



# **Metrodome Leisure Complex, Barnsley**

## **Preliminary Ecological Appraisal**

### **Barnsley Premier Leisure**

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## Executive Summary

Ecus Ltd was commissioned by Barnsley Premier Leisure in April 2019 to undertake a Preliminary Ecological Appraisal (PEA) of land at the Metrodome Leisure Complex site in Barnsley, hereafter referred to as the 'Site'.

The PEA was undertaken to inform a planning application for a new overflow car park extension at the north-east corner of the Metrodome Leisure Complex. The Site is currently in use as a community allotment, supporting habitats including rough semi-improved grassland, scrub, scattered trees, bare ground and hardstanding along with a poly-tunnel and two metal shipping containers. All habitats inside the Site are considered to be of importance to nature conservation at a maximum of site level only.

Best practise measures in respect of amphibians, badgers, bats, nesting birds, reptiles, hedgehogs and the presence of Japanese knotweed on the Site have been recommended. These include a requirement for working Method Statements during Site clearance to safeguard reptiles and amphibians, along with a Japanese knotweed Management Plan to cover the development activities during construction and in the long term. Timing restrictions for construction works apply in order to limit the risk of harm to protected species.

There is potential for active birds' nests to be disturbed during building and vegetation removal (where required). As a precautionary measure, it is recommended that works to modify current buildings or remove vegetation should be undertaken outside of the bird breeding season, i.e. between September and February (inclusive). If it is not possible to schedule works for these months, a breeding bird check should be undertaken by a suitably qualified ecologist no more than 48 hours prior to construction/vegetation removal commencing.

Suitable enhancement measures have been recommended in order to compensate for the areas of habitat to be lost on Site and limit impacts of the development. These include landscape enhancements targeted at reptiles, inclusion of new bird nesting provision on retained trees around the Site margins, and a sensitive lighting plan to prevent unnecessary lightspill to adjacent habitat of wildlife value. Enhancements measures are detailed within Section 4.

# 1. Introduction

## 1.1 Background

- 1.1.1 Ecus Ltd was commissioned by Barnsley Premier Leisure in April 2019 to undertake a Preliminary Ecological Appraisal (PEA) of land at the Metrodome Leisure Complex site in Barnsley, hereafter referred to as the 'Site'. The Site red line boundary is shown on Figure 1.
- 1.1.2 The PEA was undertaken to inform a planning application for a new overflow car park extension at the north-east corner of the Metrodome Leisure Complex. The Site is currently in use as a community allotment, supporting habitats including rough semi-improved grassland, scrub, scattered trees, bare ground and hardstanding along with a poly-tunnel and two metal shipping containers.
- 1.1.3 The purpose of the PEA was to record and map habitats, and assess the potential for the Site to support species or habitats which are protected under UK and/or European nature conservation legislation, namely the Wildlife & Countryside Act 1981 (as amended), the Conservation of Habitats and Species Regulations 2017 and the Natural Environment and Rural Communities (NERC) Act 2006. For full details of legislation relating to those habitats and species discussed within this report visit <http://www.legislation.gov.uk>.
- 1.1.4 This report details the findings of a desk-based study and extended Phase 1 habitat survey. Methodologies employed during the surveys are described along with the survey findings, evaluation, assessment and requirement for any further survey work and/or mitigation/enhancement as required.

## 2. Methodology

### 2.1 Data Consultation

- 2.1.1 As part of the ecological appraisal process Sheffield Biological Records Centre (SBRC, who administer biological data for the Barnsley area) was consulted by Ecus Ltd in April 2019 to determine the presence of existing biological records or locally (non-statutory) designated sites of nature conservation interest within 2km of the Site.
- 2.1.2 The Multi-Agency Geographic Information for the Countryside (MAGIC) website (<http://magic.gov.uk>) was also consulted for information on statutory designated sites of nature conservation interest, and the presence of great crested newt (*Triturus cristatus*, GCN) or bat European Protected Species (EPS) mitigation licences within 2km of the Site.
- 2.1.3 Information obtained from SBRC, MAGIC and other public data sources is included within the report as appropriate.

### 2.2 Extended Phase 1 Habitat Survey

- 2.2.1 The Site was surveyed on 17<sup>th</sup> April 2019 using the extended Phase 1 habitat survey methodology (JNCC, 2010) by Senior Ecologist Sean Davey ACIEEM. This survey method aims to characterise habitats and communities present and is not intended to provide a complete list of all plants occurring across the Site.
- 2.2.2 Habitats and vegetation types present inside the Site were recorded on to a field map and notable, rare or scarce plant species, including other features of ecological interest, were highlighted and marked using Target Notes (TN) where identified. Evidence of protected species or species of nature conservation importance were also recorded where present at the time of survey. Survey findings and TN are detailed in Section 3 below and annotated on Figures 1 and 2. Site photographs are provided at Appendix 1.
- 2.2.3 Habitats present which are listed under Section 41 of the NERC Act 2006 or on the Barnsley Biodiversity Action Plan Priority Species List (Barnsley BAP) were also noted.
- 2.2.4 The value and sensitivity of ecological features present in the Site was determined based on the guidance given in '*Guidelines on Ecological Impact Assessment*' (CIEEM, 2016). Individual ecological receptors (habitats and species) that could be affected by the proposed Site development were assigned levels of importance for nature conservation. The highest level is International, then decreasing in order of importance through UK, National, regional, county, district, local, and lastly site level (within the zone of influence).

### 2.3 Protected and Key Species

- 2.3.1 Any evidence of protected species encountered during the survey was recorded. Given the nature of the Site and proximity of buildings, particular attention was paid to the potential for roosting bats, though the survey did also include recording evidence of field signs and an assessment of the suitability of habitats present to support other protected species.

- 2.3.2 Field signs and noteworthy habitats/features are annotated on Figure 1 and detailed within Section 3.

### ***Amphibians***

- 2.3.3 A desk-based search for ponds within 500m of the Site, which are not separated from the Site by a significant barrier to amphibian dispersal, was undertaken using 1:10,000 OS mapping and habitats within the Site were assessed for their suitability to support amphibians during their terrestrial and aquatic stages. Where accessible, waterbodies were assessed to determine their likely suitability for GCN using the Habitat Suitability Index (HSI) (Oldham *et al.* 2000). Pond locations are illustrated on Figure 2.

### ***Badger***

- 2.3.4 Signs of badger (*Meles meles*) were searched for in the Site and for up to 30m from the Site boundary (where accessible) as part of the extended Phase 1 survey.
- 2.3.5 The survey followed standard methodology detailed in 'Surveying Badgers' (Harris *et al.*, 1989) which included checking for setts, latrines (dung pits), foraging holes, guard hairs, feeding signs and pathways.

### ***Bats***

- 2.3.6 Buildings and trees in the Site were assessed for their suitability to support roosting bats during the extended Phase 1 habitat survey.
- 2.3.7 An individual building/tree may support several features of potential interest to roosting bats and it is not always possible to confirm usage of individual features by bats during a single visit, given their transient nature. Consequently where features are identified they are assigned to a defined category of roosting suitability from negligible, low, moderate, high to confirmed roost (Collins, 2016). Any evidence indicating the presence of roosting or other bat activity in suitable features on Site was recorded where present, e.g. droppings, feeding remains, staining from fur oil or urine, or the presence of bats themselves (alive or deceased).
- 2.3.8 The Site was also assessed for its suitability to be used by foraging and commuting bats.

### ***Birds***

- 2.3.9 Whilst on Site the opportunity was taken to record any species of birds encountered and habitats in the Site were assessed for their value for nesting and foraging birds.

### ***Reptiles***

- 2.3.10 Habitats present in the Site were assessed for their suitability to support reptiles, particularly in regard to their connectivity with other suitable habitat in the surrounding area.

### ***Riparian Mammals and White-Clawed Crayfish***

- 2.3.11 A desk based search for watercourses inside and within 30m of the Site, which are not separated from the Site by a major barrier, was undertaken using 1:10,000 OS mapping. No watercourses are present in proximity to the Site

and therefore otter (*Lutra lutra*), water vole (*Arvicola amphibius*) and white-clawed crayfish (*Austropotamobius pallipes*) are ruled out as potential receptors for development impacts. Riparian mammals and crayfish are not discussed within this assessment.

#### ***Other Key and Notable Species***

- 2.3.12 The opportunity was taken whilst on Site to assess habitats for their potential to support other protected species, search for signs of nationally or locally scarce or notable species, or any species protected under national or international nature conservation law.

## **2.4 Invasive Species**

- 2.4.1 During the extended Phase 1 habitat survey any evidence of invasive species, as listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended), were recorded and mapped where encountered.

## **2.5 Survey Limitations**

- 2.5.1 Dense scrub on the bank to the east of the Site partially impeded access to search the ground directly for badger setts, however the bank was observed from several accessible locations. No evidence of worn badger pathways leading into the scrub was recorded and it is therefore considered unlikely that badger setts are present in this area.

### 3. Findings and Evaluation

#### 3.1 Site Description

- 3.1.1 The Site comprises part of a small community allotment, a level area of approximately 0.25 hectares (ha), located on the north-eastern margin of the existing car park for the Metrodome Leisure Complex. The majority of the Site supports rough semi-improved neutral grassland with a moderate diversity of herbaceous species. Scattered or dense scrub and scattered trees are present across the Site along with scattered areas of disturbed/bare ground resulting from recent site investigation works or within planting beds. Structures on Site include a polytunnel and two metal shipping containers. Numerous piles of tipped materials and garden waste are present, notably along the eastern boundary fence. The allotment is largely enclosed by metal wire fencing, with steep banks sloping down at the north and east boundaries and a dry stone wall forming the northern boundary.
- 3.1.2 The Metrodome Leisure Complex and car parks dominate to the south and west of the Site with residential housing beyond. The community allotment extends outside of the Site red line boundary to the north-west corner. A large private allotments and area of woodland lies to the north. A steep scrubby bank slopes down from the eastern boundary to an extensive area of grassland and scrub which extends towards the disused Barnsley Canal 400m to the east, with the River Dearne and Dearne Valley Park Local Nature Reserve (LNR) located beyond.

#### 3.2 Designated Sites

- 3.2.1 One LNR and three Local Wildlife Sites (LWS) were identified within 2 km of the Site. Details are provided in Table 1 below.

**Table 1: Designated Sites within 2km of the site**

Designated Site	Description from Citation	Approximate Distance and Direction from Site
<b>Statutory</b>		
Dearne Valle Park LNR	A country park consisting of a tree lined riverside with pockets of woodland.	500 m east.
<b>Non-Statutory</b>		
Old Mill Lane Culvert Bat Roost LWS	A culvert on the River Dearne supporting a maternity roost of Daubenton's Bat	800 m north.
Cliffe Wood LWS	Oak and birch dominated woodland with scattered scrub, swamp, neutral grassland and parkland.	630 m north-east.
Barnsley Canal at Wilthorpe LWS	An area of swamp, standing water and unimproved neutral grassland.	1.3 km north-west.

- 3.2.2 The LWS and LNR sites are considered to be of importance to nature conservation at between the local and county level.

### 3.3 Habitats

#### ***Semi-improved Neutral Grassland***

- 3.3.1 Much of the Site area supports rough semi-improved grassland with a moderate species diversity. Grass species recorded comprise abundant Yorkshire fog (*Holcus lanatus*), frequent cock's foot (*Dactylis gomerata*) and frequent to locally dominant red fescue grass (*Festuca rubra*). Herbs on Site include frequent broadleaved dock (*Rumex obtusifolius*), dandelion (*Taraxacum officinale*), daisy (*Bellis perennis*), nettle (*Urtica dioica*), common hogweed (*Heracleum sphondylium*), colts foot (*Tussilago farfara*), yarrow (*Achillea millefolium*), creeping cinquefoil (*Potentilla reptans*), germander speedwell (*Veronica chamaedrys*) and woundwort sp. (*Stachys sp.*), along with occasionally recorded herb Robert (*Geranium robertianum*), curled dock (*Rumex crispus*), red (*Lamium purpureum*) and white dead-nettle (*Lamium album*), common vetch (*Vicia sativa*) and barren strawberry (*Potentilla sterilis*). The ground has been disturbed in various locations creating pockets of bare ground under colonisation.
- 3.3.2 Neutral grassland is listed as a priority habitat on the Barnsley BAP however this specifically relates to species-rich or unimproved lowland grasslands. The Site supports a moderate diversity of commonly occurring grasses and wildflowers but is not considered to qualify as BAP grassland habitat, although it fits within the Built Environment and Gardens category of the BAP. The grassland on Site is very limited in extent and is considered important to nature conservation at the Site level only, with alternative similar habitat widely available in the surrounding area.

#### ***Scrub and Scattered Trees***

- 3.3.3 Bramble (*Rubus fruticosus* agg.) dominant scrub is scattered around the margins of the grassland on Site and present in dense stands in several locations, including the bank which slopes down to the northern boundary wall.
- 3.3.4 A small stand of young trees and scrub lies centrally within the allotment: this habitat comprises silver birch (*Betula pendula*), sycamore (*Acer pseudoplatanus*), Norway maple (*Acer platanoides*), alder (*Alnus glutinosa*), wild cherry (*Prunus avium*) and field maple (*Acer campestre*) trees with an understorey dominated by brambles, cleavers and common hogweed.
- 3.3.5 Several semi-mature sycamore trees are present along the north banking to the Site.
- 3.3.6 Scrub habitat on Site is limited in extent and comprises species which are common and widespread, both in the local area and nationally. Scrub and young trees are not listed under Section 41 of the NERC Act 2006 or the Barnsley BAP. This habitat is considered important to nature conservation at the Site level only.

#### ***Bare/Disturbed Ground and Spoil***

- 3.3.7 Various areas of disturbed or bare ground are present on Site, with several large prepared planting beds and areas of disturbance from recent ground

investigations noted. These display limited intrinsic ecological value although they are likely to have some value for invertebrates. In addition, piles of spoil, brush and gardening materials offer suitable sheltering habitat for a range of wildlife. Bare ground and spoil is not a priority habitat under the Barnsley BAP or Section 41 of the NERC Act 2006 and is considered important to nature conservation at the Site level only.

### ***Buildings and Hardstanding***

- 3.3.8 Two metal shipping containers and a temporary poly-tunnel comprise the only structures present within the Site. These are accessed by a short section of paved walkway which connects the structures with the wider allotment to the north-west. These are manmade habitats which display little or no intrinsic ecological value and are of negligible nature conservation importance.

## **3.4 Species**

### ***Amphibians***

- 3.4.1 SBRC returned a total of 14 records of amphibians for locations within 2km of the Site. The species recorded were common frog (*Rana temporaria*), common toad (*Bufo bufo*), smooth newt (*Triturus vulgaris*) and one unidentified newt (*Triturus* sp.). The smooth newt was recorded in 2012 approximately 1.5km north-west of the Site and the unidentified newt was from a location approximately 1.7 km north-east of the site at Monks Bretton Park in 2017.
- 3.4.2 No EPS licenses pertaining to great crested newt were identified within 2 km of the site using MAGIC.
- 3.4.3 Whilst no records of GCN were obtained from SBRC or MAGIC for within 2km, the Barnsley BAP references known populations within sections of the disused Barnsley Canal. It is unclear whether this relates to the sections located approximately 400m east of the Site.
- 3.4.4 Two water bodies were identified within 500m of the Site using OS mapping, comprising two sections of the disused Barnsley Canal located between 400 - 480m east of the Site boundary (see Figure 2). A single pond is also present within Cliffe Wood 480m north-east of the Site beyond the River Dearne, but the river is considered to represent a barrier to amphibian dispersal towards the Site. Both sections of redundant canal support abundant areas of marginal and emergent vegetation and are surrounded by high quality terrestrial habitat, achieving a HSI score indicating 'good' suitability for GCN (see Appendix 2).
- 3.4.5 The rough grassland, scrub, spoil and tipped materials offer an optimal habitat for foraging and sheltering amphibians including GCN. However, the Site is located a considerable distance from suitable breeding habitats in the disused Barnsley Canal. GCN typically only utilise habitats in relatively close proximity to their breeding ponds, with land present within 50m considered to represent 'core' habitat and areas outside of 250m from a pond likely to be utilised only where insufficient terrestrial habitat is available nearer to the pond.
- 3.4.6 Given that the disused Barnsley Canal is surrounded by extensive woodland, grassland and scrub of very high quality for GCN, the likelihood of this species being present on Site is extremely low. However, given that the Site lies within 500m of the canal (considered to represent the typical maximum dispersal range of this species) their presence cannot be entirely ruled out.

3.4.7 The Site habitats are also of high quality for common amphibians including smooth newt, common frog and common toad. Whilst frogs and toads may typically disperse further from their aquatic breeding habitats, the distance between the Site and the nearest water bodies is likely to mean that few amphibians will be found in habitats on the Site.

3.4.8 GCN are listed as a priority species under Section 41 of the NERC Act 2006 and the Barnsley BAP. Common toad are also included on the Section 41 priority species list. Given the lack of aquatic habitat near the Site and the abundance of alternative terrestrial habitat available offsite, the Site is considered important to amphibians at no greater than the Site level.

**Badger**

3.4.9 SBRC returned a total of 4 records of badger (*Meles meles*) for locations within 2 km of the site, all relating to field signs recorded in 2010. The closest record was for a location 1.3km north-east of the site.

3.4.10 No evidence of badger activity was recorded on the Site itself, or on the steep bank which drops away from the eastern boundary. Whilst this bank is covered with scrub and Japanese knotweed, it was possible to view most of the banking from several locations outside the Site and no badger setts or other evidence such as well-worn trails leading into this area were noted.

3.4.11 [REDACTED]

3.4.12 [REDACTED]

**Bats**

3.4.13 SBRC returned a total of 130 bat records for locations within 2 km of the Site dating between 1978 - 2016, including numerous records relating to bat roosts some with multiple records each. The species included in the records were common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), noctule (*Nyctalus noctula*), leisler's bat (*Nyctalus leisleri*) and Daubenton's bat (*Myotis daubentonii*). Several records simply stated 'bats' or 'Chiroptera' with no further details provided.

3.4.14 A total of 31 records, collected between 1990 and 2003, relate to the Daubenton's bat roost approximately 500 m north of the Site in the Old Mill Lane Culvert Bat Roost LWS. Another notable roost record is for a pipistrelle bat maternity roost from a site approximately 1.1 km west of the Site in 1989 and 1991 respectively. The closest roost record to the Site is of a transitional/day roost found in the roof space of a former primary school in 2014, approximately 220 m south of the site on Grove Street.

3.4.15 One EPS licenses pertaining to bats was identified within 2 km of the site using MAGIC. The licence was obtained to permit destruction of a common pipistrelle

resting place in 2013-14 at a location 1km north-west of the Site.

- 3.4.16 The structures on Site are unsuitable for roosting bats, comprising two metal shipping containers which are entirely sealed and a temporary poly-tunnel. Similarly, all trees within the Site boundary are young or semi-mature and no features (e.g. rot holes or lifted bark) which might offer suitable roosting habitat for bats were observed. A single bird box attached to a sycamore tree (TN2, Figure 1) on the northern bank of the Site was inspected using an endoscope, with no evidence of occupation by bats recorded (only an old birds' nest was present).
- 3.4.17 The trees and scrub on Site may have some limited value for foraging bats such as pipistrelle species, but the Site lacks woodland cover which might support a wider range of bat species. Given the very limited extent of suitable foraging habitat present and the lack of suitable roosting features, the Site is considered important to bats at the Site level only. Alternative bat foraging and commuting habitat is widely available in the scrubland and River Dearne corridor located east of the Site.

### **Birds**

- 3.4.18 In 2015, a re-assessment of Birds of Conservation Concern (BoCC) was published by Eaton *et al.* (2015), which defined rare and threatened bird species on two lists (Red and Amber) describing the level of threat to each species of concern.
- 3.4.19 "Red" is the highest conservation priority, with species needing urgent action due to either a historical decline in breeding population, severe (>50%) decline in breeding or non-breeding population, or severe decline in breeding range over 50 years or more. "Amber" is the next most critical group, with species qualifying for this status as a result of either recovery from red list criterion, being classed as rare breeders in the UK, moderate (>25%) decline in breeding or non-breeding population or moderate decline in breeding range over 25 years or more. These categories are followed by "Green", indicating that the species are relatively unthreatened.
- 3.4.20 SBRC returned a total of 5562 records comprising 139 bird species for locations within 2 km of the Site. A total of 15 Schedule 1 bird species and one Schedule 9 bird species, as listed within the Wildlife and Countryside Act 1981 (as amended), are included within the records. Bird species recorded within 2km of the Site are summarised in Appendix 3 and comprise 19 Red and 27 Amber-listed species.
- 3.4.21 Bird species recorded on Site during the survey include blackbird (*Turdus merula*) and chiff-chaff (*Phylloscopus collybita*), which was feeding and singing from the central area of scrub. A bird box mounted on a sycamore (TN2, Figure 1) was checked and found to contain an inactive tit nest within.
- 3.4.22 Suitable nesting is very limited in extent on Site and there is an abundance of scrub and wooded habitats within the wider area with high suitability for a range of nesting and foraging birds. As such, the Site is considered to be of importance to nesting and foraging birds at the site level only.

### **Reptiles**

- 3.4.23 SBRC provided a single reptile record for locations within 2km of the Site, relating to a shed skin of a grass snake (*Natrix natrix*) found in 2018 at a location approximately 1.4 km east of the site.
- 3.4.24 No records of other reptile species were supplied by SBRC, however common lizard (*Zootoca vivipara*) are described in the Barnsley BAP as 'widespread but patchy' in distribution across Barnsley and are known to occur with the Dearne Valley Park LNR. The Barnsley BAP lists slow worm (*Anguis fragilis*) as 'widespread', whilst adder (*Viper berus*) are considered likely to be rare in Barnsley due to restricted habitat and not recorded recently.
- 3.4.25 During the survey a single common lizard was briefly observed basking within the grassland area east of the Site, approximately 100m from the Site boundary (TN4, Figure 1). A subsequent conversation with volunteers at the community allotment project confirmed that common lizard are seen regularly within the allotment garden north-west of the Site basking on a small rockery (TN3, Figure 1), which they presumably use for shelter.
- 3.4.26 The habitats on Site provide a highly suitable (although limited in extent) mosaic of habitats including rough grassland, bare ground and various habitat piles which provide options for foraging, basking and sheltering reptiles. Common lizard are confirmed present very near Site and are likely to use habitats on Site. Given the surrounding habitat which includes allotments, extensive grasslands with scrub and a disused canal, there is also considered to be potential for slow worm and grass snake to use the Site.
- 3.4.27 Grass snake and common lizard are priority species on the Barnsley BAP, whilst all reptile species are included on Section 41 of the NERC Act 2006. Whilst the Site is used by reptiles and supports good quality habitat, it is very limited in extent and surrounded to the north and east by extensive alternative suitable habitat. As such, the Site is considered important to reptiles at the Site level only.

#### **Other Key and Notable Species**

- 3.4.28 SBRC returned a total of 5 records of hedgehog (*Erinaceus europaeus*) for locations within 2 km of the Site, dated between 2012 and 2016. The closest record was from 2016 and was located approximately 200m west of the Site.
- 3.4.29 The mosaic of grassland and scrub with numerous potential refugia on Site are of high quality for hedgehogs, although abundant highly suitable habitat is available within the allotments and grasslands located in the surrounding area. Hedgehogs are a species of principal importance on Section 41 of the NERC Act 2006 and the Barnsley BAP due to widespread declines across the country. Given its limited extent, the Site is considered important to hedgehogs at the Site level only.

### **3.5 Invasive Species**

- 3.5.1 SBRC returned a total of 46 records of Japanese knotweed within 2km of the Site, dated between 1983 and 2016, with the closest records from the former Oakwell Brewery site approximately 500m south in 2013. There were also 22 records of Himalayan balsam (*Impatiens glandulifera*) with the closest record 380m north-east. SBRC also returned 21 records of giant hogweed (*Heracleum mantegazzianum*) within 2km of the site, dated between 1986 and 2016. The closest record to the Site was 350 m to the north-east.

- 3.5.2 Japanese knotweed was recorded in two locations on Site and in several locations on the bank located immediately outwith the Site boundary to the east. Approximate locations of knotweed recorded during the survey are shown on Figure 1. Both stands (each approximately 2m<sup>2</sup>) within the Site are situated at the top of the bank near the northern boundary and show evidence of previous herbicide treatment, with both stands marked out and with significant die-back. Some regrowth was noted in the northern stand indicating that the treatment has not yet been successful in eradicating this invasive plant in this location.
- 3.5.3 A single 1m<sup>2</sup> stand of tall Japanese knotweed stems was recorded outside the north-east corner of the Site approximately 2m from the boundary fence. A further large stand occupies the eastern bank measuring approximately 20m x 5m, with the closest fresh shoots growing 1m east of the boundary. Japanese knotweed is scattered near to the south-west corner of the Site fence and two additional larger stands were present at the bottom of the bank to the south-east.
- 3.5.4 No other invasive plants were recorded on or near the Site during the survey. Japanese knotweed is listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) due to its invasive character. Its presence on and adjacent to the Site is considered a significant constraint to the development.

## 4. Ecological Assessment and Mitigation

### 4.1 Proposals

- 4.1.1 Proposals for the Site include landtake of the flat area of the community allotment to accommodate construction of a new car park extension to increase capacity for vehicle parking at the Barnsley Metrodome Leisure Complex. The proposals are illustrated on the Proposed Car Parking Plans (drawing ref: NPS-XX-P-00-DR-A-200 & NPS-XX-P-00-DR-A-101, produced by NPS in June 2019). The new car park will extend to the top of the bank in the northern part of the Site, with a strip of habitat retained along the north margin of the Site. New lighting will be installed around the margins of the car park as illustrated on the planning layout.
- 4.1.2 Within the area of landtake all grassland, scrub, trees, structures and spoil or debris will be removed. A ramp will be installed along the west boundary of the Site to accommodate for the change in levels from the existing car park. Part of the community allotment and garden which lies outside the red line boundary to the north-west will be retained.

### 4.2 Designated Sites

- 4.2.1 The statutory and non-statutory designated sites identified during the data consultation are separated from the Site by considerable distance and no direct impacts from the development proposal are anticipated. No mechanism by which the development might result in significant indirect impacts (e.g. increased public use) to any of the LNR or LWS within the wider area is envisaged has been identified as part of this assessment and therefore no mitigation is proposed.

### 4.3 Habitats

#### ***Semi-improved Neutral Grassland***

- 4.3.1 Given the relatively small limited extent of grassland present on the Site, the common species it supports and the abundance of available grassland in the wider area to the Site, the loss of semi-improved grassland on the Site is highly unlikely to result in a significant negative ecological impact at a Local level; though at a Site level may result in a small reduction in diversity and loss of potential habitat for foraging faunal species, as discussed further in Section 4.4 below.
- 4.3.2 In order to compensate for the potential loss of diversity within the Site, it is recommended that the retained bank along the northern margin of the Site should be landscaped, with dense bramble scrub cleared and the ground reseeded using native and/or wildflower-rich meadow grass mixes.

#### ***Scrub and Scattered Trees***

- 4.3.3 The stand of scrub in the centre of the Site and some of the scattered trees along the northern boundary will be lost as a result of the development, although some specimens may be retained where feasible. These habitats are very limited in extent on Site and widely available in the surrounding area. As such, landtake of scattered scrub and trees is considered significant at the Site level only.

- 4.3.4 To ensure adequate protection is given to retained trees on or adjacent the Site and their roots during construction trees it should be protected from construction activities using Root Protection Zones (RPZs), implemented in accordance with British Standard 5837 (2012) '*Trees in Relation to Design, Demolition and Construction*'.
- 4.3.5 Consideration should be given to the inclusion of replacement tree planting around the periphery of the car park to offset the loss of the trees and scrub from Site. Native specimens matching those that will be lost should be favoured, or species such as common hawthorn (*Crataegus monogyna*) and rowan (*Sorbus acuparia*) which provide an abundant berry resource for foraging insects and birds.

#### **4.4 Species**

##### ***Amphibians***

- 4.4.1 GCN are a EPS and as such receive protection under the Conservation of Habitats and Species Regulations 2017 and the Wildlife and Countryside Act 1981 (as amended). It is illegal to kill, injure, capture, handle or disturb them, and the places they use for breeding, resting, shelter and protection are protected from being damaged or destroyed. GCN is a Species of Principal Importance under Section 41 of the NERC Act 2006 and is listed on the Barnsley BAP.
- 4.4.2 Common amphibians are protected under the Wildlife and Countryside Act 1981 (as amended) against sale, barter or exchange of captive animals. Common toad (*Bufo bufo*) is listed as a priority species under Section 41 of the NERC Act 2006.
- 4.4.3 Given the considerable distance of the Site from potentially suitable breeding habitats at the disused Barnsley Canal 400m east, the potential for this species to be present on Site is considered extremely low although it cannot be entirely ruled out.
- 4.4.4 Natural England's GCN Rapid Risk Assessment (RRA) tool was used to assess whether the proposals are likely to require a EPS licence. Without mitigation, the result of the assessment was that an offence would be highly likely due to a potential (albeit minimal) risk of GCN being injured or killed during the works, or becoming trapped within open excavations on Site. However, when suitable mitigation was considered to reduce the risk of harming individual GCN, the RRA indicates that an offence would be unlikely due to the considerable distance of the Site from potential ponds and the very limited extent of the development footprint.
- 4.4.5 In view of the above, impacts to GCN are considered highly unlikely providing that appropriate precautionary measures are followed throughout the construction works. The measures outlined below in 4.4.25 for a Reptile Method Statement would also be appropriate to safeguard GCN during the works, and therefore a specific GCN Method Statement is not required as long as they are considered within this document. All suitable terrestrial habitats on Site should be cleared under the supervision of an experienced Ecological Clerk of Works (ECoW) and all excavations should be back-filled or covered overnight to avoid animals becoming trapped.
- 4.4.6 In the unlikely event that GCN are encountered during the Site clearance

operations, all works should cease and Natural England should be consulted for advice. In this event a reappraisal of the requirement to obtain a EPS licence to permit the development may be required.

4.4.7 Frogs and/or toads could potentially be associated within the Site as it contains areas of suitable terrestrial habitat and the breeding habitat requirements of these species are different to that of newts - frogs will readily breed in shallow temporary pools and toads are known to range up to 2km from their breeding sites. Despite this, suitable terrestrial habitats in the Site are limited in extent and alternative terrestrial habitat is widely available within the surrounding area. Habitat loss required to accommodate the proposed redevelopment of the Site is therefore considered to be of negligible importance to common amphibians.

4.4.8 In the unlikely event that common amphibians are encountered during Site clearance works, they should be carefully collected by gloved hand and relocated under cover, away from the area of works (e.g. into scrub to the east of the Site).

**Badger**

4.4.9 Badgers and their setts are protected under the Protection of Badgers Act 1992. It is an offence under the act to kill, injure or take a badger. It is also an offence to destroy, damage or obstruct a currently active badger sett, or to disturb animals within the sett.

4.4.10 [Redacted text block]

4.4.11 [Redacted text block]

4.4.12 [Redacted text block]

**Bats**

4.4.13 All species of bat occurring within the UK are included in Schedule 2 of the Conservation of Habitats and Species Regulations 2017 and are protected from deliberate capture, injury or killing, from deliberate disturbance and from deliberate damage or destruction of a breeding site or resting place (roost).

- 4.4.14 All UK bats are also included on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). However, their protection is limited to certain offences. Under the 1981 Act (as amended) it is an offence to intentionally or recklessly disturb bats while they are occupying a structure or place used for shelter or protection, or to obstruct access to any such place.
- 4.4.15 *Barbastelle* (*Barbastella barbastellus*), Bechstein's (*Myotis bechsteinii*), brown long-eared, greater horseshoe (*Rhinolophus ferrumequinum*), lesser horseshoe (*Rhinolophus hipposideros*), noctule and soprano pipistrelle bats are included as priority species under Section 41 of the NERC Act 2006. Daubentons bat, whiskered bat (*Myotis mystacinus*), Leislars bat, noctule, common pipistrelle, soprano pipistrelle and brown long-eared bat are all listed on the Barnsley BAP.
- 4.4.16 No suitable roosting habitat was identified on or near the Site and no impacts to roosting bats are anticipated. Given the minimal landtake of suitable foraging habitat for bats associated with the car park extension and the abundance of suitable habitat in the surrounding area, the habitat loss associated with the development is considered to have negligible potential impact for local bat populations.
- 4.4.17 There is potential for new lighting surrounding the car park to negatively impact foraging and commuting bats through unnecessary lightspill. It is therefore recommended that consideration should be given to sensitive lighting measures to protect the adjacent vegetation from light spill to preserve the function of the adjacent habitat for light sensitive bat species. The guidance provided in Appendix 4 in respect of bats and lighting should be referred to for detail and any lighting proposal should be reviewed by a licensed bat ecologist prior to installation.

### **Birds**

- 4.4.18 All nesting birds are protected under the Wildlife and Countryside Act 1981 (as amended) against destruction of the nest during the bird nesting season, which falls between March and August, inclusive.
- 4.4.19 The trees and scrub within the Site have potential to provide structural cover for a variety of small, common nesting bird species, and a single bird box is present on a tree to the north of the Site (TN2, Figure 1). Given the abundance of similar habitat within the wider area, and relatively limited habitat loss involved with the development, loss of nesting and foraging habitat for birds is considered significant at the Site level only. It is recommended that the bird box should be relocated to a retained tree if this specimen is to be removed.
- 4.4.20 Without mitigation there is potential for active bird nests to be destroyed during vegetation clearance on Site, where this is undertaken during March– August (inclusive).
- 4.4.21 It is recommended that any vegetation removal (where required) should be undertaken outside of bird breeding season, i.e. between September and February (inclusive). Where this is not possible to schedule works for these months, a nesting bird check, to be undertaken by a suitably qualified Ecologist will be required no more than two days prior to vegetation clearance, to check for the presence of active bird nests. An active nest would require an exclusion zone to be established and adhered to until chicks had fledged and/or the nest is no longer in use (to be monitored and confirmed by an ecologist).

4.4.22 Inclusion of a range of bird nesting provision around the margins of the new car park will be implemented as a positive enhancement for nature conservation (in accordance with NPPF, 2019). Suitable provision will include at least 4 bird boxes including general bird boxes with 26mm and 32mm entrance holes suitable for a range of garden bird species and sparrow terraces.

4.4.23 Bird boxes will be sited at a minimum height of 3m on retained trees surrounding the Site. Full southerly aspects, which receive full sun all day during the summer months present a risk of overheating, will be avoided. An ecologist should be consulted to advice on suitable locations for new nesting provision.

### ***Reptiles***

4.4.24 All six UK reptile species are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) against intentional killing or injury. All reptiles are included under Section 41 of the NERC Act 2006, with common lizard and grass snake also designated as priority species in the Barnsley BAP.

4.4.25 Common lizard are known to be present in the wider community allotment to the Site and within the grassland to the east of the Site. Given the limited extent of the suitable habitat to be cleared on Site and the availability of alternative habitats in the wider area, the habitat loss associated with the development is considered unlikely to have a significant negative impact for reptile populations beyond the Site level.

4.4.26 There is potential for reptiles to be present on Site and it is recommended that Site clearance should be undertaken in accordance with a Reptile Method Statement to avoid accidentally injuring or killing reptiles during the process. The Reptile Method Statement should be produced by a suitably qualified and experienced ecologist and agreed with the Local Planning Authority in advance, and should include the following measures: Site clearance works to be undertaken outside of the hibernation period for reptiles (November to February inclusive) in suitable weather conditions for animals to be active; pre-works checks and hand removal of suitable refuge features by an experienced ECoW; directional clearance of the Site from the west towards the east boundary; direct supervision of soil stripping by the ECoW; careful relocation of reptiles to a suitable receptor Site away from the works (e.g. the adjacent grassland and scrub areas to the east) where encountered; use of temporary exclusion fencing to exclude reptiles and prevent re-colonisation of the construction Site; and, appropriate storage of materials to avoid colonisation and potential injury of reptiles.

4.4.27 In order to compensate for loss of small areas of suitable reptile habitat on the Site, it is recommended that landscape enhancements designed to benefit common lizard and other reptiles are incorporated along the retained bank to the north of the new car park extension. Habitat enhancements should be detailed in a Reptile Method Statement produced by an ecologist.

4.4.28 It is recommended that brambles are cleared from the northern bank, which should be reseeded with a wildflower rich meadow mix. In addition, incorporation of a low dry stone wall along the top of the bank will provide some screening from disturbance from the adjacent car park, as well providing a potential refuge and basking site for common lizards. Any trees or scrub cleared from the development footprint should be chipped onto the bank to

create habitat piles at its base suitable for sheltering reptiles and for egg-laying by grass snake and slow worm.

### **Other Key and Notable Species**

#### Hedgehog

- 4.4.29 Hedgehog is included as a species of principal importance under Section 41 of the NERC Act 2006 and is a Barnsley BAP priority species. Whilst not afforded a high level of protection, hedgehogs have experienced significant declines in their UK population numbers, therefore, a best practice approach, avoiding harm to hedgehogs should be taken into consideration during works.
- 4.4.30 Hedgehogs are highly mobile and inquisitive animals that have potential to move onto Site at any time. As a precautionary measure, it is recommended that any excavations left overnight should be covered or have a suitable escape ramp, e.g. a long scaffold board, inserted to allow escape should a hedgehog fall in.
- 4.4.31 Should a hedgehog be discovered on Site at any time during the works, it should be moved carefully with gloved hands to a sheltered area away from the footprint of works, e.g. into the scrub to the east of the Site

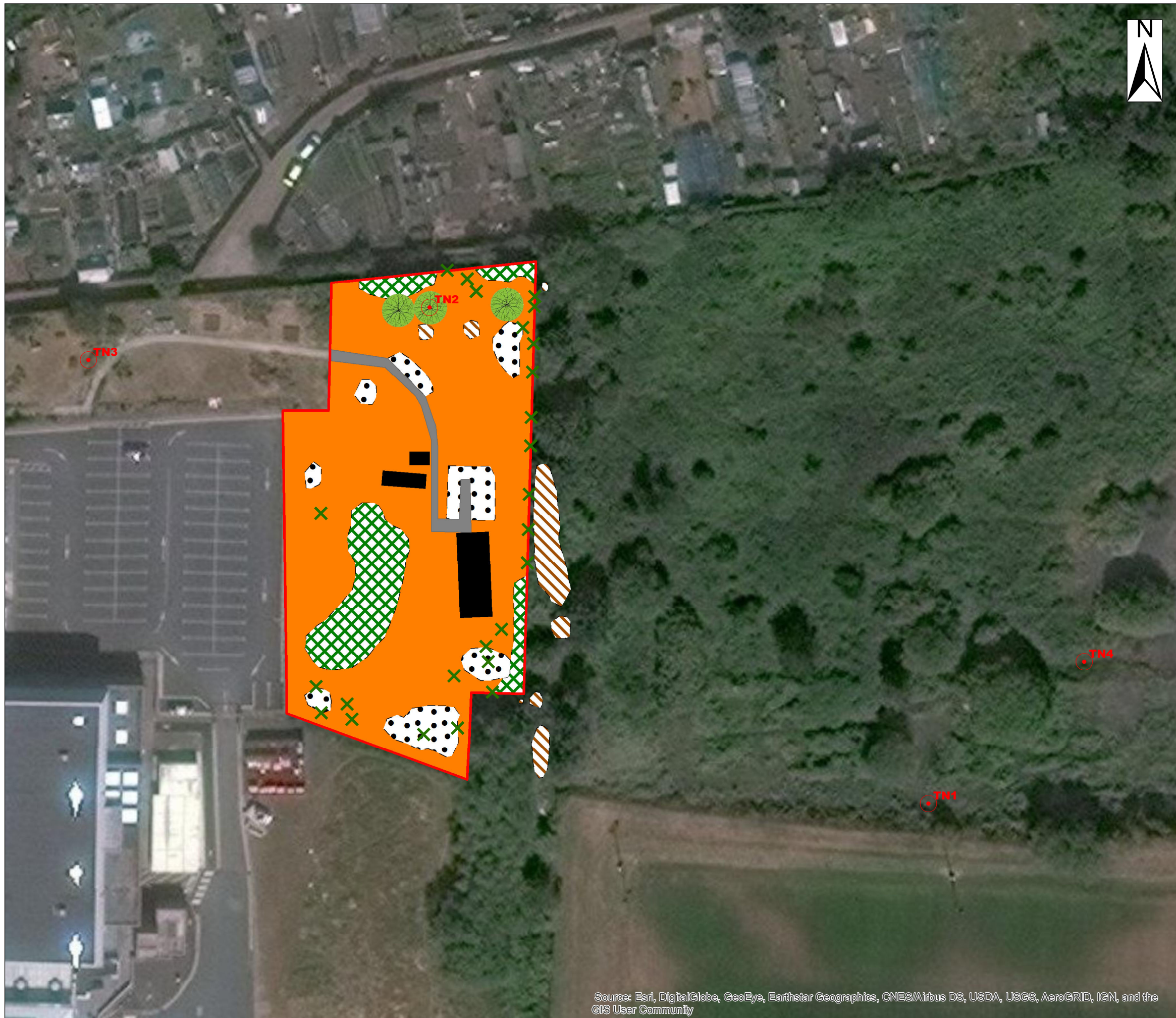
## **4.5 Invasive Species**

- 4.5.1 Japanese knotweed is an invasive plant species which is listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended). It is illegal to deliberately or accidentally cause this plant to spread or otherwise grow in the wild.
- 4.5.2 Japanese knotweed is present both within the Site and immediately adjacent to the boundary. Removal of the on Site growth will be required to permit construction of the new car park extension. Furthermore, the car park will require removal of potentially contaminated spoil material which includes any soil within 7m of above ground growth, which may harbour knotweed rhizomes which spread laterally below ground.
- 4.5.3 A Japanese knotweed management plan should be produced by a qualified Japanese knotweed specialist, in accordance with the guidance detailed in 'Managing Japanese knotweed on development sites: the knotweed code of practice' (Environment Agency, 2013).
- 4.5.4 Suitable methods of control for the Japanese knotweed may vary, however it is likely that the on Site stands will require excavation and disposal at a licensed green waste facility rather than *in situ* herbicide treatment, as they lie within the footprint of the new car park. A programme of herbicide treatment may be appropriate to control growth and eradicate the large stands growing along the eastern boundary fencing. Without management, the stands are likely to spread onto Site in time. Consideration should also be given to inclusion of a Japanese knotweed root barrier membrane below the car park along the east margin to protect the integrity of the new surfacing.




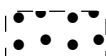







## 5. References

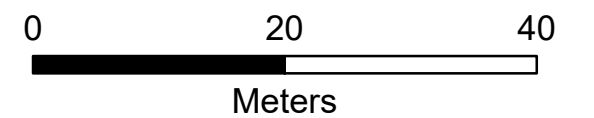
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## Figure 1. Extended Phase 1 Habitat Survey Map



**Legend**

-  Site boundary
-  Semi-improved neutral grassland
-  Dense Scrub
-  Bare ground
-  Structure
-  Hardstanding
-  Japanese knotweed (indicative)
-  Barnsley Canal (disused)
-  Scattered scrub
-  Target note
-  Tree (scattered)



**Barnsley Premier Leisure**

**Barnsley Metrodome Leisure Complex  
Preliminary Ecological Appraisal Report**

**Figure 1  
Extended Phase 1 Habitat Survey Findings**

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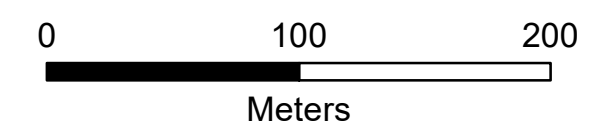
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

## Figure 2. Pond Location Plan



**Legend**

- Site boundary
- Site + 500m
- Barnsley Canal (disused)



**Barnsley Premier Leisure**  
**Barnsley Metrodome Leisure Complex**  
**Preliminary Ecological Appraisal Report**

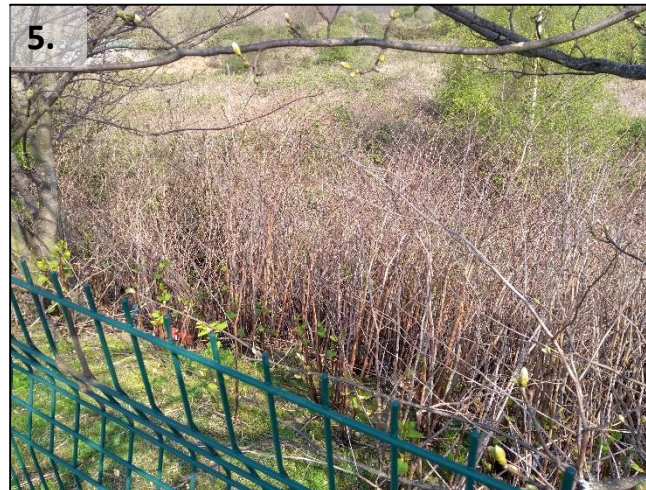
**Figure 2**  
**Pond Location Plan**

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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

## **Appendix 1. Site Photographs**

1. View of grassland and structures on Site
2. Central scrub and trees
3. Northern bank of Site
4. Treated stand of Japanese knotweed within the Site (see Figure 1)
5. Large stand of Japanese knotweed outside eastern boundary
6. Scrub and tipped material at east boundary
7. Small off-site rockery where common lizard are seen (TN3)
8. Eastern bank outwith Site boundary
9. Disused section of Barnsley Canal



## Appendix 2. Habitat Suitability Index Assessment

**Table A2.1 HSI Assessment Calculation Details**

Reference	Location	Pond Area	Pond Drying	Water Quality	Shade	Fowl	Fish	Ponds	Terrestrial Habitat	Macrophytes	HSI score	Suitability
P1	Zone A	>2000m2	Never Dries	Good	0-60%	Minor	Minor	1	Good	21-25%	0.723685	Good
P2	Zone A	1200m2	Never Dries	Good	0-60%	Minor	Minor	1	Good	26-30%	0.740685	Good

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## Appendix 3. Bird Species Records Summary

**Table A3.1: Bird Species recorded within 2km of the Site**

Common name	Latin name	BoCC status
Fieldfare	<i>Turdus pilaris</i>	Schedule 1, Red
Hen Harrier	<i>Circus cyaneus</i>	Schedule 1, Red
Merlin	<i>Falco columbarius</i>	Schedule 1, Red
Redwing	<i>Turdus iliacus</i>	Schedule 1, Red
Goldeneye	<i>Bucephala clangula</i>	Schedule 1, Amber
Kingfisher	<i>Alcedo atthis</i>	Schedule 1, Amber
Whooper Swan	<i>Cygnus cygnus</i>	Schedule 1, Amber
Barn Owl	<i>Tyto alba</i>	Schedule 1, Green
Brambling	<i>Fringilla montifringilla</i>	Schedule 1, Green
Firecrest	<i>Regulus ignicapillus</i>	Schedule 1, Green
Goshawk	<i>Accipter gentilis</i>	Schedule 1, Green
Hobby	<i>Falco subbuteo</i>	Schedule 1, Green
Little Ringed Plover	<i>Charadrius dubius</i>	Schedule 1, Green
Peregrine Falcon	<i>Falco perigrinus</i>	Schedule 1, Green
Spotted Crake	<i>Porzana porzana</i>	Schedule 1, Green
Corn Bunting	<i>Emberiza calandra</i>	Red
Cuckoo	<i>Cuculus canorus</i>	Red
Curlew	<i>Numenius arquata</i>	Red
Grasshopper Warbler	<i>Locustella naevia</i>	Red
Grey Partridge	<i>Perdix perdix</i>	Red
Grey Wagtail	<i>Motacilla cinerea</i>	Red
Hawfinch	<i>Coccothraustes coccothraustes</i>	Red
Herring Gull	<i>Larus argentatus</i>	Red
House Sparrow	<i>Passer domesticus</i>	Red
Lapwing	<i>Vanellus vanellus</i>	Red
Lesser Redpoll	<i>Carduelis cabaret</i>	Red
Lesser Spotted Woodpecker	<i>Dendrocopos minor</i>	Red
Linnet	<i>Carduelis cannabina</i>	Red
Marsh Tit	<i>Poecile palustris</i>	Red
Mistle Thrush	<i>Turdus viscivorus</i>	Red
Pied Flycatcher	<i>Ficedula hypoleuca</i>	Red
Pochard	<i>Aythya ferina</i>	Red
Skylark	<i>Alauda arvensis</i>	Red
Song Thrush	<i>Turdus philomelos</i>	Red
Spotted Flycatcher	<i>Muscicapa striata</i>	Red
Starling	<i>Sturnus vulgaris</i>	Red
Tree Pipit	<i>Anthus trivialis</i>	Red

Tree Sparrow	<i>Passer montanus</i>	Red
Turtle Dove	<i>Streptopelia turtur</i>	Red
Whinchat	<i>Saxicola rubetra</i>	Red
Willow Tit	<i>Poecile montanus</i>	Red
Wood Warbler	<i>Phylloscopus sibilatrix</i>	Red
Woodcock	<i>Scolopax rusticola</i>	Red
Yellow Wagtail	<i>Motacilla flava</i>	Red
Yellowhammer	<i>Emberiza citrinella</i>	Red
Barnacle Goose	<i>Branta leucopsis</i>	Amber
Black-Headed Gull	<i>Chroicocephalus ridibundus</i>	Amber
Bullfinch	<i>Pyrrhula pyrrhula</i>	Amber
Common Gull	<i>Larus canus</i>	Amber
Common Redpoll	<i>Carduelis flammea</i>	Amber
Common Sandpiper	<i>Actitis hypoleucos</i>	Amber
Common Tern	<i>Sterna hirundo</i>	Amber
Dipper	<i>Cinclus cinclus</i>	Amber
Dunlin	<i>Calidris alpina</i>	Amber
Dunnock	<i>Prunella modularis</i>	Amber
Gadwall	<i>Anas strepera</i>	Amber
Great Black-Backed Gull	<i>Larus marinus</i>	Amber
House Martin	<i>Delichon urbica</i>	Amber
Iceland Gull	<i>Larus glaucoides</i>	Amber
Kestrel	<i>Falco tinnunculus</i>	Amber
Mallard	<i>Anas platyrhynchos</i>	Amber
Meadow Pipit	<i>Anthus pratensis</i>	Amber
Mute Swan	<i>Cygnus olor</i>	Amber
Nightjar	<i>Caprimulgus europaeus</i>	Amber
Oystercatcher	<i>Haematopus ostralegus</i>	Amber
Pink-Footed Goose	<i>Anser brachyrhynchus</i>	Amber
Redshank	<i>Tringa totanus</i>	Amber
Redstart	<i>Phoenicurus phoenicurus</i>	Amber
Reed Bunting	<i>Emberiza schoeniclus</i>	Amber
Shelduck	<i>Tadorna tadorna</i>	Amber
Short-Eared Owl	<i>Asio flammeus</i>	Amber
Shoveler	<i>Anas clypeata</i>	Amber
Snipe	<i>Alectoris rufa</i>	Amber
Spotted Redshank	<i>Tringa erythropus</i>	Amber
Stock Dove	<i>Columba oenas</i>	Amber
Swift	<i>Apus apus</i>	Amber
Tawny Owl	<i>Strix aluco</i>	Amber
Teal	<i>Anas crecca</i>	Amber

Wigeon	<i>Anas penelope</i>	Amber
Willow Warbler	<i>Phylloscopus trochilus</i>	Amber
Blackbird	<i>Turdus merula</i>	Green
Blackcap	<i>Sylvia atricapilla</i>	Green
Blue Tit	<i>Cyanistes caeruleus</i>	Green
Buzzard	<i>Buteo buteo</i>	Green
Carrion Crow	<i>Corvus corone</i>	Green
Chaffinch	<i>Fringilla coelebs</i>	Green
Chiffchaff	<i>Phylloscopus collybita</i>	Green
Coal Tit	<i>Parus ater</i>	Green
Collared Dove	<i>Streptopelia decaocto</i>	Green
Coot	<i>Fulica atra</i>	Green
Feral Pigeon	<i>Columba livia feral</i>	Green
Garden Warbler	<i>Sylvia borin</i>	Green
Goldcrest	<i>Regulus regulus</i>	Green
Golden Plover	<i>Pluvialis apricaria</i>	Green
Goldfinch	<i>Carduelis carduelis</i>	Green
Goosander	<i>Mergus merganser</i>	Green
Great Crested Grebe	<i>Podiceps cristatus</i>	Green
Great Spotted Woodpecker	<i>Dendrocopos major</i>	Green
Great Tit	<i>Parus major</i>	Green
Green Woodpecker	<i>Picus viridis</i>	Green
Greenfinch	<i>Carduelis chloris</i>	Green
Grey Heron	<i>Ardea cinerea</i>	Green
Jackdaw	<i>Corvus monedula</i>	Green
Jay	<i>Garrulus glandarius</i>	Green
Lesser Whitethroat	<i>Sylvia curruca</i>	Green
Little Grebe	<i>Tachybaptus ruficollis</i>	Green
Long-Eared Owl	<i>Asio otus</i>	Green
Long-Tailed Tit	<i>Aegithalos caudatus</i>	Green
Magpie	<i>Pica pica</i>	Green
Moorhen	<i>Gallinula chloropus</i>	Green
Nuthatch	<i>Sitta europaea</i>	Green
Pied Wagtail	<i>Motacilla alba</i>	Green
Pied Wagtail	<i>Motacilla alba</i>	Green
Pomarine Skua	<i>Stercorarius pomarinus</i>	Green
Reed Warbler	<i>Acrocephalus scirpaceus</i>	Green
Robin	<i>Erithacus rubecula</i>	Green
Rock Dove	<i>Columba livia</i>	Green
Rock Pipit	<i>Anthus petrosus</i>	Green
Rook	<i>Corvus frugilegus</i>	Green

Sand Martin	<i>Riparia riparia</i>	Green
Sedge Warbler	<i>Acrocephalus schoenobaenus</i>	Green
Siskin	<i>Carduelis spinus</i>	Green
Sparrowhawk	<i>Accipiter nisus</i>	Green
Stonechat	<i>Saxicola torquata</i>	Green
Swallow	<i>Hirundo rustica</i>	Green
Treecreeper	<i>Certhia familiaris</i>	Green
Tufted Duck	<i>Aythya fuligula</i>	Green
Water Rail	<i>Rallus aquaticus</i>	Green
Waxwing	<i>Bombycilla garrulus</i>	Green
Wheatear	<i>Oenanthe oenanthe</i>	Green
Whitethroat	<i>Sylvia communis</i>	Green
Wood Pigeon	<i>Columba palumbus</i>	Green
Wren	<i>Troglodytes troglodytes</i>	Green
Canada Goose	<i>Branta canadensis</i>	Schedule 9
Little Owl	<i>Athene noctua</i>	No Status
Pheasant	<i>Phasianus colchicus</i>	No status
Red Legged Partridge	<i>Alectoris rufa</i>	No Status
Ring necked Parakeet	<i>Psittacula krameri</i>	No status

## Appendix 4. Bats and Lighting

### Bats and lighting

Artificial lighting is known to affect bat roosting and foraging behaviour with lighting shown to result in a range of impacts including roost desertion (BCT, 2009), delayed emergence of roosting bats (Downs *et al.*, 2003), increased activity of some bat species and decreased activity by others (Stone *et al.*, 2012).

An experimental approach using LED units, demonstrated that relatively fast-flying bat species, including common pipistrelle, showed no significant impacts as a result of new artificial lighting, even when lighting was set at relatively high levels close to 50 lux. In contrast slow flying bats, including myotis bats (*Myotis* spp.) showed sharp reductions in presence, even at low light levels of 3.6 lux (Stone *et al.*, 2012). Current recommendations for all bat species specifies that no bat roost should be directly illuminated (BCT 2014).

### Mitigation and lighting design

Bat friendly lighting plans should firstly look to avoid lighting where possible and minimise lighting impacts by adopting the following measures:

1. **Lighting curfews or use of PIR sensors.** Lighting curfews can be an effective way of avoiding impacts on bats. These curfews may involve either turning off lighting or dimming light units at specific times of the night, dimming units at key times of the year, providing the luminaire allows for this option via a control unit. Lighting to be triggered by PIR sensors can be expected to be illuminated only when required and for a low proportion of the overall time.
2. **Use only high pressure sodium or warm white LED lamps where possible.** High pressure sodium and warm white LED lamps emit lower proportions of insect attracting UV light than mercury, metal halide lamps and white LED lighting. Generally lamps should have a lower proportion of white or blue wavelengths, with a colour temperature <4200 kelvin recommended (BCT, 2014).
3. **Minimise the spread of light.** Light spread should be kept at or near horizontal in order to ensure that only the task area is lit. Flat cut-off lanterns or accessories should be used to shield or direct light to where it is required. Baffles, hoods, louvres and shields should be used where necessary to reduce light spill.
4. **Consider the height of lighting column.** Whilst downward facing bollard lighting is often preferable, it should be noted that a lower mounting height does not automatically reduce impacts to bats as bollard lighting can often be designed to provide uplighting. Where bollard lighting is considered to be the most appropriate system, bollard spacing or unit density should be kept to a minimum and units should be fitted with the appropriate hoods/deflectors to reduce uplighting. Column height should be carefully considered to balance task and mitigation measures.
5. **Avoid reflective surfaces below lights.** The polarisation of light by shiny surfaces attracts insects increasing bat activity (BCT, 2012). Consequently surface materials around lighting require consideration.

## References

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