwTW. This habitat may be deemed to be sub-optimal however due to heavy shading from mature trees located across the bankside of the beck. Water vole are listed within Barnsley local BAP whilst Daking Brook LWS (located 0.06km north of the site) is listed within the BAP as suitable habitat for this species. As the habitats assessed within the survey area were considered unlikely to hold any potential for this species; the site was considered to hold 'negligible' NCV for water vole.		Barnsley BAP
White-clawed crayfish	The desk study revealed eight records of white-clawed crayfish within 500m of the site. Despite these records, no flowing watercourses were found during the walkover of the site. Potential habitat may be present within Tanyard beck, located immediately to the east of the WwTW however the works are not expected to impact this watercourse. This site was considered to hold 'negligible' NCV for white-clawed crayfish.	No anticipated impact.	Barnsley BAP
Brown hare	The desk study revealed nine brown hare records within 2km of the site. The presence of fencing around the WwTW means that the likelihood of brown hare within the boundary of the treatment works may be deemed unlikely. However, open grassland and arable fields to the west of the WwTW would provide suitable foraging habitat for this species. This site was considered to hold 'local' NCV for brown hare.	Killing/injury of leverets during construction phase – slight adverse impact and contravention of the objectives of the UK BAP by reducing the population size. Loss of suitable foraging habitat during the construction of temporary access roads on arable land. Works within this habitat are small scale, with similar habitats found to be widespread within the wider area – slight adverse impact.	UK BAP/S41 NERC
Hedgehogs	The desk study revealed five hedgehog records within 500m of the site. No evidence of hedgehogs was found during the walkover of the site. Potential habitat for hedgehogs exists however during every stage of their life cycle, within the grassland, scrub, woodland, arable land and areas of debris/spoil across the site. The survey areas was considered to hold 'local' NCV for hedgehog.	Potential killing/injury through woodland clearance to facilitate installation of the temporary track. Potential entrapment of hedgehog should excavations be left open overnight with no means of escape for trapped fauna – moderate adverse impact and contravention of the objectives of the UK BAP by reducing the population size.	UK BAP/S41 NERC Barnsley BAP
Invertebrates	All habitats on site have the potential to support invertebrates but diversity is limited within habitats discovered within the WwTW due to the small-scale nature of the site and the management of other neutral grassland (Area 1).	Likely reduction in botanical species diversity across the site, which has the potential to reduce the species diversity and abundance of invertebrates using the site. The works are of a small-scale with similar habitats present within the wider landscape, therefore they are	Barnsley BAP

	A range of invertebrate species are highly likely to be present within Area 2 due to the variety of habitats on site. This includes the dingy skipper (<i>Erynnis tages</i>) which is listed within Barnsley local BAP. This site was considered to hold 'regional' NCV for invertebrates.	not to be considered to be a major impact – <i>slight adverse impact</i>. Potential increase in light, dust and chemical pollution short-term during the construction phase, however this is likely to be minimal (assuming soil stripping/levelling is not required) – <i>slight adverse impact</i>.	
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5 Recommendations

5.1 Habitats and Faunal Species

5.1.1 Table 5 below provides the recommendations for habitats and faunal species that will potentially be impacted by the development.

Table 5: Mitigation and Recommendations

Receptor	Mitigation
Habitats and botany	
g3c – other neutral grassland	Re-seed damaged grass areas with species-rich grass mix once trenching/excavations for installation of new utilities has been carried out; habitats provide limited ecological value therefore further mitigation is not required.
w1g – other woodland; broadleaved 11 – scattered trees	Trees are a valuable habitat for a variety of species including birds, bats, hedgehogs and invertebrates and are an important source of carbon uptake. It is highly recommended that minimal amounts of the woodland are cleared for creation of the temporary access track.]. Tree loss throughout the remaining site should be avoided if possible. Should any trees require removal they should ideally be replaced with the same or similar species elsewhere on site or on a suitable receptor site. Woodland trees removed for creation of temporary access track, should be replaced with native saplings. Timing of tree removal should follow the requirements of faunal species, see below sections for details. Root protection zones following BS:5387 (2012) guidelines should be marked out on site with fencing and clear signage.
c1 – arable and horticulture c1b – temporary grass and clover keys	Arable land to be returned to its current condition in liaison with the land-owner. Where possible, it should be re-seeded with a seed mix, ideally an arable wildflower seed mix for example a wild-bird seed mix to benefit and attract species of 'breeding and farmland bird assemblages' identified within the data search.
r1e - ditch	Ditches shall be recreated following the use of the temporary access road to allow connectivity between areas of the ditch that are not affected by the development. Natural recolonization of vegetation is expected to occur over time. .
Faunal species	
Amphibians and reptiles	The works should ideally be undertaken over the winter period when amphibians are hibernating and unlikely to be present within the grasslands where the works will take place. Should the works be carried out during the active season, areas of scrub, woodland vegetation and arable land should ideally be strimmed prior to any works taking place, including removal of trees, in order to discourage BAP amphibians and reptiles from the working area. If undertaken in the active season, habitats should initially be cut to no lower than 150mm, left for 48 hours, then cut down to 50mm. All arisings should be removed from the working area to prevent creating refugia. Vegetation cuttings provide suitable habitat for reptiles providing them with both shelter and egg laying opportunities (for grass snake only), failure to remove the cuttings at the end of each day will make the site more suitable for reptiles. The low sward height should be maintained until works commence. Should any water be present within the ditch adjacent to the WwTW, it should be searched prior to the commencement of any works within this area or within the neighbouring woodland. Contractors should be made aware of the potential for amphibians and reptiles within Target Note 1 and Target Note 2. Should any of the large debris piles scattered across the site require removal this should be dismantles carefully by hand. Should any reptiles or amphibians be observed, an ecologist should be consulted (BL Ecology can be contacted on 01274 816800).
Bats	Should BT1 or BT2 require removal for the installation of a new temporary access road, bat surveys will be required to ascertain bat absence. Due to the height of the features within BT1 a traditional bat activity survey is not considered appropriate. Therefore, this shall be undertaken in the form of a survey conducted by a qualified tree climber using a torch and endoscope, under supervision of a licenced bat worker, to ascertain the likely presence/absence of bats within BT1.

	Or, should the tree be unsuitable for climbing, it may be possible to view the features in a MEWP. Surveys conducted on BT2 should comprise of dusk emergence surveys carried out by suitably qualified ecologists between May and August inclusive. Measures should be in place to avoid excessive dust and light around building B1 and bat trees T1, T2 and G1 identified in the preliminary roost assessment report conducted by Arcus. Materials and stored equipment should not be placed against B1 or any of the aforementioned trees where they may block potential roost access points and any site welfare units should be located as far away as possible. No night working to be carried out. The site should remain unlit both during the development to maintain the ecological functionality for bats as potential foraging and commuting ground.
Birds	Vegetation removal should be undertaken outside of the breeding bird season (i.e. undertaken between October and February). If this is not possible and vegetation has to be removed or disturbed during the active breeding bird season then a nesting check should be carried out by a suitably qualified ecologist within 48 hours of the vegetation removal.
Mitigation covering multiple fauns	Any security fencing should incorporate a gap between the base of the fence and the ground to allow small wildlife to pass through; the gap should be 20-30cm high. Any open excavations should be covered over-night or a slope/mammal path provided to allow any badger and hedgehogs that fall in safe egress out. No night working should be carried out. The site should remain unlit overnight to maintain functionality of the site as a potential foraging ground for badger and hedgehog. Operational maintenance of existing habitats should be kept to a minimum to maintain functionality of the site as foraging ground for brown hare.

- 5.1.2 The mitigation outlined above would prevent the risk of killing/injury or disturbance to fauna and thereby reducing the anticipated impacts to '**neutral**'. Impacts to habitats are considered to be minimal and following the mitigation outlined above would reduce the impact to '**neutral**'.

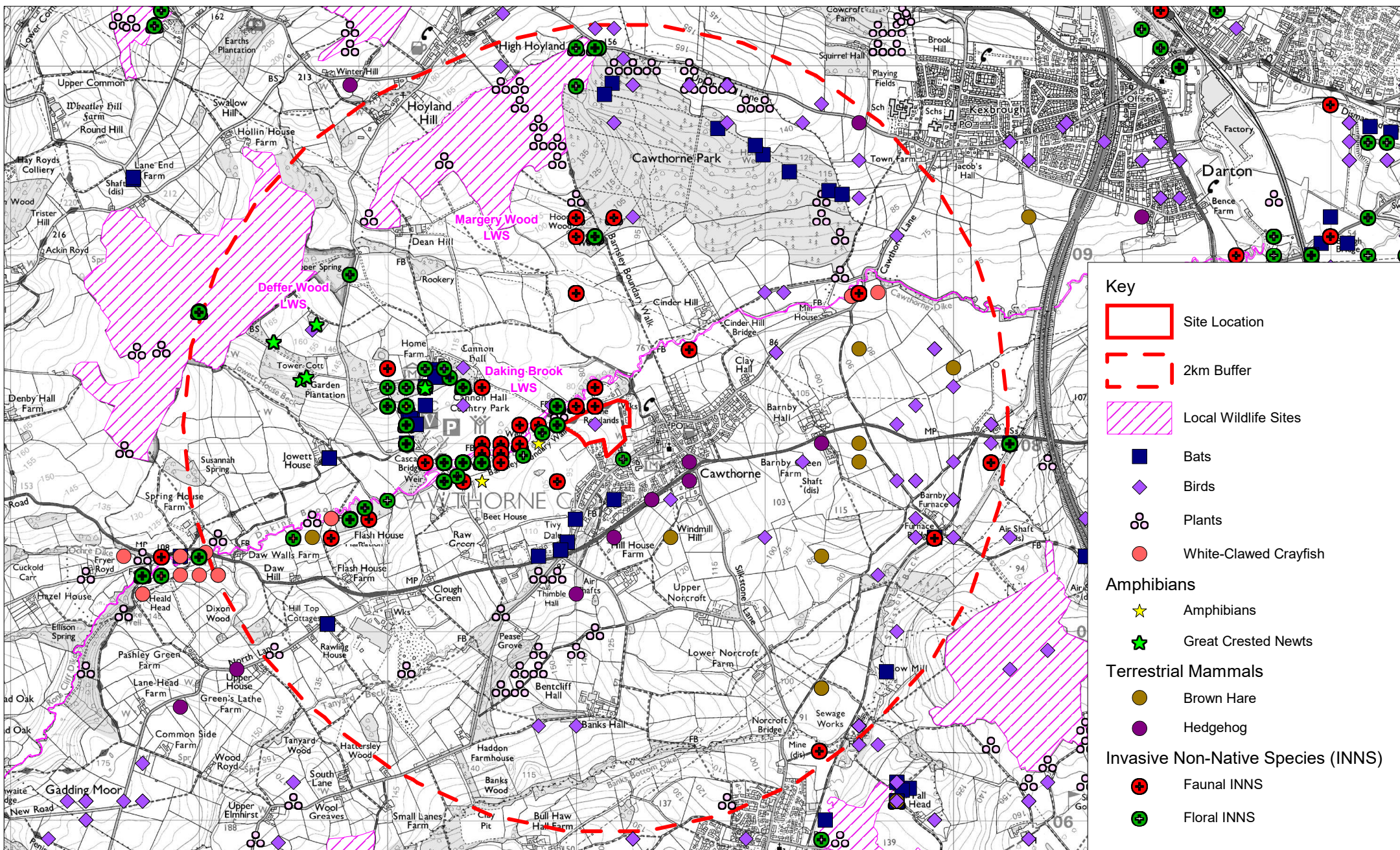
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7 **Figures**

- 7.1 Figure 1 – Site Location and Desk Study Results**
- 7.2 Figure 2a – UK Habitat Classification Map (Area 1)**
- 7.3 Figure 2b – UK Habitat Classification Map (Area 2)**
- 7.4 Figure 3 – Photographs**



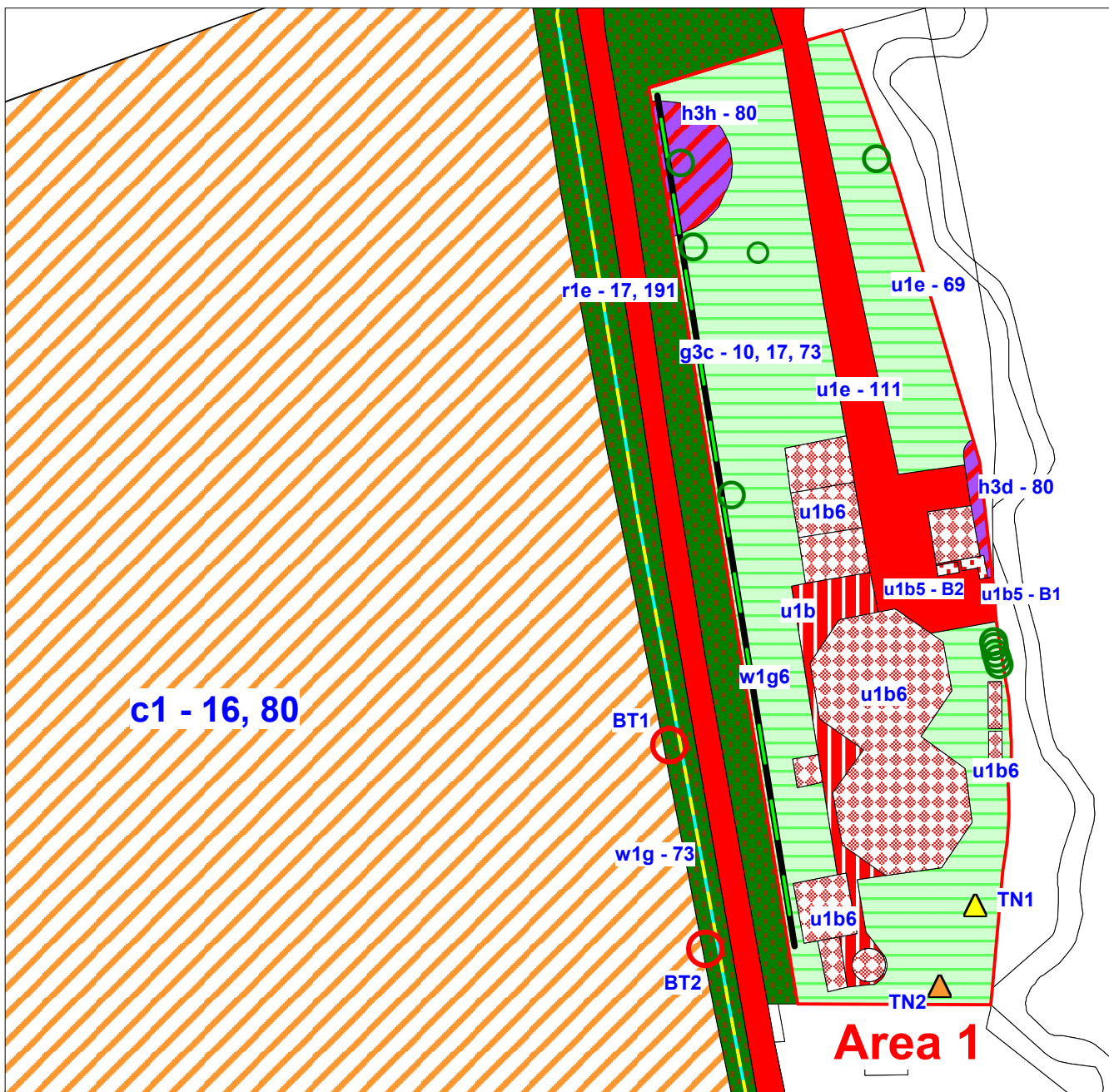
- Key**
- Site Location
 - 2km Buffer
 - Local Wildlife Sites
 - Bats
 - Birds
 - Plants
 - White-Clawed Crayfish
- Amphibians**
- ★ Amphibians
 - ★ Great Crested Newts
- Terrestrial Mammals**
- Brown Hare
 - Hedgehog
- Invasive Non-Native Species (INNS)**
- ⊕ Faunal INNS
 - ⊕ Floral INNS

Figure 1 - Site Location and Desk Study Results
Cawthorne WwTW - Preliminary Ecological Appraisal

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 This mapping uses OS Open Data Vector Map District (1:25,000)



Date	23/03/2023
Map reference	029_23/RE01 - FIG 1 - V1
Drawn/Approved by	SB/JC
Scale	1:2'600 at A4



Key

Habitat Areas

-  u1b5 - buildings
-  u1b6 - other developed land
-  h3h - mixed scrub
h3d - bramble scrub
-  u1e - built linear features
111 - road
-  u1b - developed land, sealed surface
-  w1g - other woodland; broadleaved
73 - bare ground
-  g3c - other neutral grassland
10 - scattered scrub
17 - ruderal/ephemeral
73 - bare ground
-  c1 - arable and horticulture
16 - tall herb
80 - unmanaged
-  c1b - temporary grass and clover leys
16 - tall herb
80 - unmanaged
-  r1e - ditch
17 - ruderal/ephemeral
73 - bare ground

Linear Habitats

-  u1e - built linear features
-  69 - road
-  w1g6 - line of trees

Scattered Trees

-  Medium Scattered Trees
-  Large Scattered Trees With Bat Potential
-  Small Scattered Trees

Target Notes

-  Target Note 1
-  Target Note 2



Date	22/05/2023
Map reference	029_23/RE01 - FIG 2a - V1
Drawn/Approved by	SB/BL
Scale	1:8'000 at A4

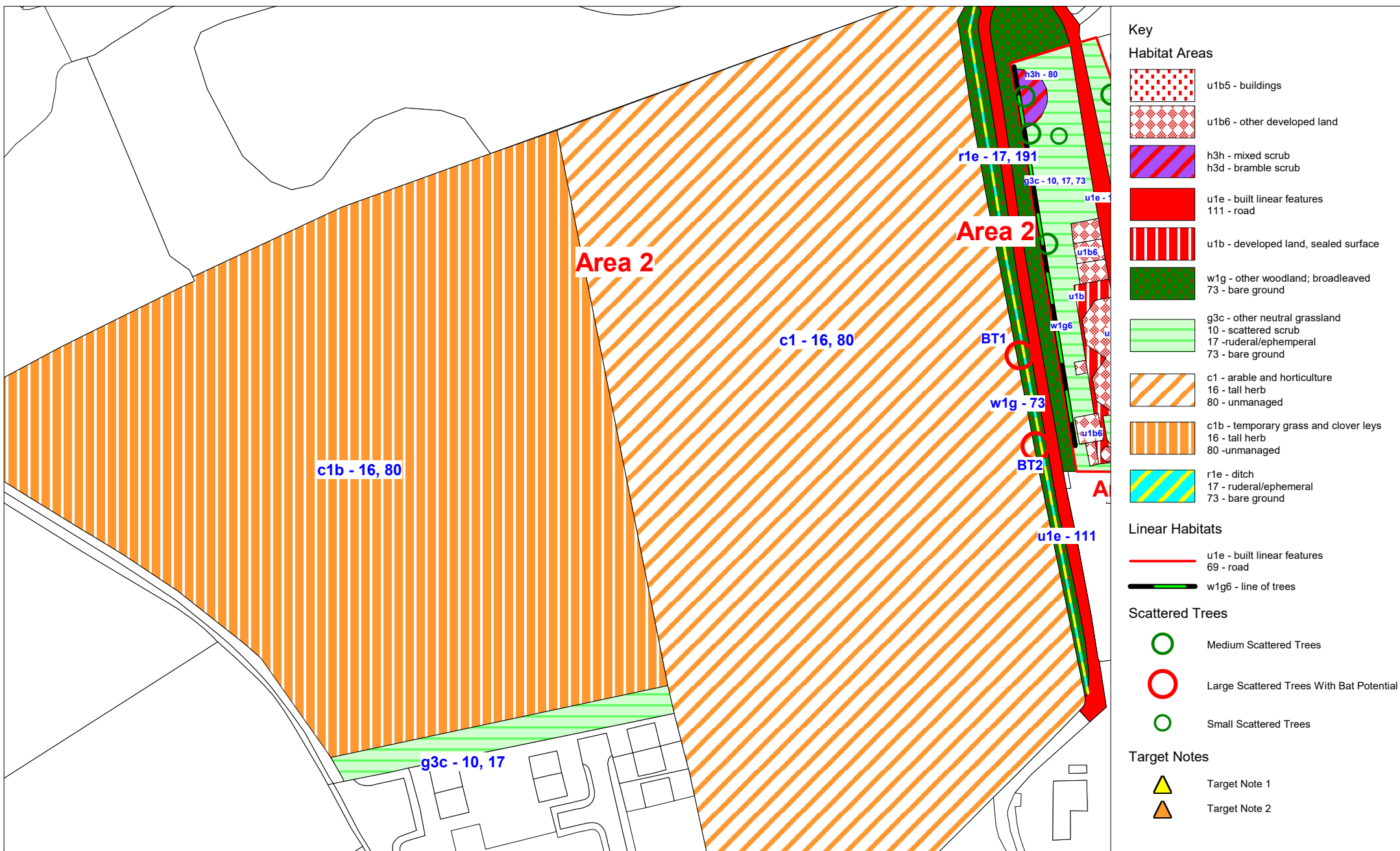


Figure 2b - UK Habitat Classification Map (Area 2)

Cawthorne Treatment Works - Preliminary Ecological Appraisal

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Ordnance Survey 0100031673



Date	22/05/2023
Map reference	029_23/RE01 - FIG 2b - V1
Drawn/Approved by	SB/BL
Scale	1:14'000 at A4

Photograph 1: g3c – other neutral grassland with patches of bare ground



Photograph 2: u1b6 – other developed land



Photograph 3: h3h – mixed scrub



Photograph 4: h3d – bramble scrub



Photograph 5: u1b6 – buildings (B1)



Photograph 6: u1b6 – buildings (B2)



Photograph 7: w1g6 – line of trees



Photograph 8: Target Note 1: piles of discarded debris



Photograph 9: Target Note 2 – piles of woody debris



Photograph 10: c1 – arable and horticulture



Photograph 11: c1b - temporary grass and clover leys



Photograph 12: w1g – other woodland; broadleaved



	Project	Cawthorne Wastewater Treatment Works – PEA
	Title	Photographs
	Reference	029_23
	Figure Number	3, Page 2 of 3
	Created by	Sam Bland

Photograph 13: g3c – other neutral grassland



Photograph 14: r1e - ditch



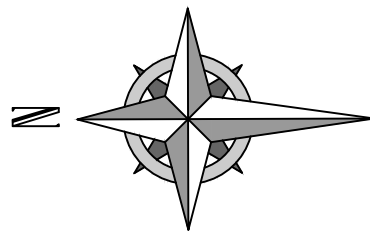
Photograph 15: BT1



Photograph 16: BT2



	Project	Cawthorne Wastewater Treatment Works – PEA
	Title	Photographs
	Reference	029_23
	Figure Number	3, Page 3 of 3
	Created by	Sam Bland



1. ALL DIMENSIONS ARE IN MILLIMETRES
2. ALL LEVELS ARE IN METRES RELATED TO ORDNANCE DATUM
3. DO NOT SCALE, IF IN DOUBT ASK
4. ALL WORKS COMPLY WITH YORKSHIRE WATER ENGINEERING SPECIFICATION V22.
5. CONCRETE GRADES AS FOLLOWS:-
 - WATER RETAINING STRUCTURES / GRADE WR2
 - NON-WATER RETAINING STRUCTURES / SLABS - GRADE SMOO
 - UNREINFORCED MASS CONCRETE BLINDING / SURROUND
 - GRADE UMB.
 - CONCRETE ROADS, HARDSTANDING AREAS AND PAVING
 - GRADE RHS.
6. ALL EXPOSED VERTICAL AND HORIZONTAL EDGES OF CONCRETE HAVE A 25mm CHAMFER.
7. ALL PIPEWORK BENEATH CONCRETE STRUCTURES HAVE A MASS CONCRETE SURROUND (150mm THICK MINIMUM) AND WHERE PRACTICAL THE CONCRETE SHALL EXTEND UP TO THE UNDERSIDE OF THE STRUCTURE. FLEXIBLE JOINTS PROVIDED IN ACCORDANCE WITH YORKSHIRE WATER ENGINEERING SPECIFICATION V22 - CLAUSE 5.3
8. ISOLATION JOINTS COMPRISING 20mm THICK FLEXIBLE FILLER BOARD WITH 20x200mm POLYSULPHIDE SEALANT TO THE SURFACE TO BE PROVIDED AT ALL FOOTPATH / STRUCTURE INTERFACES.
9. CONCRETE PATHS AND STEPS HAVE A TRANSVERSELY APPLIED BRUSH FINISH WITH TROWELED MARGIN TO EACH SIDE (EXCLUDING THE TOE EDGE).
10. CONCRETE FOOTPATHS AND HARD-STANDING PROVIDED WITH MOVEMENT JOINTS EVERY 4.5m-5.4m MINIMUM. JOINTS MAY BE SUB-CONTRACTOR LAYING PREFERENCE.
11. SEE STANDARD DETAIL NO SD-02/05 FOR CABLE DUCT INSTALLATION DETAILS. ABOVE GROUND CABLE SECURITY IN ACCORDANCE WITH YW ENGINEERING SPECIFICATION V22 (SECTION 12 - CLAUSE 12.1.3)
12. 50mm NOMINAL COVER TO REINFORCEMENT

	NEW COMBINED MAIN
	NEW DUCTWORK
	ELECTRIC LINE-B1
	ELECTRIC LINE-B2
	GPR-B2
	UNIDENTIFIED
	MAINS WATER-B2
	SUPPLIED TOPO

CAW03-ERW-WWT-WWT-GA-M-0001
CAW03-ERW-WWT-WWT-GA-M-0002
CAW03-ERW-WWT-WWT-GA-M-0003
CAW03-ERW-WWT-WWT-GA-M-0004
CAW03-ERW-WWT-WWT-GA-M-0005
CAW03-ERW-WWT-WWT-GA-M-0006
CAW03-ERW-WWT-WWT-DR-C-0002
CAW03-ERW-WWT-WWT-DR-M-0003
CAW03-ERW-WWT-WWT-GA-C-0001
CAW03-ERW-WWT-WWT-GA-M-0002
CAW03-ERW-WWT-WWT-GA-M-0002
CAW03-ERW-WWT-WWT-GA-M-0004

Originator / Partner / OEM Ref:



ERIC WRIGHT
WATER

Part of the Eric Wright Group
 Sceptre House, Sceptre Way
 Bamber Bridge, Preston PR5 6AW
Tel: 01772 698822
Fax: 01772 6288 11
www.ericwright.co.uk

**YORKSHIRE WATER
ALWAYS CONSIDERS**



LIFE SAVING RULES

Framework:	Work Stream:
YW Batch ID / Project Code:	YW Solution ID:

OS Grid Reference:	DAZ or DMA References:
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Original Design / OEM Reference:	Size:	Scale:
ERIC WRIGHT WATER	A1	1:100
Status Description:	Status:	Revision:
CORE ENGINEERING REVIEW	S3	P01
Drawing Number:		
CAW03-ERW-WWT-WWT-DR-C-0001		

9

Appendix 2 – Impact Assessment Criteria

- 9.1.1 It is important to be able to provide an objective, expert assessment/appraisal of the importance of an ecological receptor (habitats and species). To do this, BL Ecology Ltd followed the structure within the Chartered Institute for Ecology and Environmental Management's (CIEEM) Guidelines for Ecological Impact Assessment in the UK and Ireland (Second Edition, 2016). This provides for three steps in the process of assessing the significance of the impact of a development:
- 1) Evaluate the importance/sensitivity of the receptor (i.e. assign a conservation value to it);
 - 2) Predict the scale of the impact (in terms of extent, magnitude, duration etc);
 - 3) Assess the significance of the effect of those impacts relative to the conservation value of the site.
- 9.1.2 There is a fourth step to assess the 'residual' effects of the impacts with mitigation, which follows the same methodology as Step 3.
- 9.1.3 The first step in assessing the impact of a development is to assign a value to current ecological features and resources. Table 6 below provides a method for this assessment devised by BL Ecology Ltd. The categories of value are usually assigned in geographical terms, e.g. of international, national, local importance etc.
- 9.1.4 The value of an ecological receptor is determined by factors such as distribution, designation, rarity, population size, species assemblage, mobility, local distinctiveness and vulnerability. Whilst the legal protection or BAP status of a species or habitat must be taken into account, it cannot be automatically determined which category the receptor falls into, as that particular receptor may be in an unfavourable ecological condition, fragmented/isolated, or a small area/population.

Table 6: Assigning Nature Conservation Value

Nature Conservation Value	Examples
International	An internationally designated site (or candidate site) such as a Special Area of Conservation (SAC), a Special Protection Area (SPA), and Ramsar Sites; Habitats listed on Annex I of the Habitats Directive; or Significant population of a faunal species listed on Annex II of the Habitats Directive or a hibernation site for the same species.
National	A nationally designated site such as a Site of Special Scientific Interest (SSSI) and National Nature Reserve; A Priority Habitat as listed on the UK Biodiversity Action Plan (UK BAP) within favourable status; or A significant population of a Priority Species listed on the UK BAP.
Regional	A third-tier (locally) designated site such as Local Wildlife Sites, Important hedgerows under The Hedgerow Regulations 1997; A Priority Habitat as listed on the District BAP and within favourable status; A significant population of a Priority Species listed on District BAP; or A regularly occurring significant population listed in a Local Red Data Book;
Local	Habitats classed as common and widespread throughout the UK; Small numbers (non-breeding) of protected species; or Significant population of common faunal species.
Negligible	Minor/no nature conservation value.

9.1.5 Potential impacts that the development may have on the ecological receptor are then considered by deliberation of the following factors:

- Extent;
- Magnitude;
- Duration;
- Reversibility;
- Timing and Frequency;
- Cumulative effects; and
- Confidence in predictions (level of uncertainty).

9.1.6 The predicted magnitude of an impact on the ecological receptor is determined using Table 7 below. Impacts can be positive or negative and consider the likelihood that a change or activity will occur as predicted, on a scale of certain, probable or unlikely, this is without mitigation.

Table 7: Predicted Magnitude of Impact (Without Mitigation)

Magnitude	Criteria
Major Negative	The proposed development is likely to permanently adversely affect the integrity of the ecological receptor.
Intermediate Negative	No permanent effect on the integrity of the ecological receptor however the key attributes are likely to be adversely altered.
Minor Negative	Neither of the above apply, but some minor negative impact is likely.
Neutral	No observable impact in either direction.
Beneficial	Impacts which provide a net gain for the ecological receptor.

9.1.7 Consideration of the magnitude of each impact against the nature conservation value of the ecological receptor produces a matrix table to determine the overall impact that the development is likely to have on the receptor. This is shown in Table 8 below.

Table 8: Estimating the Overall Appraisal Category (in term of significance)

Magnitude of Potential Impact	Nature Conservation Value				
	International	National	Regional	Local	Negligible
Major Negative	Very Large Adverse	Very Large Adverse	Moderate Adverse	Slight Adverse	Neutral
Intermediate Negative	Large Adverse	Large Adverse	Moderate Adverse	Slight Adverse	Neutral
Minor Negative	Slight Adverse	Slight Adverse	Slight Adverse	Slight Adverse	Neutral
Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
Beneficial	Large Beneficial	Large Beneficial	Moderate Beneficial	Slight Beneficial	Neutral

10 Appendix 3 – Habitat Condition Assessments

10.1.1 Table 9: Modified Grassland Condition Assessment

Neutral Grassland (medium, high and very high distinctiveness, other neutral grassland)			
Criteria number	Brief description	Area 1	Area 2
1	The grassland is a good representation of the habitat type it has been identified as, based on its UKHab description – the appearance and composition of the vegetation closely matches the characteristics of the specific grassland habitat type. Indicator species listed by UKHab for the specific grassland habitat type are consistently present. NB: this criterion is essential for achieving Moderate or Good condition.	No	No
2	Sward height is varied (at least 20% of the sward is less than 7 cm and at least 20% is more than 7 cm) creating microclimates which provide opportunities for insects, birds and small mammals to live and breed.	No	No
3	Cover of bare ground is between 1% and 10%, including localised areas (for example, a concentration of rabbit warrens).	Yes	Yes
4	Cover of bracken <i>Pteridium aquilinum</i> is less than 20% and cover of scrub (including bramble <i>Rubus fruticosus</i> agg.) is less than 5%.	Yes	Yes
5	Combined cover of species indicative of sub-optimal condition and physical damage (such as excessive poaching, damage from machinery use or storage, damaging levels of access, or any other damaging management activities) accounts for less than 5% of total area. If any INNS are present, this criterion is automatically failed.	No	No
6	There are 10 or more vascular plants per m ² present, including forbs that are characteristic of the habitat type. NB: this criterion is essential for achieving Good condition.	No	No
Outcome:		Poor	Poor

10.1.2 Table 10: Mixed Scrub Condition Assessment

Heathland and shrub (mixed scrub)		
Criteria number	Brief description	Area 1
1	"The scrub is a good representation of the habitat type it has been identified as, based on its UKHab description (where in its natural range). The appearance and composition of the vegetation closely matches the characteristics of the specific scrub type. At least 80% of scrub is native, and there are at least three native woody species, with no single species comprising more than 75% of the cover (except hazel <i>Corylus avellana</i> , common juniper <i>Juniperus communis</i> , sea buckthorn <i>Hippophae rhamnoides</i> or box <i>Buxus sempervirens</i> , which can be up to 100% cover)."	Yes
2	Seedlings, saplings, young shrubs and mature (or ancient or veteran) shrubs are all present.	No
3	There is an absence of invasive non-native plant species (as listed on Schedule 9 of WCA) and species indicative of sub-optimal condition make up less than 5% of ground cover.	Yes
4	The scrub has a well-developed edge with scattered scrub and tall grassland and or forbs present between the scrub and adjacent habitat.	No
5	There are clearings, glades or rides present within the scrub, providing sheltered edges.	No
Outcome:		Poor

Table 11: Line of Trees Condition Assessment

Line of Trees		
Criteria number	Brief description	Area 1
1	At least 70% of trees are native species.	No
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.	Yes
3	One or more trees has veteran features and or natural ecological niches for vertebrates and invertebrates, such as presence of standing and attached deadwood, cavities, ivy or loose bark.	No
4	There is an undisturbed naturally-vegetated strip of at least 6 m on both sides to protect the line of trees from farming and other human activities (excluding grazing). Where veteran trees are present, root protection areas should follow standing advice.	No
5	At least 95% of the trees are in a healthy condition (deadwood or veteran features valuable for wildlife are excluded from this). 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.	Yes
Outcome:		Poor

Table 12: Urban Trees Condition Assessment

Urban Trees						
Criteria number	Brief description	Cherry	Crab-Apple	Elder	Golden-Chain Laburnum	Group
1	The tree is a native species (or at least 70% within the block are native species).	Yes	Yes	Yes	No	Yes
2	The tree canopy is predominantly continuous, with gaps in canopy cover making up <10% of total area and no individual gap being >5m wide (individual trees automatically pass this criterion).	Yes	Yes	Yes	No	No
3	The tree is mature (or more than 50% within the block are mature).	Yes	Yes	Yes	Yes	No
4	There is little or no evidence of an adverse impact on tree health by human activities (such as vandalism, herbicide, or detrimental agricultural activity). And there is no current regular or pruning regime, so the trees retain >75% of expected canopy for their age range and height.	Yes	Yes	Yes	Yes	Yes
5	Natural ecological niches for vertebrates and invertebrates are present, such as presence of deadwood, cavities, ivy or loose bark.	Yes	No	Yes	Yes	Yes
6	More than 20% of the tree canopy area is oversailing vegetation beneath	Yes	Yes	Yes	Yes	Yes
Outcome:		Good	Good	Good	Moderate	Moderate

Woodland and forest (other woodland; broadleaved)		
Criteria number	Brief description	Area 2
1	Age distribution of trees.	2
2	Wild, domestic and feral herbivore damage.	3
3	Invasive plant species.	3
4	Number of native tree species.	2
5	Cover of native tree and shrub species.	2
6	Open space within woodland.	1
7	Woodland regeneration.	2
8	Tree health.	1
9	Vegetation and ground flora.	1
10	Woodland vertical structure.	2
11	Veteran trees.	2
12	Amount of deadwood.	1
13	Woodland disturbance.	1
Outcome:		Poor

Watercourses (ditches)		
Criteria number	Brief description	Area 2
1	The ditch is of good water quality, with clear water (low turbidity) indicating no obvious signs of pollution.	Yes
2	A range of emergent, submerged and floating-leaved plants are present. As a guide >10 species of emergent, floating or submerged plants present in a 20 m ditch length.	No
3	There is less than 10% cover of filamentous algae and or duckweed <i>Lemna spp.</i> (these are signs of eutrophication).	Yes
4	A fringe of aquatic marginal vegetation is present along more than 75% of the ditch.	No
5	Physical damage is evident along less than 5% of the ditch, with examples of damage including: excessive poaching, damage from machinery use or storage, or any other damaging management activities.	Yes
6	Sufficient water levels are maintained - as a guide a minimum summer depth of approximately 50 cm in minor ditches and 1 m in main drains.	No
7	Less than 10% of the ditch is heavily shaded.	No
8	There is an absence of non-native plant and animal species.	Yes
Outcome:		Poor