



# Rookwood Golf Course, Horsham

## Ecological Constraints and Opportunities Plan

### Report for Horsham District Council

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# Contents

Ecological Constraints and Opportunities Plan	4
References	18
Appendix 1: ECOP Maps	19

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# Ecological Constraints and Opportunities Plan

## BACKGROUND

- 1.1 The Ecology Consultancy was commissioned by Horsham District Council (HDC) to assess the potential impact on Warnham Mill Local Nature Reserve (LNR) and Horsham Riverside Walk from the proposed development of Rookwood Golf Course, Warnham, Horsham, West Sussex, RH12 3RR. This includes:
- Impact on the corridors and important linkages between the existing golf course, Warnham Mill LNR and Riverside Walk;
  - Important areas for potential net gain and enhancement of recovery networks if development on this land was to be approved;
  - Production of an Ecological Constraints and Opportunities Plan (ECOP) to highlight the preservation and enhancement of key corridors, which connect Warnham Mill LNR and Riverside Walk to the wider landscape.
- 1.2 The golf course (hereby referred to as ‘site’) is owned by HDC and has been identified as a potential development site in the draft Local Plan.

## SCOPE OF THE REPORT

- 1.3 This report is not able to robustly address the impact of proposed development on site ecology or the adjacent Warnham Mill LNR and Site of Nature Conservation Importance (SNCI) (hereby referred to as the ‘reserve’). This can only be addressed through an Ecological Impact Assessment (EclA) that is informed by up to date ecological survey data (see *Further Survey* below).
- 1.4 It has not been possible to provide biodiversity net-gain scenarios as part of this work. These require a detailed habitat survey from which to run pre-development calculations (the ‘before scenario’) and at least a parameter plan/indicative masterplan from which to run post-development calculations (the ‘after scenario’).
- 1.5 This document provides an ECOP which is a tool for mapping where biodiversity might act as a constraint to development and also where the development site presents opportunities to retain, mitigate, compensate or enhance biodiversity.

- 1.6 It has been written by Ben Kimpton Dip(Hort) BSc MSc MCIEEM a Principal Ecologist with 15 years' consultancy experience who is proficient in carrying out ecological surveys, assessments and masterplanning for a wide range of residential-led schemes.
- 1.7 The ECOP has been prepared with reference to best practice guidance as detailed in British Standard 42020:2013 Biodiversity - Code of Practice for Biodiversity and Development (BSI, 2013).

## **METHOD**

- 1.8 Information for this ECOP has been obtained from the following sources:
- Data search from Sussex Biological Records Centre, principally for species records and information on non-statutory sites;
  - Informal interview with the site's Head Greenkeeper/Course Manager, site's Club Manager and Horsham District Council Countryside & Ecology Manager;
  - An ecological walkover survey of the site undertaken in March 2020 by Ben Kimpton;
  - Bluesky's National Tree Map Data;
  - MAGIC (<http://www.magic.gov.uk/>) - the Government's on-line mapping service; and
  - 1797 Shelley Map, 1840 Tithe Map, on-line Ordnance Survey maps and publicly available aerial photography.

## **LIMITATIONS**

- 1.9 An ECOP should be informed by the results of ecological surveys, with the level of detail included in an ECOP proportionate to the nature and scale of the proposed development (BSI, 2013).
- 1.10 Every effort has been made to provide a comprehensive assessment of the likely constraints and opportunities, however as no site specific ecological survey data or development proposals were available, this ECOP is considered preliminary. It should be revised with the findings of ecological surveys as they become available and framed within the context of development proposals as they progress .

## SUMMARY OF POTENTIAL IMPACTS AND MITIGATION

1.11 The following activities or changes identified during the ECOP process highlight some of the impacts likely to generate effects on the reserve and Riverside Walk, if the golf course site were to be allocated:

### Construction Phase

- Runoff of pollutants from construction site;
- Airborne pollutants (i.e. dust) from construction site;
- Noise/vibrations from demolition/construction;
- Increased human activity; and
- Light spill from construction site during evenings and early mornings.

### Operational Phase

- Runoff of pollutants from the developed site;
- Emission of airborne pollutants;
- Noise/vibrations from site operations and vehicle movements;
- Shading from buildings;
- Loss or changes to habitats and green corridors that provide a supporting role to species present in the reserve;
- Increased human activity;
- Disturbance and predation from pets (cats and dogs); and
- Light spill during 24 hour operation.

1.12 To avoid the above potential impacts on the reserve (if the site were to be allocated) some or all of the following outline measures may be required:

- Retention, protection and enhancement of key corridors that link the reserve to the wider landscape;
- Creation of buffer zone adjacent to the reserve, including no illumination (see below) and where necessary boundary treatments such as fencing;
- Retention, protection and enhancement of important on-site habitats such as ditches/ponds, wooded boundaries, woodland and river corridors that are likely to provide an important supporting role to species using the reserve;

- Creation of buffer zones to important retained on-site habitats such as ditches/ponds, wooded boundaries, woodland and river corridors;
- Full or part covenant on cats and restrictions on dog access;
- Invasive plant species management;
- Sustainable Drainage System; and
- Sensitive lighting strategy with areas of both dark i.e. no light spill and controlled light spill i.e. within a specified range and type of light spill.

### **FURTHER WORK**

1.13 The following is provided as a preliminary list of ecological investigations required to inform a robust assessment of the likely impacts of site development. It is not definitive and should be subject to a more detailed survey scoping exercise if the site were allocated. Any required surveys should be undertaken following best practice guidelines:

- Preliminary Ecological Appraisal;
- Reptile survey, considering the potential presence of adders;
- Dormouse survey;
- Harvest mouse survey;
- Great crested survey;
- Bat survey including preliminary roost assessment of buildings/trees, emergence/re-entry surveys, transect surveys and static monitoring surveys;
- Combined water vole and otter survey;
- Badger survey;
- Breeding bird survey, including a survey of suitable buildings for barn owl;
- Invertebrate survey; and
- EclA.

### **DESIGN NOTES**

1.14 In line with the brief, a series of ECOP maps have been developed to visualise the existing ecological features (see ECOP Map 1 and 2 for species and habitats) and key constraints and opportunities (see ECOP Map 3 and 4, Appendix 1)

1.15 The following notes expand on the Legend for ECOP Map 3 and 4 and provide further detail on the retention, protection and enhancement of individual features.

1.16 ECOP Map 4 presents ‘heat map colour coding’ showing the levels of environmental risk associated with development of the golf course as follows:

- High risk denotes development parcels where there will likely be greater impact on biodiversity, where mitigation (particularly in regards to species) is harder to successfully achieve and where they fall within, or adjacent to, flood zones.
- Medium risk denotes development parcels where there will likely be impact on biodiversity, where mitigation has a greater chance of minimising the predicted effects and where they fall adjacent to flood zones.
- Low risk denotes development parcels where there will likely be less impact on biodiversity (comparatively), where mitigation has the best chance of success and where these zones fall outside of flood zones.

### **Rookwood Golf Course - Habitats**

1.17 The main habitat types present on-site, observed during the walkover survey and identified during the desk-study, were as follows:

- Buildings and hardstanding;
- Ephemeral/short perennial and tall ruderal vegetation;
- Improved grassland (dominating the fairways);
- Species-poor semi-improved grassland (dominating the rough);
- Ditches and ponds with marginal and floating aquatic vegetation;
- Introduced shrub and scrub (scattered and continuous);
- Scattered trees including mature pedunculate oak along old field boundaries;
- Native hedgerows; and
- Woodland including alder/willow carr (wet woodland), broad-leaved plantation, broad-leaved semi-natural woodland and Ancient Semi-Natural Woodland (ASNW)<sup>1</sup> along river corridors.

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<sup>1</sup> ASNW or Planted Ancient Woodland (PAW) are both categories of ‘ancient woodland’ - which is defined as woodland which has had at least some form of continuous cover since at least 1600AD. Although counterintuitive, this cover does not necessarily have to be in the form of trees or shrubs. It can, in the case of cleared woodland, take the form of ground flora (such as bluebells) as these plants show a high fidelity to ancient woodland (soil) conditions and can persist for decades.



1.18 These habitats, but in particular the wooded boundaries, are continuous with the reserve and Riverside Walk and provide a supporting role to species that are present there. This is best seen with wetland habitats such as ponds in the northern section of the site that support at least four amphibian species and notable dragonfly/damselfly species whose core habitat is considered to be the reserve, but are using adjacent suitable habitat.

 Warnham Mill LNR/SNCI

1.19 Warnham Mill is 38.35 hectares in size and designated as a LNR which is a statutory nature conservation site. It is additionally designated as an SNCI, which is a non-statutory nature conservation site. Nature conservation sites are afforded protection through Policy 24 of the current Local Plan (Horsham District Council, 2015) and Policy 27 of the Draft Local Plan (Horsham District Council, 2020).

1.20 The LNR / SNCI is of particular importance for its ornithology, supporting 168 species of bird, but it also supports good assemblages of other groups including plants (472+ species) and invertebrates (758 moth, 35 butterfly and 25 dragonfly/damselfly species). Twelve amphibian/reptile and 32 mammal species have also been recorded including seven species of bat, historic dormouse records and an extant population of harvest mouse.

1.21 Wetland habitats including the open standing water of Warnham Millpond and the rivers of Boldings Brook and Channells Brook dominate the reserve. Other wetland habitats include alder/willow carr, reedbeds, marginal vegetation, fresh water marsh and wet grassland. The woodlands types at Millpond Plantation and Walnut Tree Plantation further increase the reserve's diversity of habitats (Friends of Warnham LNR, 2020; Natural England, 2020).

 50m / 100m buffers to the western boundary of Warnham Mill LNR/SNCI

1.22 The proposed development has potential to cause long-term impacts on the LNR/SNCI through air and waterborne pollutants (see *Water Pollution Risk* below), disturbance from increased light and noise levels, shading from buildings and predation from pets *viz.* cats etc.

1.23 The 50m and 100m buffers provided on ECOP Map 3 are for reference purposes only. Appropriate buffer zones, using retained habitats (not recreated), should be provided

to mitigate these impacts. Their design and function i.e. location, use, access, distance from LNR/SNCI, habitat composition and any additional hard infrastructure such as fencing, should be informed by further ecological survey and assessment work. NOTE: all boundary treatments should be mindful (permeable) of badger, deer and other wild mammal commuting/foraging routes.

- 1.24 In regards to cat predation, which could have a significant effect on small mammals and birds both on-site and in the reserve, a study in England (Thomas, Baker & Fellowes, 2014) has also shown that the largest maximum daily area ranged by a cat was c.34ha. This equates to a circular area with c.660m diameter and following this, c.300-400m buffers between a cat residency and key habitats were recommended to minimise the impact of predation. This may however need to be larger if cat ranging is increased by higher cat population density. With 20% of households in the south-east owning on average 1.6 cats (PFMA, 2019) this means the estimated cat population for 500 dwellings is 160 cats.

In regards to light pollution, no direct or in-direct illumination of the western boundary of the LNR/SNCI should take place and ideally a dark zone should be maintained adjacent to the LNR/SNCI. This approach should be extended to include key on-site habitats such as woodland, wooded corridors/boundary features and wetland habitats to avoid potential impacts on wildlife e.g. bat foraging and commuting routes. Where lighting is required it should include controllable and directional sources such as baffled LED and be informed by a Lighting Strategy designed in consultation with an ecologist and providing details on 'no light zones' and 'controlled light zones'.

— 50m / 100m buffers to the western boundary of Warnham Mill LNR/SNCI

- 1.25 The site forms part of the upper catchment of the River Arun. The site (particularly the northern section) slopes from west to east towards Warnham Mill LNR/SNCI and Boldings Brook. A number of ditches and streams also traverse the golf course and feed into Boldings Brook/Warnham Millpond. Boldings Brook and Red River flow through the southern section of the site and converge at its southern limit before flowing south to join the River Arun.
- 1.26 It is recommended that key watercourses and associated wetland habitats are retained and protected and that measures are put in place to minimise any potential impacts. This should include an appropriate buffer zone of semi-natural habitat between watercourses/wetland habitats and erecting barriers/screens as protection from dust

or pollution during construction. These and other best practice measures should be detailed in a Construction Environmental Management Plan (CEMP).



10m river buffer zone

1.27 The Environment Agency require a minimum 10m Watercourse Protection Zone (WPZ) from the upper banks of main rivers which includes Boldings Brook and Red River. This is to safeguard against impacts such as pollution events, and for access and maintenance. Ditches/streams within the golf course may also require minimum 8m WPZs.

1.28 To avoid any increase in flood risk whilst also protecting surface and ground water quality, Sustainable Drainage Systems (SuDS) should be used to control the quantity and rate of run-off from the site. They should be detailed in a Mitigation Strategy including cross sections and a planting plan. They should make use of natural 'infiltration measures' and provide a net gain in aquatic habitats including areas of wet grassland, ponds and reed bed, the latter two being Habitat of Principal Importance (HPI)<sup>2</sup>. As newly created wetland features they should be linked to the wider landscape using existing vegetation such as scrub, hedgerow, meadow grassland wherever possible.



Flood Zone 3

1.29 Land within Zone 3 is 'High Probability Land', having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding.



Flood Zone 2

1.30 Land within Zone 2 is 'Medium Probability Land', having between a 1 in 100 and 1 in 1,000 annual probability of river flooding

1.31 By default all remaining areas of the site outside Zones 2 and 3 are within Zone 1 which is 'Low Probability Land' having a less than 1 in 1,000 annual probability of river flooding.

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<sup>2</sup> Habitats of Principal Importance for The Conservation of Biodiversity in England are listed under The Natural Environmental and Rural Communities (NERC) Act (2006). They are synonymous with Biodiversity Action Plan (BAP) priority habitats. Both HPIs and Species of Principal Importance (SPIs) are listed under the NERC Act (2006).

1.32 Note: The Environment Agency (EA) Flood Zones that are represented on ECOP Map 3 do not take account of the possible impacts of climate change and consequent changes in the future probability of flooding. The climate change floodplain for the site and reserve is shown on P.44, Appendix B of Horsham's Strategic Flood Risk Assessment (Scott Wilson, 2010). It shows a larger area of flooding than mapped as part of this ECOP in particular at the northern end of the site, adjacent areas to the north and south of the dipping ponds and between the two rivers in the southern section of the site.



1.33 Watercourses have been culverted in a number of places across the site. Where possible, these should be re-instated as natural sections of ditch/stream to increase the site's biodiversity and slow the rate of water discharge.



1.34 Four invasive plant species have been recorded on-site and are shown on ECOP Map 3, These are giant hogweed, rhododendron, variegated yellow archangel and three-cornered leek. Under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended), it is an offence to plant or otherwise cause the spread of these species into the wild. If these plants are to be affected during works, appropriate site management and waste disposal will be required.

1.35 As best practice, the removal of these four plants is shown on ECOP Map 4, along with the removal of two other invasive non-native species i.e. eucalyptus and winter heliotrope. Eucalyptus trees are in close proximity to alder/willow carr along Boldings Brook and due to their high water demands are a potential risk to locally important wetland habitats. Winter heliotrope (along with variegated yellow archangel) is located in an area of established woodland likely to be ancient in origin and comprising Ancient Woodland Indicators (AWIs) such as wild daffodil, bluebell and primrose that could be outcompeted by the dense growth form of this invasive species.

1.36 Environmental management guidance to prevent the spread of invasive plant species is available on the Government website (Natural England, Defra & Environment Agency, 2019) and from The Commonwealth Agricultural Bureau International (2020).



### Retention, protection and enhancement of key ponds with buffer zones

- 1.37 The two larger on-site ponds in the northern section provide an important wildlife resource and should be retained, protected and enhanced. They are known to support a range of amphibians (toad, frog, palmate and smooth newt) and notable Odonata including downy emerald, brilliant emerald and scarce chaser that are all county rare species. All of these species are found in larger numbers in Warnham LNR/SNCI e.g. the three dipping ponds located *c.*100m south. Open standing water on-site is therefore considered to provide a supporting role to the core habitat for these species.
- 1.38 Both of these ponds would also qualify as being a HPI if found to support protected species such as great crested newts, which have been recorded in the two small ponds *c.*270 to the south in Warnham LNR/SNCI.
- 1.39 If great crested newt are confirmed present, retaining and enhancing the buffer zone around these two ponds will be beneficial for any EPSM licence that may subsequently be required as guidance requires that all habitat lost within 500m of a known GCN pond is replaced like for like. The buffer zone should be designed and managed for wildlife with a mosaic of trees/scrub and meadow grassland to provide species-rich habitats and permanent cover for amphibians that is linked to larger areas of woodland in the wider landscape e.g. Walnut Tree Plantation and the reserve's dipping ponds. Turf covered hibernacula and/or log piles should be created within the pond buffer zone and if not already present in adjacent woodland within the reserve.
- 1.40 NOTE: SuDS cannot mitigate for the loss of GCN habitat and therefore the creation of attenuation ponds and detention basins etc. cannot be included as part of an EPSM licence. It should also be noted that any SuDS created in proximity to a known GCN pond and any on-going maintenance may require an EPSM licence.
- 1.41 Ponds can support a variety of wildlife, are potential HPIs and could be easily retrofitted to existing bunkers and depressions, a number of which already hold water during periods of high rainfall. Their creation would provide an overall net gain in this habitat and enhancement for amphibians that are already present on-site and at Warnham LNR/SNCI.
- 1.42 Optimum locations for new ponds in the northern section are downslope, along the eastern side of the site. This location will provide a network of breeding habitat within the range of existing amphibian populations. All newly created wetland features,

including ponds, should be linked to the wider landscape using existing habitats such as hedgerows, scrub and ditches or similar newly created/planted habitats.

#### Mitigation for potential bat roosts

- 1.43 Roosting bats were reported from the greenkeepers cottage (from sarking board on the southern facade) and the large barn in the northern section of the site. All other buildings present on-site, the two bridges under the B2237 Warnham Road and multiple trees (particularly the mature pedunculate oak trees along old field boundaries) also provide potential features for roosting bats. All structures and trees to be impacted by development proposals must be surveyed for bats and where bat roosts are confirmed present mitigation measures must be put in place, which may include a European Protected Species Mitigation (EPSM) licence. New residential properties are not suitable for compensatory roosts should these be required as part of an EPSM licence.

#### Retention and protection of notable trees

- 1.44 167 trees with a canopy area greater than 200 square metres (equivalent of 16m diameter) are present on-site. ECOP Map 2 show that these are strongly associated with old field boundaries and the walk-over survey confirmed the majority were pedunculate oaks. These are important green infrastructure assets and should be retained and protected in accordance with *BS 5837:2012 Trees in Relation to Design, Demolition and Construction – Recommendations*.

#### Retention and protection of Walnut Tree Plantation

- 1.45 Walnut Tree Plantation is shown on the 1844 Tithe map as plot No.1087 and the apportionment describes it as Walnut Tree Field, a plot of arable land measuring just over 8 acres. The 1797 Shelley map shows it as plot No.14 and describes it as Walk Field. It would appear by inference that it must have been established as a plantation sometime between 1797 and 1844. The plantation comprises the older wooded field boundaries that pre-date the planting of walnut trees. Both the plantation and its boundaries comprise AWIs.

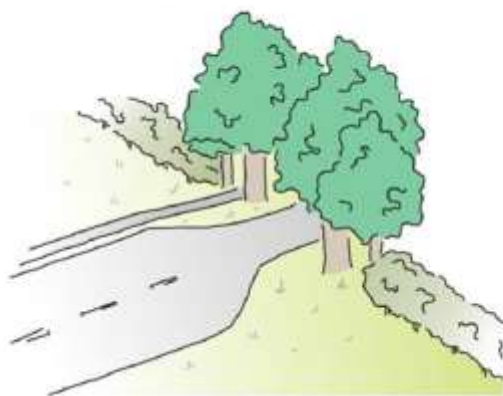
#### Scrub/Woodland retention, protection and enhancement

- 1.46 Wooded boundary features provide an important green infrastructure resource being corridors for the movement of wildlife across the wider landscape and likely to support a range of protected and notable species. They connect other important habitats such as ponds and blocks of woodland e.g. Walnut Tree Plantation. Many are historic, being

present on the 1797 Shelley Map, but likely to be much older. An indication of their age/importance is shown by the presence of at least 20 AWIs for the south-east (Rose 1999, Rose & O'Reilly 2006) casually recorded<sup>3</sup> in wooded boundaries, including the two wooded river corridors in the southern section (see \* on ECOP Map 2). There should be a presumption that all of these boundaries are retained, protected and integrated (and enhanced) into any green infrastructure strategy. The retention of larger thickets of blackthorn in the northern section is recommended to benefit brown hairstreak butterfly, an SPI that is known to use the site and reserve.

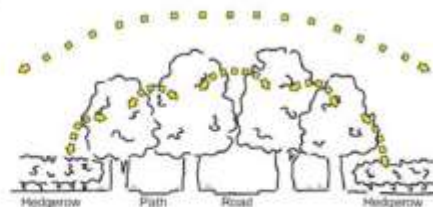
1.47 Any impact to boundaries should be kept to an absolute minimum. All transport routes should be laid out to minimise the number and width of crossing points through hedgerows/wooded boundaries. Where intersection is needed, existing gaps should be utilised, road widths minimised by reducing roads to a single carriageway (which also assists as a traffic calming measure), off-setting pavements/footpaths and ensuring hop-overs and underpasses are in place to maintain connections for wildlife using the site. If dormice are confirmed present, a similar approach would be a requirement of an EPSM licence.

1.48 The images below (© Aspect Ecology 2017) show how roads can be reduced to a single carriageway where intersecting boundaries with the footpath off-set in order to maintain connections for dormice through the use of connected tree canopy. NOTE: dormice bridges are only recommended as a temporary measure to providing aerial connectivity, whilst tree canopies fill-out in the short-term.



**Single carriageway**

The road narrows to the width of a single carriageway at the crossing point, with pedestrian access restricted to one side of the road. This design minimises the width of the vegetation corridor that is affected by the works and can be incorporated as a traffic calming measure.



<sup>3</sup> Only incidental records were taken of notable areas of woodland ground flora in March, observed during the walk-over survey and as such the number and extent of AWIs recorded is considered an underestimate. AWIs present include holly, hazel, wild cherry, bluebell, primrose, moschatel, wild daffodil, ransoms, wood anemone, pendulous sedge, remote sedge, wood sedge, pignut, hart's-tongue fern, soft shield fern, sweet violet, stinking iris, yellow archangel, greater stitchwort and potentially green hellebore.

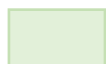
1.49 As discussed above many of the older wooded boundaries exhibit characteristics of ancient woodland, including Walnut Tree Plantation and the wooded corridors of Boldings Brook and Red River. All ASNW should be retained and protected. Standing advice from Natural England requires a minimum 15m (development-free) buffer around all ASNW. Wherever possible it is recommended that this buffer be expanded to provide additional habitat zones. Gardens or any amenity/formal landscaping should not be included as part of the 15m ASNW buffer.

1.50 The site comprises approximately 7.5ha of Lowland Mixed Deciduous Woodland HPI. The national dataset (MAGIC, 2020) identifies it in the following locations on-site:

- Western edge, adjacent to A24 (northern section);
- Eastern edge adjacent to reserve (northern section);
- Walnut Tree Plantation
- Along Boldings Brook (southern section);
- Between Boldings Brook and Red River (southern section); and
- Between Red River and Redford Avenue (southern section).

1.51 The extent of this HPI is however considered to be much greater than currently mapped by the national dataset and should be validated as part of any further, more detailed work.

1.52 The Natural Environment and Rural Communities Act 2006 requires that HPIs are regarded as a material consideration in determining planning applications. All HPI are by default also Sussex BAP habitats. As such, this HPI should be retained, protected and enhanced where possible, but where its loss is unavoidable, impacts should be minimised and any loss compensated for.



Woodland/scrub enhancement

1.53 The areas of ancient woodland (including their buffer zones), broad-leaved semi-natural woodland, and scrub/tree habitats should be managed to enhance their current condition, in order to contribute to no-net-loss of biodiversity as required by planning policy. Stands of hazel stools of varying ages are present across the site and could be coppiced on rotation (see \* on ECOP Map 4).

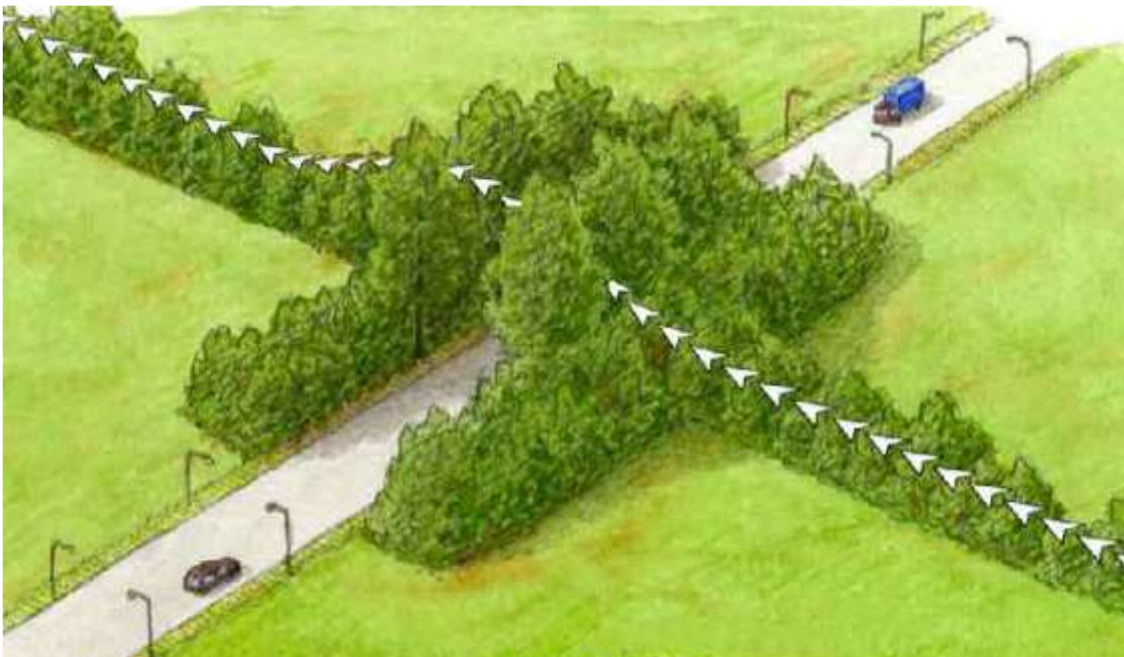
1.54 Any future management proposals should be detailed in a Woodland Management Plan or as part of a site-wide Landscape and Ecological Management Plan compliant with BS 42020:2013. This should include a description of the habitats to be managed, any



constraints to management, the aims and objectives of management, appropriate management options, prescriptions for management actions, work schedule, details of the body responsible for its implementation, and the funding mechanism and monitoring.

↔ **New woody planting as compensation and to improve green corridors**

- 1.55 To minimise indirect impacts from the scheme, boundaries should be reinforced with a combination of fencing and native tree/scrub planting. Field margins should be retained to buffer water bodies, increase the structural and habitat diversity of important green corridors and maintain the foraging resource for birds such as barn owl and mammals such as barn owl.
  
- 1.56 To avoid potential collision with vehicles and maintain commuting routes for bats and barn owls, over-passes (hop-overs, elevated verges etc.) should be designed at key locations across roads. The detailed design of hop-overs should be included as part of a site wide Mitigation Strategy, and should follow best practice as shown below, including the provision of new standard trees planted at a height of at least 6m.



Taken from Highways Agency Interim Advice Note 116/08. Pp.35-36

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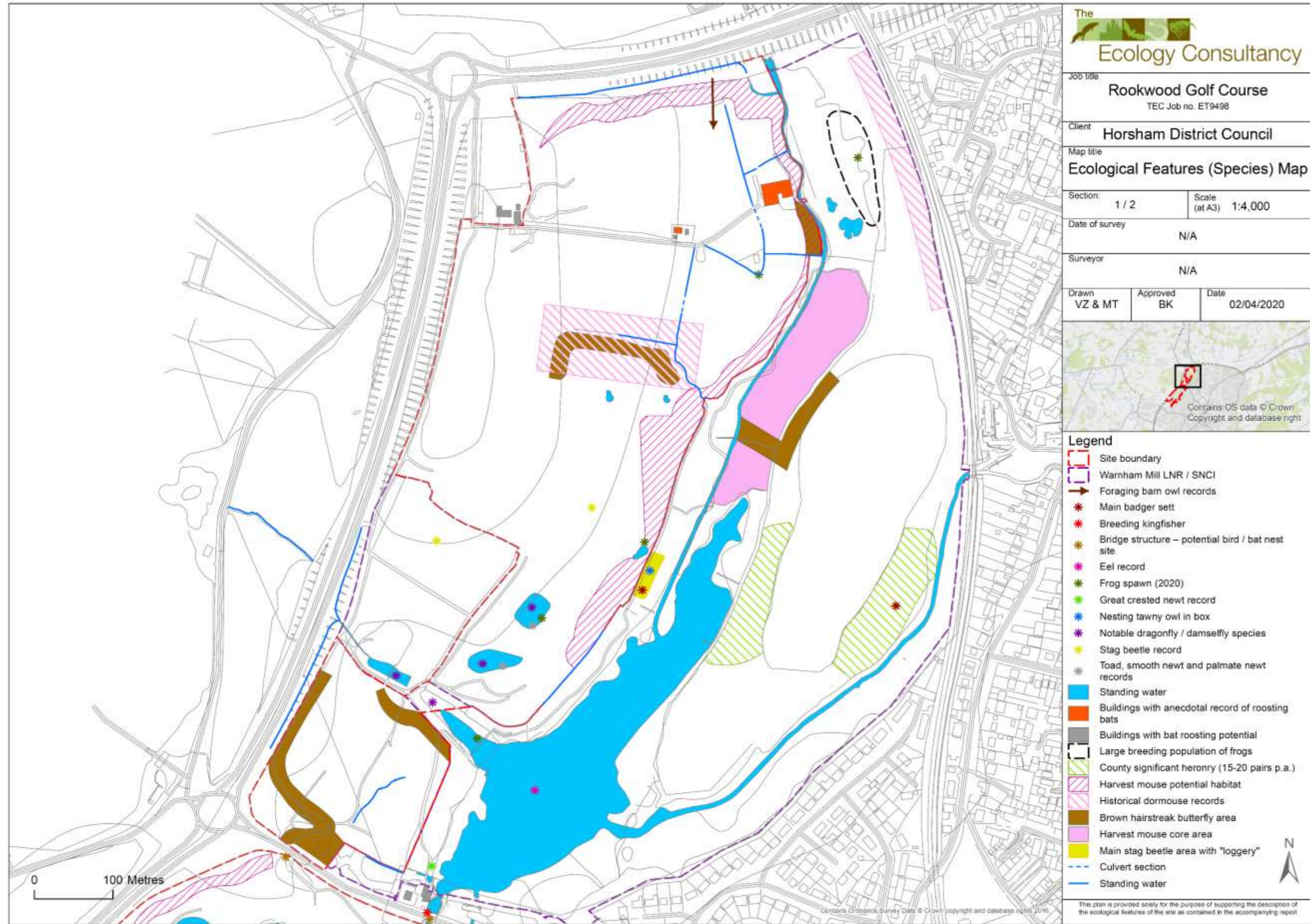
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Scott Wilson (2010). *Horsham District Council Strategic Flood Risk Assessment*. Available from: <https://www.horsham.gov.uk/planning/planning-policy/evidence-base/strategic-flood-risk-assessment> [accessed 12.04.2020].

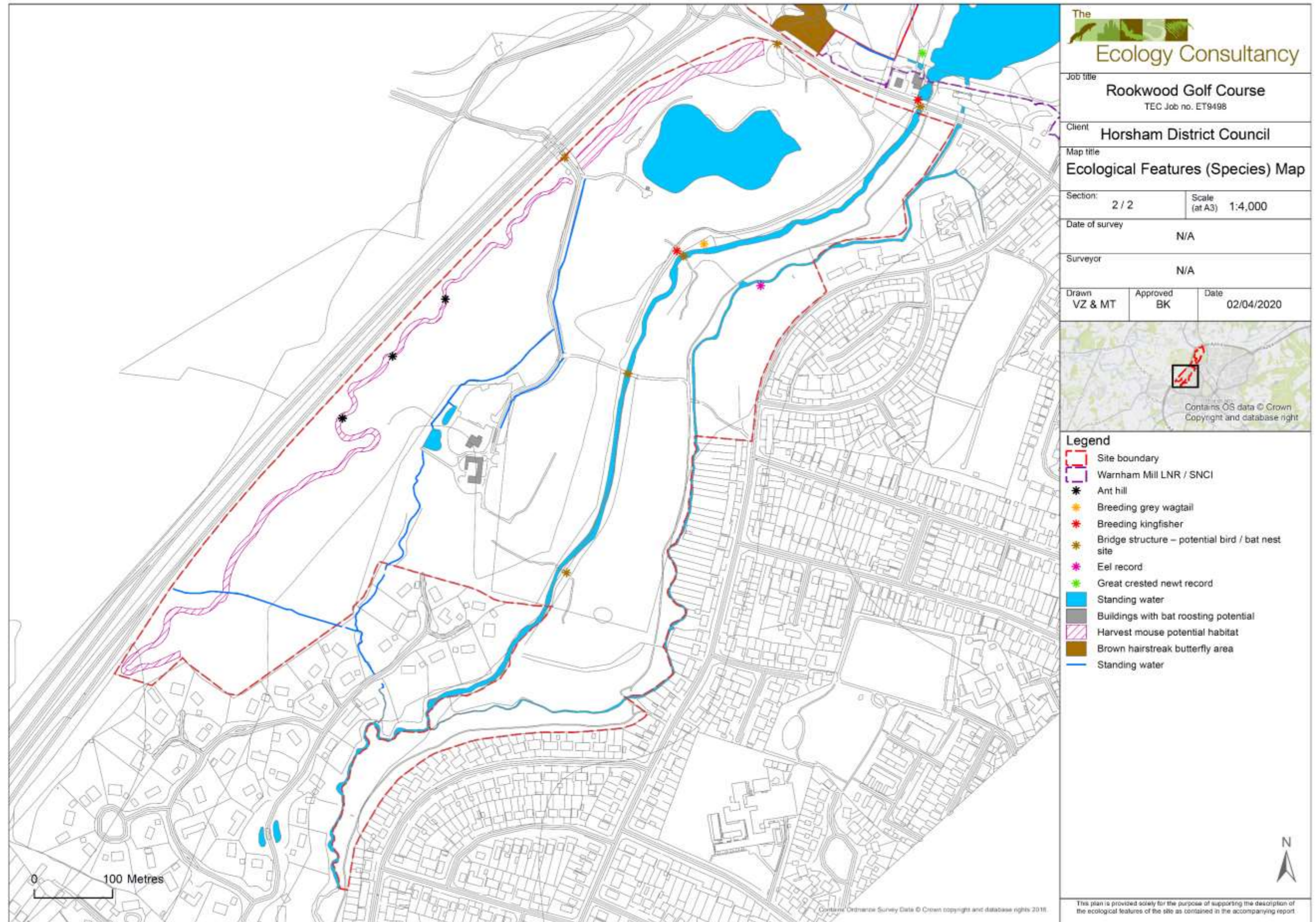
Thomas, R.L., Baker, P.J & Fellowes, M.D.E. (2014). *Ranging characteristics of the domestic cat (Felis catus) in an urban environment*. Urban Ecosystems.

## Appendix 1: ECOP Maps

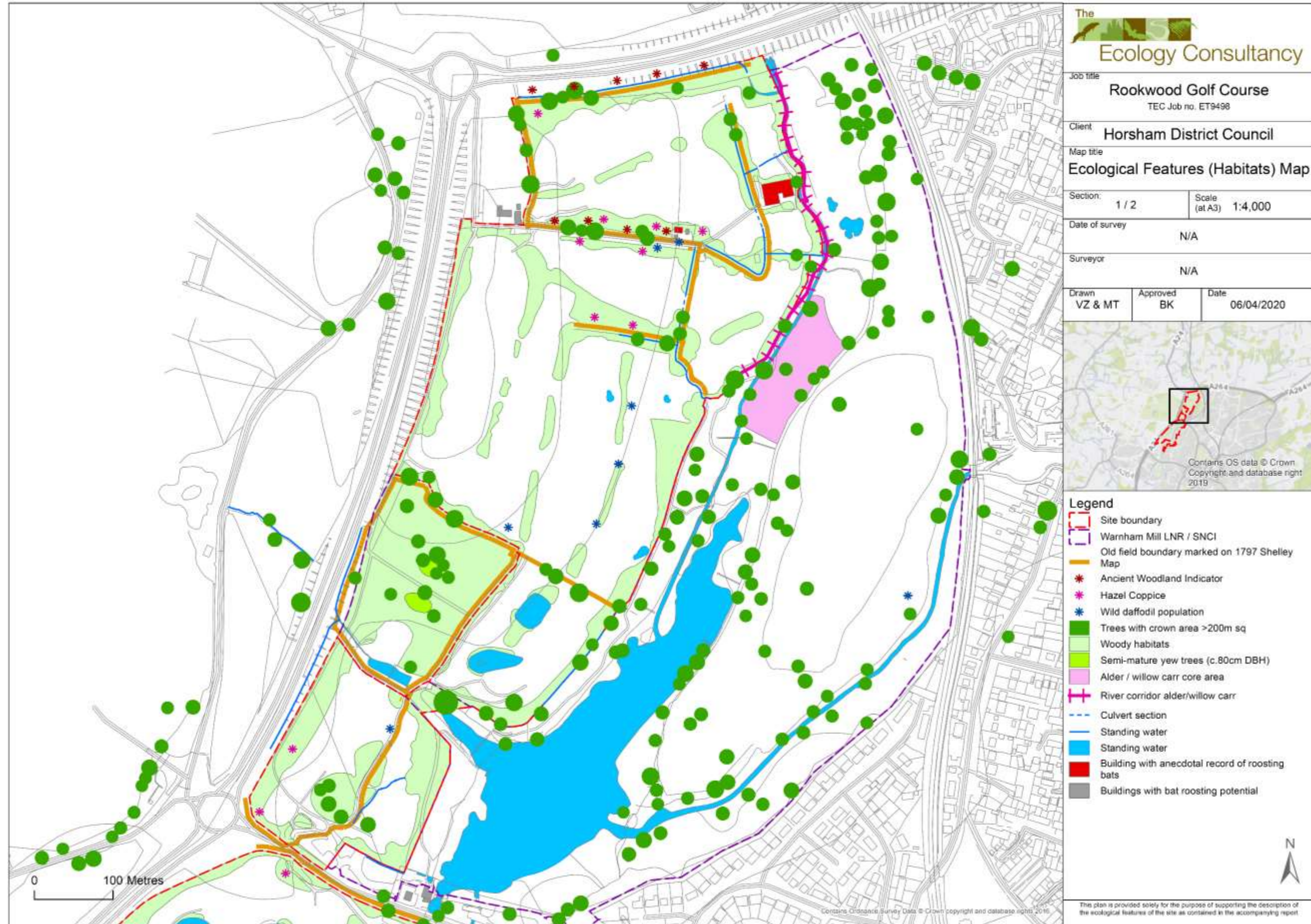
MAP 1: Ecological Features (Species) – Northern Section



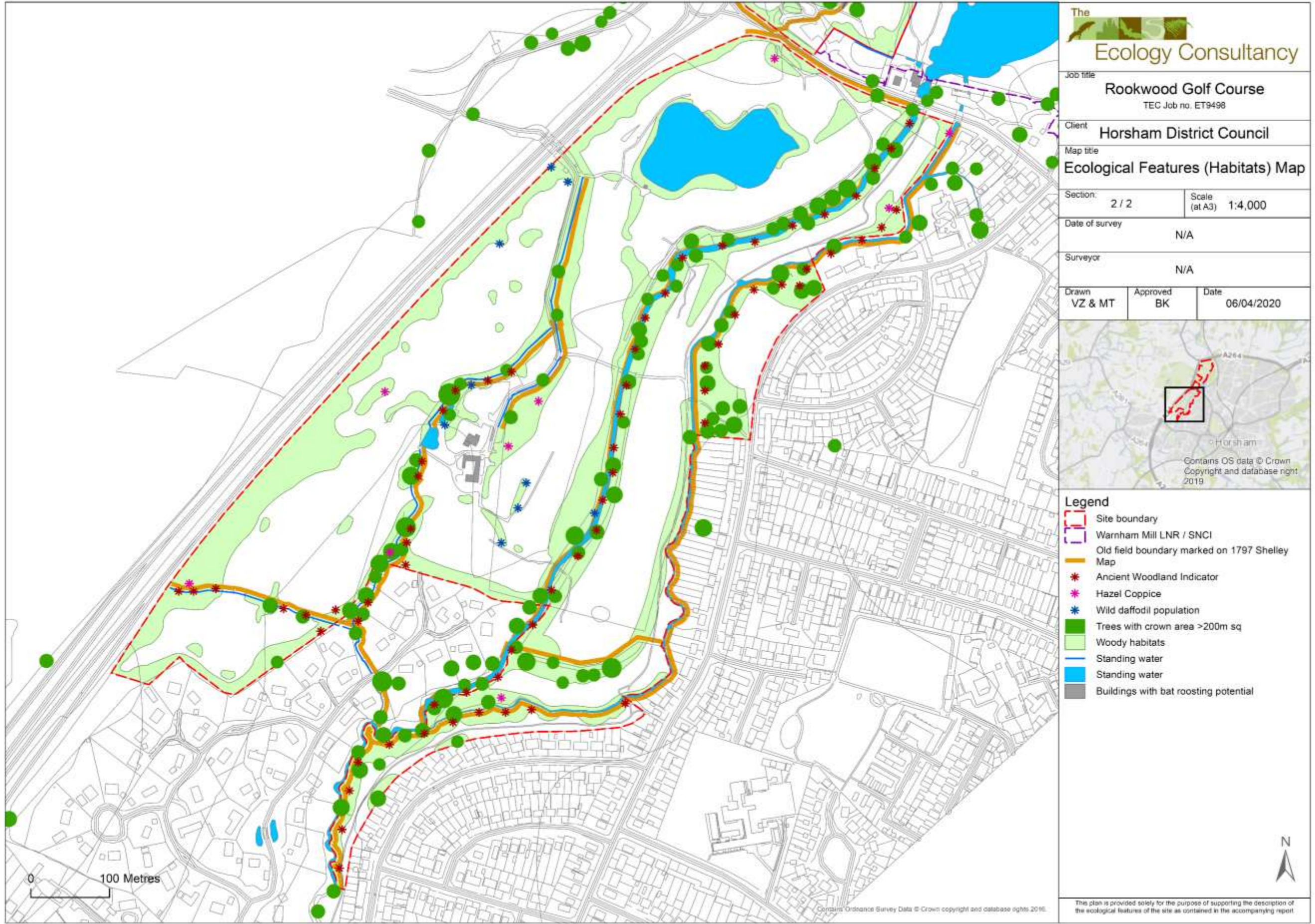
MAP 1: Ecological Features (Species) – Southern Section



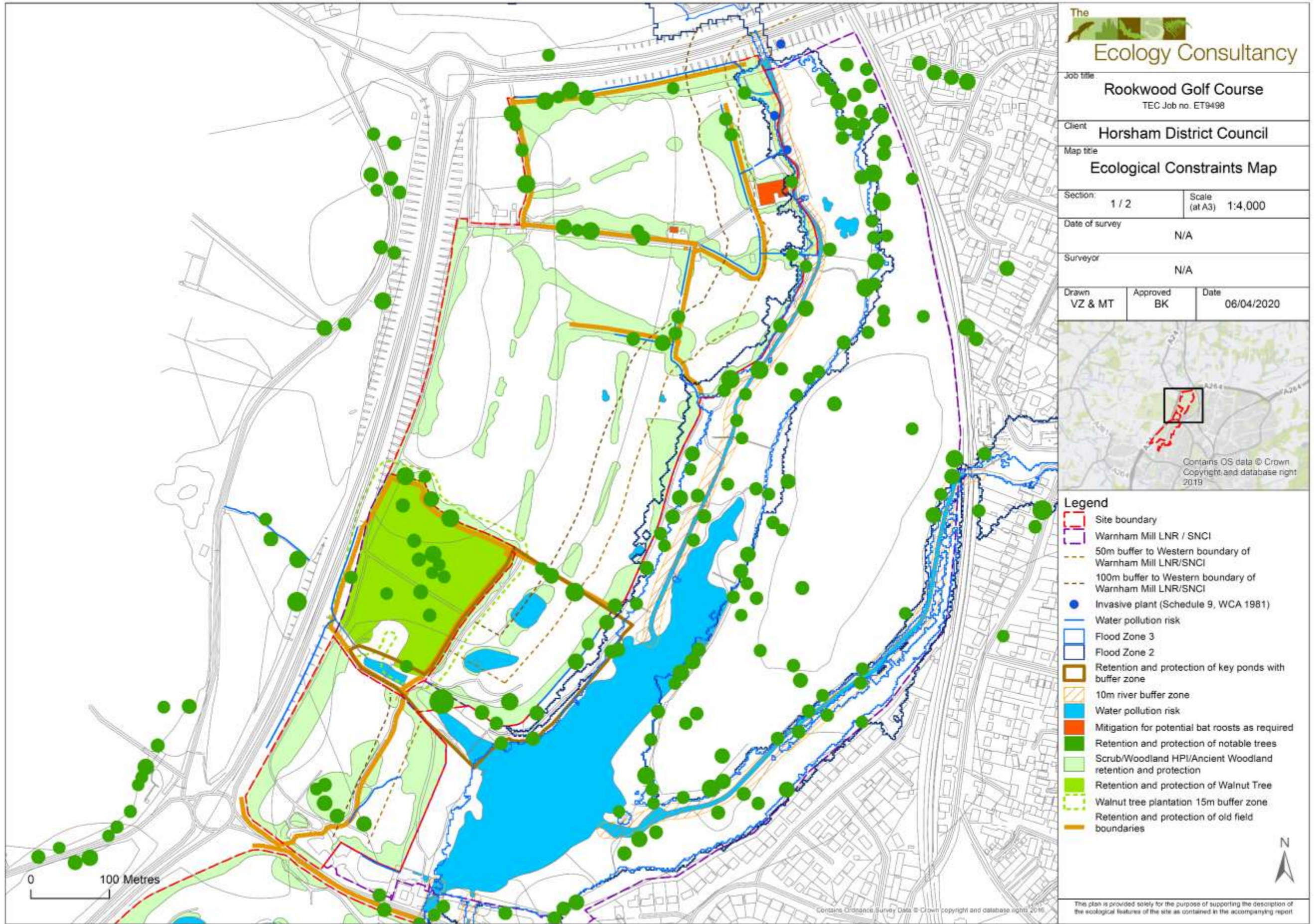
MAP 2: Ecological Features (Habitats) – Northern Section



MAP 2: Ecological Features (Habitats) – Southern Section



MAP 3: Ecological Constraints – Northern Section

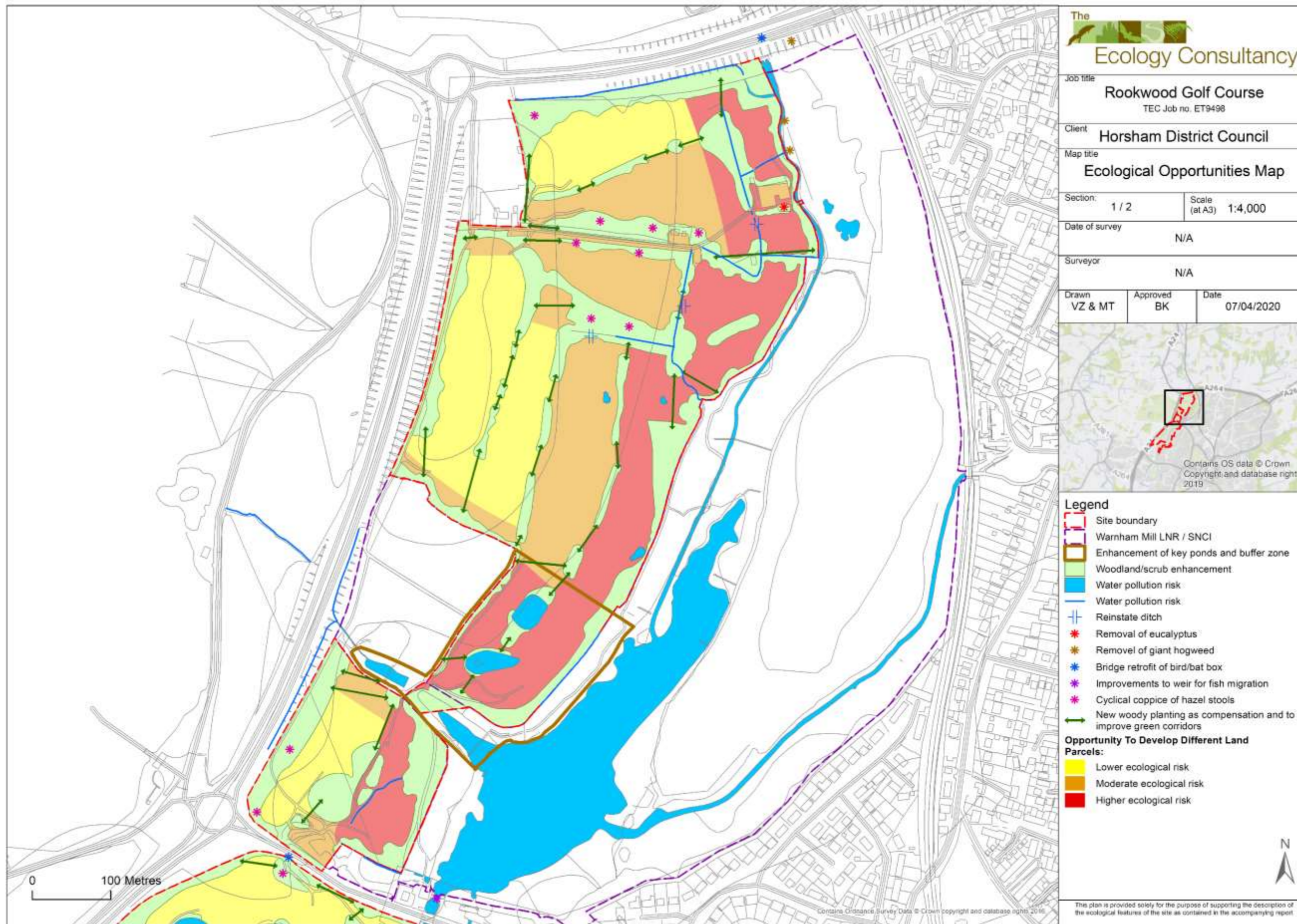




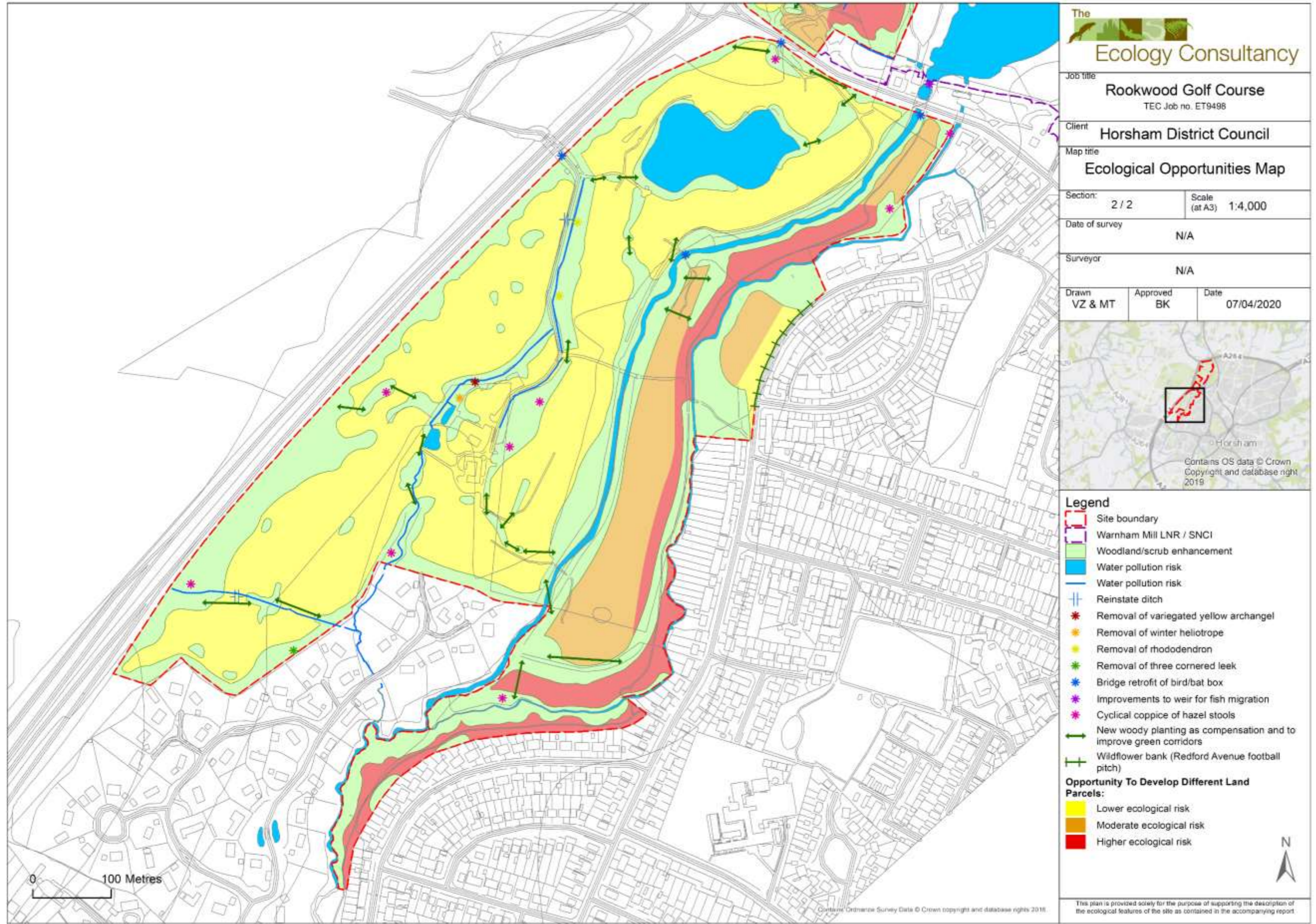
MAP 3: Ecological Constraints – Southern Section



MAP 4: Ecological Opportunities – Northern Section



MAP 4: Ecological Opportunities – Southern Section





## Ecology Consultancy

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