October 2010

CELEBRATING 50 YEARS in 2010

WENTWORTH CASTLE AND STAINBOROUGH PARK

Ecological Appraisal for the Proposed Restoration Work "The World at Wentworth"

Submitted to:
Wentworth Castle and Stainborough Park Trust
Lowe Lane
Stainborough
Barnsley
S75 3ET

REPORT

A world of capabilities delivered locally

Report Number. 08514520259.509/v.B.0

Distribution:

Wentworth Castle and Stainborough Park Trust - 1 copy (1 pdf)
Golder Associates (UK) Ltd - 1 copy

Golder Associates

Table of Contents

1.0 INTRODUCTION 3

1.1 Scope of the Study 3

1.2 Objectives 3

1.3 Definitions 3

1.4 Study Limitations 3

2.0 SITE OVERVIEW AND DETAILS OF THE PROPOSALS 3

3.0 LEGISLATIVE BACKGROUND AND BIODIVERSITY ACTION PLAN FRAMEWORK 4

3.1 Species Protection 4

3.2 Non-native Invasive Plants 6

3.3 Biodiversity Action Plans 6

4.0 SURVEY METHODOLOGY 7

4.1 Desk Study 7

4.2 Extended Phase 1 Habitat Survey 7

4.3 Great Crested Newt Habitat Suitability Survey 7

4.4 Badger Survey 8

4.5 External Bat Roost Potential Survey 8

5.0 RESULTS 9

5.1 Desk Study 9

5.2 Extended Phase 1 Habitat Survey 10

5.3 Great Crested Newt Habitat Suitability Survey 11

5.4 Badger Survey 11

5.5 External Bat Roost Potential Survey 11

6.0 ECOLOGICAL IMPACT ASSESSMENT 12

6.1 Habitats 12

6.2 Non-native Invasive Plants 13

6.3 Great Crested Newt 13

6.4 Badger 13

6.5 Bats 13

7.0 MITIGATION AND RECOMMENDATIONS 14

7.1 Habitats 14

7.2 Non-native Invasive Plants 14
7.3 Great Crested Newt 14
7.4 Badger 15
7.5 Bats 15
7.6 Timing of Works 16
7.7 Summary Recommendations for Mitigation 16
8.0 REFERENCES 17

TABLES

Table 1: BAP Priority Habitats and Species Relevant to the Study Area 6
Table 2: Criteria for Bat Roost Potential Assessment 8
Table 3: Summary of Protected Species Data for the Study Area 9
Table 4: Tree Bat Roost Potential Results 12
Table 5: Summary Recommendations for Mitigation 16

APPENDICES

APPENDIX A
Drawings

Drawing 1: Phase 1 Habitat Survey

Drawing 2: Great Crested Newt Terrestrial Habitat Suitability

Drawing 3: Badger Survey

Drawing 4: Bat Roost Potential Assessment – Buildings & Trees

APPENDIX B
Extended Phase 1 Habitat Survey – Target Notes

1.0 INTRODUCTION

Golder Associates (UK) Ltd (here after referred to as "Golder") was commissioned by Wentworth Castle and Stainborough Park Trust to carry out an Ecological Appraisal of a proposed site for The World at Wentworth development at Wentworth Castle, Stainborough, Barnsley (hereafter referred to as "the Site"). The Site is located at Ordnance Survey (OS) National Grid Reference SE 319 031.

1.1 Scope of the Study

An Ecological Appraisal of the Site was undertaken in September 2010. The surveys used and updated existing survey information collected in 2008 and 2009 on badger *Meles meles* (Golder Associates, 2009b) and on great crested newt *Triturus cristatus* (Golder Associates, 2009c).

1.2 Objectives

The objectives of the assessment were to:

- Carry out a desk study to identify existing information regarding protected species within the defined radial search area from the Site;
- Carry out an Extended Phase 1 Habitat Survey to map key and broad habitats and invasive plants;
- Assess the Site for its suitability for great crested newts;
- Undertake a badger survey to confirm the presence of setts;
- Carry out a bat potential assessment to determine if buildings or trees on Site have potential to support roosting bats;
- Produce a report that details the findings of the above surveys, including details of any key ecological issues to the proposed development; and
- Advise on recommendations for further necessary ecological surveys and any relevant mitigation measures as appropriate.

1.3 Definitions

The 'Site' refers to the footprint of the proposed development (see Appendix A, Drawing 1 for Site boundary).

1.4 Study Limitations

Species lists included in the Extended Phase 1 Habitat Survey Target Notes are not necessarily an exhaustive inventory of all species occurring at the Site. They are intended to illustrate the general species richness of a particular area, and draw attention to any species that may be considered uncommon or unusual. The Phase 1 Habitat Survey took place in September, which is at the end of the optimal survey period of April to September, and some spring flowering plant species may have been overlooked.

The presence of dense rhododendron *Rhododendron ponticum* scrub on Site impeded access for the badger survey and low lighting levels under the scrub reduced the ease with which field signs such as hairs and prints could be detected. However, all areas of scrub were searched as far as possible, including the location of a known existing sett just to the south of the Site.

2.0 SITE OVERVIEW AND DETAILS OF THE PROPOSALS

Wentworth Castle Gardens and Stainborough Park is an historic 18th Century estate located near to Barnsley, South Yorkshire. It is the only English Heritage Grade One Listed landscape in the county and contains a diverse collection of 26 listed buildings and monuments within an area of more than 500 acres. The estate contains formal gardens and parkland characterised by grazed grassland, semi-natural and

plantation woodlands, arable fields, ponds and marshes. The estate is managed by Wentworth Castle and Stainborough Park Trust, which is undertaking a phased programme of restoration to open it up to the general public and to conserve and enhance its heritage and wildlife value.

The World at Wentworth project includes the restoration of the Grade II listed Wentworth Conservatory, which is located just to the west of Wentworth Castle at OS Grid Reference SE 319 031. The Conservatory and adjoining potting shed are in a derelict and structurally unsafe condition and require urgent restorative works to prevent further deterioration. The development proposal includes construction of a new entrance foyer immediately to the north and linked to the conservatory via the potting shed (Buttress Fuller Alsop Williams, 2010).

The proposals also allow for landscaping works around the conservatory, including the removal of dense rhododendron stands and establishment of a level lawned or gravel area to the south of the conservatory, to tie in with the formal planting scheme in the adjacent castle gardens. The World at Wentworth title relates to planting in the gardens that has been sourced from all around the world, with the provision of new interpretive elements. The conservatory will provide a new visitor entrance point into Stainborough Park and the castle gardens, with access being provided via a new entrance route to the north east of the conservatory along existing paths. The Site considered in this report encompasses the conservatory, immediate environs and new access route from the courtyard area to the north of Wentworth Castle (see Appendix A, Drawing 1 for Site boundary).

3.0 LEGISLATIVE BACKGROUND AND BIODIVERSITY ACTION PLAN FRAMEWORK

3.1 Species Protection

A level of statutory protection is afforded to specific species, largely as a consequence of dramatic declines in populations caused by habitat loss and/or degradation (both direct and indirect impacts) and persecution. The various statutes which provide this protection include the following:

- Wildlife & Countryside Act 1981 (as amended);
- Countryside and Rights of Way (CRoW) Act 2000;
- Natural Environment and Rural Communities (NERC) Act 2006; and
- Conservation of Habitats and Species Regulations 2010.

Natural England is the relevant statutory nature conservation organisation for England. Relevant species specific legislation is described below.

Great Crested Newt

The great crested newt is protected under UK and European legislation. Great crested newt is included in Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), the Countryside and Rights of Way Act 2000 and Regulation 40 and Schedule 2 of The Conservation of Habitats and Species Regulations 2010. It is an offence to:

- Deliberately capture, injure or kill a great crested newt;
- Deliberately take or destroy the young of a great crested newt;
- Damage or destroy a breeding site or resting place of a great crested newt; and
- Deliberately disturb a great crested newt, including disturbance of a great crested newt in such a way as to be likely to affect:

  i) the ability of great crested newts to survive, reproduce or breed, or to rear or nurture their young;

ii) their ability to hibernate or migrate; and

iii) significantly affect the local distribution or abundance of great crested newt.

Provisions are made within the UK legislation to allow for disturbance of great crested newt to take place under licence where works affect the species. The licence is issued by the appropriate statutory authority, which in England is Natural England. Licences can only be granted if there is no satisfactory alternative or if the action authorised will not be detrimental to the maintenance of the population of the species at a favourable conservation status in their natural range. Licences can be issued for scientific, research purposes (including survey work), and for the disturbance of great crested newt in relation to a development. Licences can only be granted if there is no satisfactory alternative or if the action authorised will not be detrimental to the maintenance of the population of the species at a favourable conservation status in their natural range.

Badger

The badger is protected in the UK under the Protection of Badgers Act 1992 (as amended). The law offers considerable protection to both badgers and badger setts. Not only is it an offence to cruelly ill treat, kill or take badgers, but it is also illegal to damage or disturb the badger sett, obstruct the access or entrance, or cause a dog to enter the sett while the sett is still occupied. The definition of ill treatment is no longer limited to the direct killing of badgers, but can be taken to include the destruction or severance of large areas of foraging territory.

Licences can be granted to disturb badgers in respect of development. Guidance from Natural England's *Interpretation of 'Disturbance' in relation to badgers occupying a Sett* (June 2009), provides greater clarity of activities which may need a licence. Natural England advice identifies that badgers can be relatively tolerant of moderate levels of noise and activity around their setts and that even moderate levels of 'disturbance' may not actually disturb the badger occupying the sett. Therefore licences should only be sought were the activity will in fact disturb a badger, such as high levels of noise/activity around a sett, damaging the sett or obstructing access to a sett.

Licences to disturb badger setts in respect of development may be issued by Natural England, if the applicants can convince the licensing authority of the necessity for the proposed action. Natural England has produced useful guidelines for development activities within a given range of a sett which would require a licence (English Nature, 2002). Notwithstanding, the Natural England June 2009 guidance, the following guidelines remain useful:

- Using very heavy machinery (generally tracked vehicles) within 30 metres of any entrance to an active sett;
- Using lighter machinery (generally wheeled vehicles), particularly for any digging operation, within 20 metres; and
- Light work such as hand digging or scrub clearance within 10 metres.

Some activities such as the use of explosives or pile driving may cause disturbance at greater distances and require individual consideration.

Penalties for offences under the Act are up to six months in prison and a fine of £5,000 for each offence.

Bats

All species of bat and their roost are protected under UK and European legislation. Bats are included in Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), the Countryside and Rights of Way Act 2000 and Regulation 40 and Schedule 2 of The Conservation of Habitats and Species Regulations 2010. It is an offence to:

- Deliberately capture, injure or kill a bat;
- Deliberately take or destroy the young of a bat;

- Damage or destroy a breeding site or resting place of a bat; and
- Deliberately disturb a bat, including disturbance of a bat in such a way as to be likely to affect:
  - i) the ability of bats to survive, reproduce or breed, or to rear or nurture their young;
  - ii) their ability to hibernate or migrate; and
  - iii) significantly affect the local distribution or abundance of bats.

Provisions are made within the UK legislation to allow for disturbance of bats or their roosts to take place under licence where works affect any bat species. The licence is issued by the appropriate statutory authority, which in England is Natural England (NE). Licences can only be granted if there is no satisfactory alternative or if the action authorised will not be detrimental to the maintenance of the population of the species at a favourable conservation status in their natural range. Licences can be issued for scientific, research purposes (including survey work), and for the disturbance of bats in relation to a development.

Birds

All birds are protected under the Wildlife and Countryside Act 1981 (as amended), making it an offence, with certain exceptions (e.g. game birds), to intentionally (or recklessly in Scotland):

- Kill, injure or take any wild bird;
- Take, damage or destroy the nest of any wild bird while it is in use or being built; and
- Take or destroy the egg of any wild bird.

Schedule 1 of the Act contains a list of birds which are conferred extra protection and for which all offences carry harsher penalties. Under the legislation it is illegal to: intentionally or recklessly disturb a Schedule 1 bird while it is building a nest or is in or near a nest containing eggs or young; and intentionally or recklessly disturb dependent young of such a bird. Examples of species covered under Schedule 1 include: barn owl *Tyto alba*, kingfisher *Alcedo atthis* and little-ringed plover *Charadrius dubius*. It should be noted that there are additional offences that apply to Scotland only.

3.2 Non-Native Invasive Plants

Under the Wildlife and Countryside Act 1981 (as amended) it is an offence "*to plant or otherwise cause to grow in the wild any plant listed in Schedule 9, Part II*". This includes Japanese knotweed *Fallopia japonica,* giant hogweed *Heracleum mantegazzianum,* Himalayan balsam *Impatiens glandulifera and* rhododendron *Rhododendron ponticum*. This could include cutting the plant or roots and disturbing surrounding soil if not correctly managed.

3.3 Biodiversity Action Plans

The UK and Local Biodiversity Action Plan (BAP) framework identifies Priority Habitats and Species of primary importance for nature conservation and this, to a certain extent, forms the context for the surveys conducted on Site. The UK BAP (BARS, 2010) and the Barnsley BAP (Barnsley Biodiversity Trust, 2009) are relevant to the area surveyed. Accordingly, a number of habitats and species described in these plans might be expected (Table 1):

Table 1: BAP Priority Habitats and Species Relevant to the Study Area

Feature	UK BAP	Barnsley BAP
Habitats	Hedgerows Lowland Dry Acid Grassland Lowland Heathland Lowland Mixed Deciduous Woodland Wood Pasture and Parkland	Hedgerows Lowland Dry Acidic Grassland Lowland Heathland Lowland Mixed Deciduous Woodland Wood Pasture and Parkland

Feature	UK BAP	Barnsley BAP
Mammals	Soprano pipistrelle Brown long-eared bat Noctule Hedgehog	Bats Hedgehog
Amphibians and Reptiles	Great crested newt Slow-worm	Great crested newt
Birds	Bullfinch Song thrush House sparrow Tree sparrow Starling	Kestrel Barn owl Tree sparrow

Golder Associates has recently undertaken an audit of existing information on biodiversity at Wentworth Castle and Stainborough Park and is in the process of developing a site-based Biodiversity Action Plan, which will be used by the Trust to prioritise, plan and manage the estate to promote its ecological interest.

4.0 SURVEY METHODOLOGY

4.1 Desk Study

The Desk Study Area encompasses the boundary of Wentworth Castle and Stainborough Park. Protected species records were gathered for this area from surveys carried out by Golder Associates (Golder Associates, 2009a–d) and other organisations, including the Barnsley Biodiversity Trust. Consultation was also undertaken with West Yorkshire Ecology[1] for bat records within 5 km of the Site.

4.2 Extended Phase 1 Habitat Survey

The Extended Phase 1 Habitat Survey was undertaken by a suitably qualified ecologist on 23 September 2010 to record the habitats and vegetation on the Site. This followed the standard methodology set out by the Joint Nature Conservation Committee (JNCC, 2003). Land within the marked Site boundary was surveyed and mapped. The abundance of each plant species was recorded within each habitat using the DAFOR scale (D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare; an L prefix indicates that the species is Locally Dominant, Abundant or Frequent). Key features and habitats identified during the survey are summarised in the form of Target Notes. Nomenclature for plant species names is taken from Stace (1991) and the Botanical Society of the British Isles (BSBI) plant checklist (2007). The survey included mapping of non-native invasive plant species as listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).

4.3 Great Crested Newt Habitat Suitability Survey

During the Extended Phase 1 Habitat Survey, a note was made of the terrestrial habitats within the Site boundary and their suitability to support foraging or sheltering great crested newts. The habitats were assessed as unsuitable, poor, moderate or good as defined in the National Amphibian and Reptile Recording Scheme great crested newt survey guidelines (NARRS, 2008). Additionally, survey data from 2009 were used to inform habitat suitability for great crested newts and presence of breeding ponds within the Wentworth Castle and Stainborough Park Estate (Golder Associates, 2009c).

[1] There are currently no biological records centre in South Yorkshire; therefore West Yorkshire Ecology was contacted as they hold records for South Yorkshire.

4.4 Badger Survey

The Site was inspected for evidence of badger activity by a suitably experienced ecologist on 23 September 2010. Areas of suitable habitat, especially dense rhododendron scrub, formed the focus of this search. The aim was to detect key field signs including setts, latrines, paw prints, snuffle holes (created when foraging), track-ways and hairs (caught on fencing). Setts were classified into one of the following types: main, annex, subsidiary and outlier:

- **The Main Sett**: Has a number of entrances, used and disused, with large spoil heaps. Usually active and with well used paths;
- **Annex Setts**: Also have many entrances and worn paths connected to the main sett, 50 - 150 metres away. Not always in use;
- **Subsidiary**: With variable number of entrances and not connected to other setts by obvious paths. Not always in use; and
- **Outlier**: With 1, sometimes 2 holes with no defined paths. Only sporadically used, mainly during the winter.

4.5 External Bat Roost Potential Survey

All buildings within the Site were assessed externally by a suitably experienced bat worker to determine their potential for roosting bats. The survey was commensurate with good practice, following the guidance set out in *The Bat Worker's Manual* (Mitchell-Jones and McLeish, 2004) and in *Bat Surveys Good Practice Guidelines* (Bat Conservation Trust, 2007). The assessment was conducted on 23 September 2010, during daylight hours. Each building was graded as high, moderate, low or negligible for its suitability for roosting bats (see Table 2 below). Features providing bat roost potential include the following:

- Gaps under roof tiles, ridge tiles and lead flashing;
- Missing roof or ridge tiles;
- Holes in the roof or gable end; and
- Gaps in the fascias and under the eaves.

Table 2: Criteria for Bat Roost Potential Assessment

Category	Bat Roost Potential	Description
1	Negligible	Generally used where a structure initially looks like it has significant bat roost potential, but on closer examination, the structure has no importance for roosting bats. In this survey, it has been used where a structure has been inspected and found not to contain any of the features of use to bats.
2	Low	Superficially the structure may have some interest to roosting bats, but it is considered sub-optimal to the extent that the surveyor would not anticipate bats to favour it.
3	Moderate	A structure that has some potential for roosting bats, but is less than ideal in some way. The surveyor would neither expect, nor be surprised to find a bat in a structure categorised as having moderate bat potential.
4	High	A structure with 'ideal' features which, in the experience of the surveyor, is wholly appropriate for use by roosting bats. For example, it has no obstructions below cavity entrances, the cavity is upward leading, the tree/structure has a high degree of connectivity with likely navigation routes, and surrounding habitat offers good

Category	Bat Roost Potential	Description
		foraging potential. The structure might be particularly prominent and likely to be noticed by navigating bats.
5	Confirmed	Positive signs of bats are found, i.e. individual bats, bat droppings or existing records of a bat roost are directly associated with this structure.

In addition to the buildings, a note was made of any mature trees on Site (i.e. those measuring at least 0.3 m diameter at breast height [DBH]) for their potential to support roosting bats. Features of interest include cracks, rot holes, crevices and ivy that might provide roosting opportunities for bats.

5.0 RESULTS

5.1 Desk Study

The following table provides a summary of protected species data for Wentworth Castle and Stainborough Park Estate collected by Golder Associates during ecology surveys conducted in 2009 (Golder Associates, 2009a-d) and from previous surveys conducted by other organisations.

Table 3: Summary of Protected Species Data for the Study Area

Species	Records
Great crested newt (GCN)	GCN were recorded within 500 m of the Site at: ■ Keepers Pond: small breeding population, approx. 325 m south west of Site; and ■ The Serpentine River: medium breeding population, approx. 550 m east of Site. The majority of the estate comprises rough pasture with moderate terrestrial habitat suitability, with areas of woodland, scrub and wetland providing high suitability habitat.
Badger	15 badger setts (3 active, 12 inactive) were identified across the estate in 2009, making it an ecologically significant site for this species. The nearest sett to the Site was identified as a disused main sett located in scrub approx. 10 m south of the Site boundary. The *Confidential Badger Survey Report (*Golder Associates, 2009b) contains details of other sett locations.
Bats	Signs of bats have previously been found in several buildings on the estate, namely the Long Barn, Arched Barn, St James' Church, Wentworth Castle and Stainborough Castle tower and gate arch. Bat surveys carried out prior to renovation of the Garden House in 2009 revealed a significant brown long-eared *Plecotus auritus* roost in this building. Daubenton's *Myotis daubentonii* and Natterer's *Myotis nattereri* roosts have been recorded in the last 10 years. There are also records of Leisler's *Nyctalus leisleri*, noctule *Nyctalus noctula*, whiskered *Myotis mystacinus* and pipistrelle *Pipistrellus spp.* bats on the estate (Chris Blandford Associates, 2003).
Birds	Approximately 85 species of bird (60 breeding) have been recorded, making Wentworth a site of County importance for ornithology (Chris Blandford Associates, 2003). The estate is the main breeding stronghold in Barnsley District for nuthatch *Sitta europaea*, hawfinch *Coccothraustes coccothraustes* (Red list) and lesser spotted woodpecker *Dendrocopos minor* (Red list), with the woodlands providing an important habitat.

West Yorkshire Ecology holds no bat records within 5 km of the Site.

5.2 Extended Phase 1 Habitat Survey

The results of the Extended Phase 1 Habitat Survey are shown in Appendix A, Drawing 1 and are supplemented by Target Notes in Appendix B. The habitats are described below.

The Site comprised the following broad habitats:

- Mixed plantation;
- Dense scrub;
- Poor semi-improved grassland;
- Bracken and tall ruderal;
- Dry dwarf shrub heath and dry heath/acid grassland mosaic;
- Amenity grassland;
- Introduced shrub;
- Buildings, hardstanding and bare ground;
- Species-poor intact hedge; and
- Scattered trees.

Mixed Plantation

The north of the Site is characterised by a strip of mature plantation of yew *Taxus baccata* and holly *Ilex aquifolium* with a few non-native trees (Target Note 5). These species form a dense, shady canopy and the woodland lacks an understory. The ground flora is sparse and comprises ornamental planting of mostly shade tolerant species. Bird boxes have been erected on a few trees.

Dense Scrub

The south of the Site, in the environs of the conservatory, is dominated by thick, mature stands of rhododendron that originate from ornamental planting (Target Note 2). Recent rhododendron clearance in front of the conservatory has opened up rides through the scrub. Other species recorded in this area include bramble *Rubus fructicosus* agg., holly, yew and silver birch *Betula pendula*. A few semi-mature non-native cypresses are also present; some have recently been felled. Ruderal species such as rosebay willowherb *Chamerion angustifolium* were recorded at the edges of the scrub.

Poor Semi-Improved Grassland

A small patch of semi-improved grassland was located on a bank immediately to the west of the conservatory and was characterised by bent-grass *Agrostis* sp. and common herbs such as creeping buttercup *Ranunculus repens*.

Bracken and Tall Ruderal

A stand of dense bracken *Pteridium aquilinum* had developed beside an area of cleared rhododendron in the south of the Site. Tall ruderal dominated by common nettle *Urtica dioica* and broad-leaved dock *Rumex obtusifolius* was also present to the north of the conservatory.

Dry Dwarf Shrub Heath and Dry Heath/Acid Grassland Mosaic

A strip of dry acid dwarf shrub heath formed the southern Site boundary (Target Note 1). This appeared to be the remnant of a larger area of heath that had been converted to ornamental scrub and woodland planting in the past. A typical dry heathland community of mature heather *Calluna vulgaris*, bilberry *Vaccinium myrtillus*, heath bedstraw *Galium saxatile* and tormentil *Potentilla erecta* was recorded. The heath graded into a mosaic of heath and acid grassland to the west, with wavy hair-grass *Deschampsia flexuosa* the most

abundant grass in the sward. The heath showed no signs of recent management and was being invaded by bramble and tree saplings from the surrounding scrub.

Amenity Grassland

Areas of intensely managed amenity grassland were recorded in the central and northern parts of the Site. The sward was characterised by planted grasses such as annual meadow-grass *Poa annua*.

Introduced Shrub

Formal beds of ornamental planting, forming part of the castle gardens, were present in the central part of the Site (Target Note 4). These beds, and the adjacent scrub margins, supported the richest ground flora on Site. Foxglove *Digitalis purpurea*, wood-sorrel *Oxalis acetosella*, common figwort *Scrophularia nodosa* and nipplewort *Lapsana communis* were among the species recorded.

Buildings, Hardstanding and Bare Ground

The conservatory/potting shed formed the man structure on Site; two small brick outbuildings were located beside a pathway to the north. Paths were a prominent feature of the Site, linking the conservatory and gardens to the Wentworth Castle access road to the north. Bare ground supporting a very limited flora was noted under the plantation canopy, in areas where there was no ornamental planting. A number of post and rail fences and walls were also recorded across the Site.

Species-Poor Intact Hedge

One metre high holly hedges had been planted in parts of the Site and are managed by regular cutting.

Scattered Trees

A number of mature trees had been planted across the Site. Yew and holly were the most abundant; pedunculate oak *Quercus robur*, sycamore *Acer pseudoplatanus*, beech *Fagus sylvatica*, lime *Tilia* x *europaea* and cedar *Cedrus* sp. were also recorded.

5.3 Great Crested Newt Habitat Suitability Survey

Drawing 2 shows the results of the terrestrial habitat suitability survey within the Site. The area of dense scrub and heath around the conservatory provides good habitat for great crested newt. The plantation and the conservatory (which is open to the elements and provides some plant cover) are of moderate suitability, while the areas of amenity grassland and hardstanding are no low or negligible suitability. Drawing 2 also shows the results of the 2009 newt surveys (Golder Associates, 2009c) for the wider Wentworth estate. Breeding great crested newt populations were recorded in Keepers Pond and the Serpentine River, lying approximately 325 m and 550 m from the Site respectively. The ponds are connected to the Site by terrestrial habitat of mostly moderate and high suitability for newts, i.e. rough pasture and woodland.

5.4 Badger Survey

An inactive main sett was found under dense rhododendron scrub just to the south the Site (Drawing 3). It comprised at least 15 entrance holes, the nearest of which was located approximately 5 m from the southern Site boundary. The holes were filled with leaves and debris and there were no signs of recent badger activity. A number of feeding scrapes were found under mature trees a few metres to the west; however these could not be identified as badger snuffle holes and may have been created by rabbits *Oryctolagus cuniculus*.

The sett is in the same location as Sett A from the 2009 surveys, which was identified as a disused main sett that appears to have been inactive for several years (Golder Associates, 2009b).

5.5 External Bat Roost Potential Survey

Three buildings within the Site were assessed for their potential to support roosting bats, the conservatory/potting shed and two small single storey outbuildings located to the north (Drawing 4). The conservatory/potting shed is an open iron lattice structure being supported with steel scaffold. It is clad in glass panes on the roof and on all sides except for a stone retaining wall forming part of the northern side.

The structure is in a derelict state and is open to the elements. A dense covering of ivy and a fallen tree trunk cover parts of the potting shed roof. The structure provides low potential for roosting bats due to the presence of the thick ivy coverage and gaps under lead flashing along the roof ridges (see Appendix B, Target Note 3 for photographs). The two small, brick built outbuildings had flat roofs and lacked any significant features to support roosting bats; they were assessed to have negligible bat potential.

The presence of features such as cracks, crevices, rot holes, deadwood and ivy were used in the tree roost assessment. The trees surrounding the conservatory were mostly semi-mature non-native conifers with negligible bat potential. However, seven semi-mature or mature trees were identified within the wider Site that had some bat potential. These are summarised in Table 4.

Table 4: Tree Bat Roost Potential Results

Tree Identifier (see Drawing 4)	**Tree Species**	**Features of Bat Roost Potential**	**Assessment of Roost Potential**
1	Cedar	Crevices in branch	Moderate
2	Oak	Woodpecker holes, cavities, crevices, deadwood	Moderate
3	Sycamore	Several cavities	Moderate
4	Yew	A few cavities	Low
5	Yew	A few crevices	Low
6	Yew	Hole in trunk	Low
7	Beech	A few crevices	Low

6.0 ECOLOGICAL IMPACT ASSESSMENT

6.1 Habitats

A variety of habitats are present within the Site, which are typical of the wider garden and parkland landscape of Wentworth Estate and are in accordance with the findings of the Extended Phase 1 Habitat Survey carried out by Golder Associates in 2009. Of these, the plantation woodland, scrub, scattered trees and dry heath/acid grassland are of ecological value.

Lowland Mixed Deciduous Woodland is a Priority Habitat within the UK BAP and Barnsley BAP and has the potential to support BAP Priority Species of bird such as song thrush *Turdus philomelos* and hawfinch *Coccothraustes coccothraustes*, as well as providing roosting and foraging opportunities for BAP species of bat. The mixed plantation on Site provides some bird nesting habitat and bat foraging potential and has good connectivity to the larger area of woodland around Stainborough Castle to the west. However, the plantation is species poor (with holly and yew dominating the canopy) and lacks an understory or substantial ground flora due to intensive management (weed clearance and ornamental planting) and canopy shading. The scattered mature trees on Site provide additional habitat for birds and bats, including bird boxes. A small amount of habitat will be lost at the north east corner of the Site under proposals to re-route the existing path to the south of Tree 7 (see Drawing 4 for location) to improve its alignment with the entrance to the courtyard, enabling easier visitor access. This would involve the removal of a small section of species-poor holly hedge, ornamental planting and possible felling of a small number of holly and/or yew trees.

The dense stands of rhododendron around the conservatory shade out other plant life and are of low ecological value; however bramble, other scrub and herbaceous plants have colonised the edges of these stands and provide useful resources for invertebrates, small mammals and nesting birds. The scrub and

woodland areas also provide suitable terrestrial habitat for great crested newts (see Section 6.3). This habitat will be entirely lost to the proposals as the scrub is due to be removed and replaced with a lawned/gravel terrace area and ornamental planting.

Lowland Heathland and Lowland Dry Acid Grassland are UK BAP and Barnsley BAP Priority Habitats. These habitats are rare at Wentworth and represent the remaining fragments of what would presumably have been a wider heathland area prior to the creation of the 18th Century parkland. Heathland habitats have historically suffered large declines due to a lack of management and direct loss to development and now exist mostly as small, isolated sites across Barnsley District (Barnsley Biodiversity Trust, 2009). As such the heathland/acid grassland, although only totalling approximately 350 m^2, is of local ecological value. This habitat has the potential to support small numbers of BAP Priority species such as slow-worm. This habitat will be lost to the proposals as the heathland/acid grassland will be replaced with a sloping reseeded grassed area and mown footpath, which will lie immediately to the south of the retaining wall of the new terrace.

The other habitats on Site comprise amenity grassland, ornamental planting, buildings, hardstanding and bare ground, which are of low or negligible ecological value.

6.2 Non-native Invasive Plants

Rhododendron was added to Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) in April 2010, making it an offence to plant this species in the wild or otherwise cause it to grow in the wild. The landscaping proposals involve clearing the rhododendron from the Site and replacing it with a lawned/gravelled terrace and new ornamental planting.

6.3 Great Crested Newt

The conservatory, surrounding scrub and borders and the woodland provide suitable terrestrial habitat for great crested newts to forage, shelter and hibernate in. The Site is located within 500 m of Keepers Pond and of the Serpentine River, known breeding sites supporting respectively a small and medium great crested newt population, and is connected to the ponds by rough pasture, woodland and scrub. Great crested newts breeding in Keepers Pond and in the Serpentine River may be expected to be found on Site in low numbers. The Site may also form part of a newt commuting corridor between Keepers Pond and the Serpentine River. Without mitigation, the impact on this suitable habitat within the Site is likely to be significant due to the removal of the rhododendron scrub and restoration of the conservatory, although the landscaping proposals do allow for the retention of existing vegetation where possible around the conservatory and the provision of new planting. Terrestrial habitat outside of the Site boundary is likely to be unaffected as the restoration and landscaping works will be mostly confined to the area immediately around the conservatory.

6.4 Badger

The main badger sett identified in the 2009 and current surveys lies within 30 m of the proposed development. The restoration plans do not involve the removal of the sett, however disturbance may be caused by the creation of a new lawned/gravel terrace area in front of the conservatory and selective rhododendron clearance to the south of the Site to create a new mown footpath to the Corinthian Temple monument. This footpath could pass within 10 m of the sett, although the exact route has not been fixed. As the sett shows no signs of recent activity and appears to have been disused for a number of years, no impacts are anticipated.

6.5 Bats

The external inspections of the buildings on Site revealed very few features suitable for roosting bats. The two small outbuildings with negligible bat potential will be retained and no impacts on these buildings are anticipated. The development plans include the complete restoration of the conservatory/potting shed and construction of a new entrance foyer adjoined to the north. Visitor numbers to this part of the estate will be greatly increased as the restored conservatory will form a new entrance point to the castle gardens and Stainborough Park. However, as the existing structure was found to offer only low bat potential, impacts on roosting bats will be negligible.

Seven trees were identified on Site that have some bat roost potential (moderate or low). None of the trees were assessed as having high bat potential. Under the current proposals these trees are likely to be retained as they are mostly mature specimen trees of amenity value to the surrounding gardens and are not included in the development footprint. It is understood that the works will involve a widening of the path leading to the new entrance foyer in order to improve visitor access, however this widening will extend only to the southern edge of the plantation, and removal of trees within the plantation itself is not anticipated. The entrance path is likely to be re-routed to the south of Tree 7 (see Drawing 4 for location) to better align it with the entrance to the courtyard, however this will not impact directly on the tree. Consequently, no impacts on bats or their habitat are anticipated.

7.0 MITIGATION AND RECOMMENDATIONS

7.1 Habitats and Birds

With the exception of the non-native cypress and rhododendron, the loss of mature trees, woodland and scrub on Site should be minimised so that impacts on potential bird, bat, amphibian and small mammal habitats are minimised. Nesting birds are protected under the Wildlife and Countryside Act 1981 (as amended) and any tree or scrub clearance or management should be conducted outside of the bird breeding season (March to August inclusive). If this is not possible, a suitably qualified ecologist should check for the presence of nesting birds immediately prior to the works commencing. If nesting birds are found, work must be put on hold until the young have fledged. Additionally, any bird boxes on trees that will be felled or heavily disturbed should be moved to alternative trees over the autumn or winter, well in advance of the bird breeding season.

It is recommended that any trees and scrub removed should be replaced within the Site with new planting, using species of local provenance, e.g. hawthorn, oak and ash *Fraxinus excelsior*. Scrub species such as hawthorn and blackthorn *Prunus spinosa* provide useful resources for a range of wildlife, for example cover and a berry crop for nesting birds. This planting should be incorporated into the landscaping proposals wherever possible, to compliment the World at Wentworth planting scheme. If planting within the Site is restricted, then areas of scrub should be established elsewhere on the estate by way of compensation.

Heathland/acid grassland is an important habitat locally and in order to avoid its destruction it is recommended that the area to be removed is translocated a suitable receptor site in another part of the estate, which would be identified under the guidance of a suitably qualified ecologist. This would be subject to further discussions and approval.

7.2 Non-native Invasive Plants

To minimise the chance of rhododendron being spread to other parts of the estate, the arisings should be burnt on Site or removed and disposed of in a suitable waste facility. Woody species of local provenance (e.g. hawthorn) should be used wherever possible in any new scrub planting on Site and planting of Schedule 9 non-native invasive species must be avoided. See Defra (2009) for a full list of Schedule 9 species.

7.3 Great Crested Newt

The legislation afforded to the great crested newt and its habitat requires that appropriate mitigation is put into place to minimise negative effects and maintain the favourable conservation status of the species. Prior to commencement of any operations at the Site, which have the potential to injure or kill great crested newts or damage their habitat, a licence must be obtained from Natural England. This will consist of a Method Statement and a Reasoned Statement of Application. The Method Statement will provide details of the survey, impacts and proposed mitigation strategy. The Method will usually require the trapping of any great crested newts in the area where terrestrial habitat is to be affected, and the maintenance of Temporary Amphibian Fencing (TAF) around the Site during the vegetation clearance and building works. As both small and medium-sized populations are present, then up to 60 days trapping in the affected area will be

necessary (English Nature, 2001). Trapping can only be undertaken during the active season for great crested newt (**usually mid-March to October**).

The mitigation strategy is likely to include:

- Provision within the Wentworth estate of suitable terrestrial habitat of sufficient size for the population, to be used as a receptor area for newts removed from the area to be cleared;
- Creation of hibernacula and other habitat features within the receptor area, to provide compensation for the loss of existing habitat; and
- Monitoring of the great crested newt population for several years after the work has been completed.

The development works can proceed once the newt trapping and translocation is complete.

7.4 Badger

The existing badger sett must be retained during the restoration and landscaping works, particularly during construction of the terrace and rhododendron clearance to the south of the Site. It is recommended that a pre-construction badger survey is carried out immediately in advance of the restoration works to confirm the continued disuse of the sett and to identify any new setts that may have been created in the vicinity of the Site. Should any active setts be found, an exclusion zone of 30 m for heavy machinery (generally tracked vehicles), 20 m for lighter machinery (generally wheeled vehicles) and 10 m for light work (hand digging or scrub clearance) will need to be maintained around those setts.

7.5 Bats

No further survey for bats in buildings is recommended and the restoration works to the conservatory/potting shed can proceed as planned. It should be noted that although a thorough external assessment has been carried out, it is not possible to prove absolute absence of bats. Therefore if any roosting bats are found during the restoration, all works must cease and a suitably qualified ecologist contacted immediately.

No further bat surveys of trees are recommended. However if felling of trees with moderate bat potential (Trees 1-3; Drawing 4) is subsequently required the following precautions should be followed:

- All trees with moderate potential should be felled by a ‘soft felling’ approach (sectioning of branch and trunk, carefully lowering to the ground under the guidance of a licensed batworker);
- Cavities and crevices in trunks and branches will be carefully inspected by the licensed batworker and the remaining tree will be left on the ground for 24 hours in order to provide an opportunity for any bats within to escape;
- If bats are discovered during soft felling, they will be placed in pre-erected bat boxes; and
- Tree felling is best undertaken in **September/October 2011**. At such a time of the year bats are likely to be active (minimising the risk of disturbing hibernating bats) but are unlikely to be using tree roosts as temporary summer roosts. If needed, the felling period could be extended into the winter, **November 2011 until February 2012**; given that none of the trees on site have potential for hibernating bats.

Trees with low bat potential do not require a soft felling approach and can be felled without further specific mitigation. If any roosting bats are found during tree and vegetation clearance, all works must cease and a suitably qualified ecologist contacted immediately.

Additionally, if any trees with bat roost potential are felled, alternative roosting sites should be provided in the form of a minimum of three bat boxes per tree; including a mix of Schwegler 2F and wooden bat boxes. One tree, of suitable size, is able to support two or three bat boxes and provide roost opportunities with differing aspects; located at a height of 4 m from the ground. Boxes at this height can easily be reached using a ladder for future monitoring and maintenance purposes.

7.6 Timing of Works

It is understood that the renovation works and vegetation clearance are due to take place over the winter period 2011-2012. Due to the likely presence of great crested newts, it will not be possible to clear the Site entirely before a Natural England development licence has been applied for and trapping has taken place (between March and October 2011). However, in order to respect the legislation afforded to nesting birds, a certain degree of vegetation clearance could be undertaken during the winter period if necessary. This would involve cutting back all the vegetation to an approximate height of 30 cm above the ground. No ground disturbance will be allowed and only light machinery should be employed. This work should be done under a Method Statement and under the supervision of a suitably qualified ecologist. The vegetation should be removed immediately or left on the ground until the trapping for great crested newts has been completed, as it will provide suitable hibernation opportunities for newts. This would also apply to the restoration of the conservatory/potting shed, as these buildings, in their derelict state, currently provide suitable habitat for great crested newt. Landscaping and construction works can proceed in areas of low habitat suitability (i.e. paths, hardstanding and areas of managed amenity grassland) under the supervision of a suitably qualified ecologist. Works in the areas of the proposed path will need to be discussed in advance with a suitably qualified ecologist in order to define if it can take place prior to a Natural England licence being applied for.

7.7 Summary Recommendations for Mitigation

The table below summarises the main recommendations for mitigation of harm and/or disturbance to ecological interests during the restoration and landscaping works.

Table 5: Summary Recommendations for Mitigation

Feature	Action
Habitats	■ Retain existing woodland, mature trees and scrub (other than cypress and rhododendron), wherever possible to avoid loss of nesting bird habitat. Relocate bird boxes well in advance of trees being felled; ■ Replace lost trees and scrub with species of local provenance; and ■ Translocate the heathland/acid grassland to a nearby receptor site under the guidance of a suitably qualified ecologist.
Invasive species	■ Remove rhododendron from Site and avoid ornamental planting of Schedule 9 invasive plant species.
Great crested newt	■ Apply for Natural England development licence, including Method Statement and Reasoned Statement of Application; ■ Mitigation will involve erecting Temporary Amphibian Fencing and trapping newts for up to 60 days, with relocation to a suitable receptor site, to be carried out between March and October 2011; and ■ Works can proceed in areas of low or negligible habitat suitability under the supervision of a suitably qualified ecologist.
Badger	■ Retain existing badger sett and conduct survey prior to works commencing to determine level of badger activity; ■ Maintain machinery exclusion buffers around any active setts found within 30 m of the Site boundary; and ■ Route new path to Corinthian Temple sensitively to avoid the existing sett.

Feature	Action
Bats	■ Soft felling of any trees on Site with moderate bat potential in September/October 2011. Erect three bat boxes on suitable nearby trees for each tree felled; and ■ Consult suitably qualified and licensed ecologist should roosting bats be found in buildings or trees during the works and stop work immediately.

8.0 REFERENCES

Barnsley Biodiversity Trust (2009) *Barnsley Biodiversity Action Plan, Second Edition.* Barnsley: Barnsley Biodiversity Trust.

BARS (2010) *UKBAP Priority Species and Habitats [online].* Available from: http://www.ukbap-reporting.org.uk/plans/priority.asp [Accessed June 2010].

Bat Conservation Trust (2007) *Bat Surveys Good Practice Guidelines.* London: Bat Conservation Trust.

BSBI (2007) *Checklist of British and Irish Flora [online].* Available from: http://www.bsbi.org.uk/resources.html [Accessed June 2010].

Buttress Fuller Alsop Williams Architects (2010) *The World at Wentworth – Stage C Design Report.*

Chris Blandford Associates (2003) *Phase 1 Summary from Ecology Report.*

Defra (2009) *Government response to the public consultation: Review of Schedule 9 to the Wildlife and Countryside Act 1981 and the Ban on Sale of Certain Non-native Species. Part 1: Schedule 9 Amendments. [online].* Available from: http://www.defra.gov.uk/wildlife-pets/wildlife/management/non-native/documents/gov-response-schedule9%20.pdf [Accessed August 2010].

English Nature (2001) *Great Crested Newt Mitigation Guidelines.* Peterborough: English Nature.

Golder Associates (2009a) *Bat Survey of Wentworth Castle and Stainborough Park: Garden House, Walled Kitchen Garden and Orangery.*

Golder Associates (2009b) *Confidential Badger Survey Report for Wentworth Castle and Stainborough Park Trust.*

Golder Associates (2009c) *Great Crested Newt Survey Report for Wentworth Castle and Stainborough Park Trust.*

Golder Associates (2009d) *Wentworth Castle and Stainborough Park Extended Phase 1 Habitat Survey*

JNCC (2003) *Handbook for Phase 1 Habitat Survey – A Technique for Environmental Audit*. Revised reprint 2003. Peterborough: Joint Nature Conservation Committee.

Mitchell-Jones, A.J. and McLeish, A.P. (2004) *The Bat Worker's Manual*: *3rd Edition.* Peterborough: Joint Nature Conservation Committee.

NARRS (2008) *Great Crested Newt Habitat Suitability Index Guidance Notes.* National Amphibian and Reptile Recording Scheme.

National Biodiversity Network (2010). *National Biodiversity Network Gateway [online].* Available from: http://data.nbn.org.uk/ [Accessed June 2010].

ODPM (2005) *Planning Policy Statement 9: Biodiversity and Geological Conservation*. London: Office of the Deputy Prime Minister.

Stace, C.A. (1991). *New Flora of the British Isles.* Cambridge: Cambridge University Press.

Report Signature Page

GOLDER ASSOCIATES (UK) LTD

Delphine Pouget
Project Manager

Paul Wheelhouse
Reviewer

Author: Andrew Halcro-Johnston/PW/jv

Date: 19 October 2010

Company Registered in England No.1125149.
At Attenborough House, Browns Lane Business Park, Stanton-on-the-Wolds, Nottinghamshire NG12 5BL
VAT No. 209 0084 92
Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

APPENDIX A

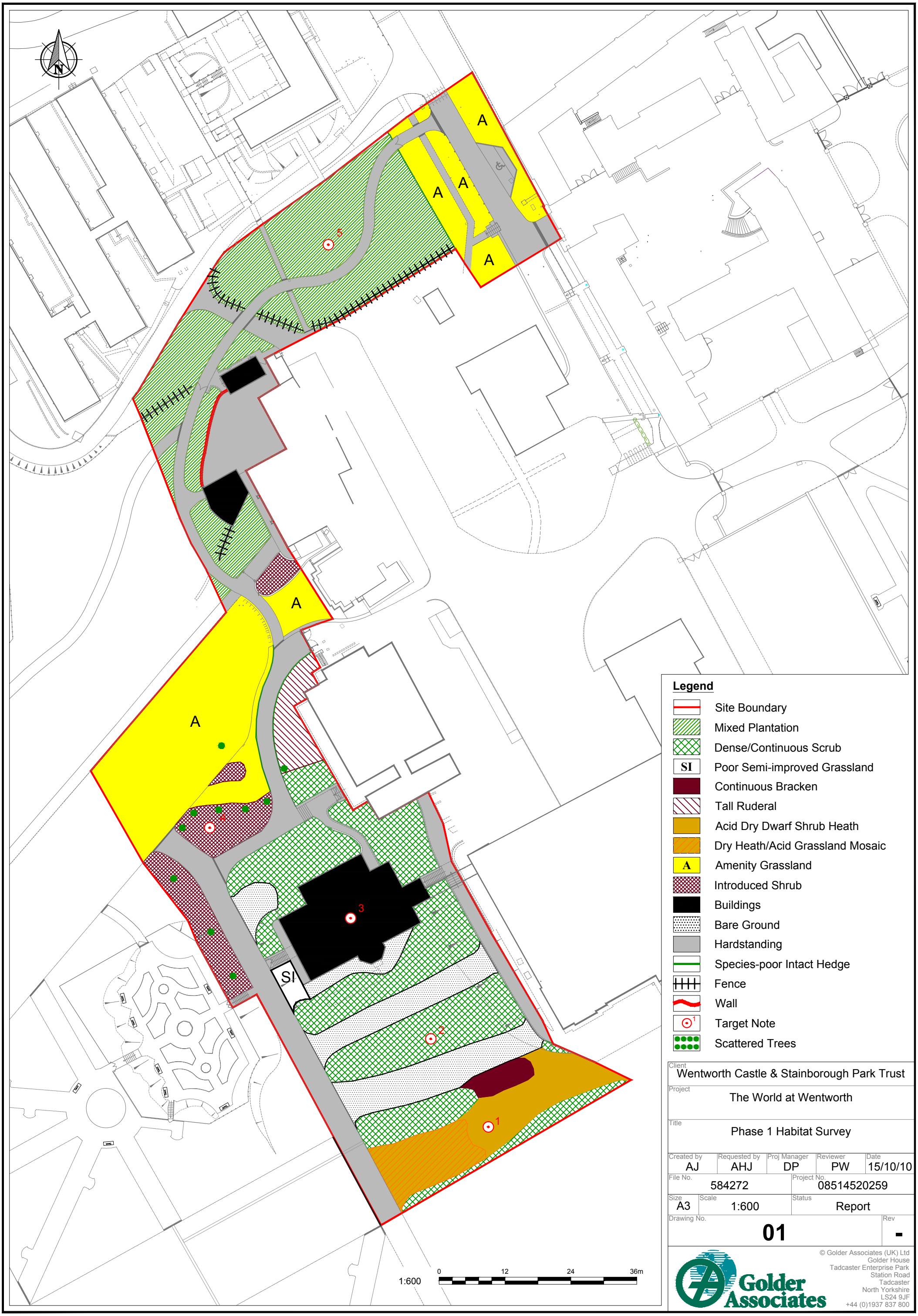
Drawings

Drawing 1: Phase 1 Habitat Survey

Drawing 2: Great Crested Newt Terrestrial Habitat Suitability

Drawing 3: Badger Survey

Drawing 4: Bat Roost Potential Assessment – Buildings & Trees



Legend

- Site Boundary
- Mixed Plantation
- Dense/Continuous Scrub
- SI — Poor Semi-improved Grassland
- Continuous Bracken
- Tall Ruderal
- Acid Dry Dwarf Shrub Heath
- Dry Heath/Acid Grassland Mosaic
- A — Amenity Grassland
- Introduced Shrub
- Buildings
- Bare Ground
- Hardstanding
- Species-poor Intact Hedge
- Fence
- Wall
- Target Note
- Scattered Trees

Client	Wentworth Castle & Stainborough Park Trust
Project	The World at Wentworth
Title	Phase 1 Habitat Survey

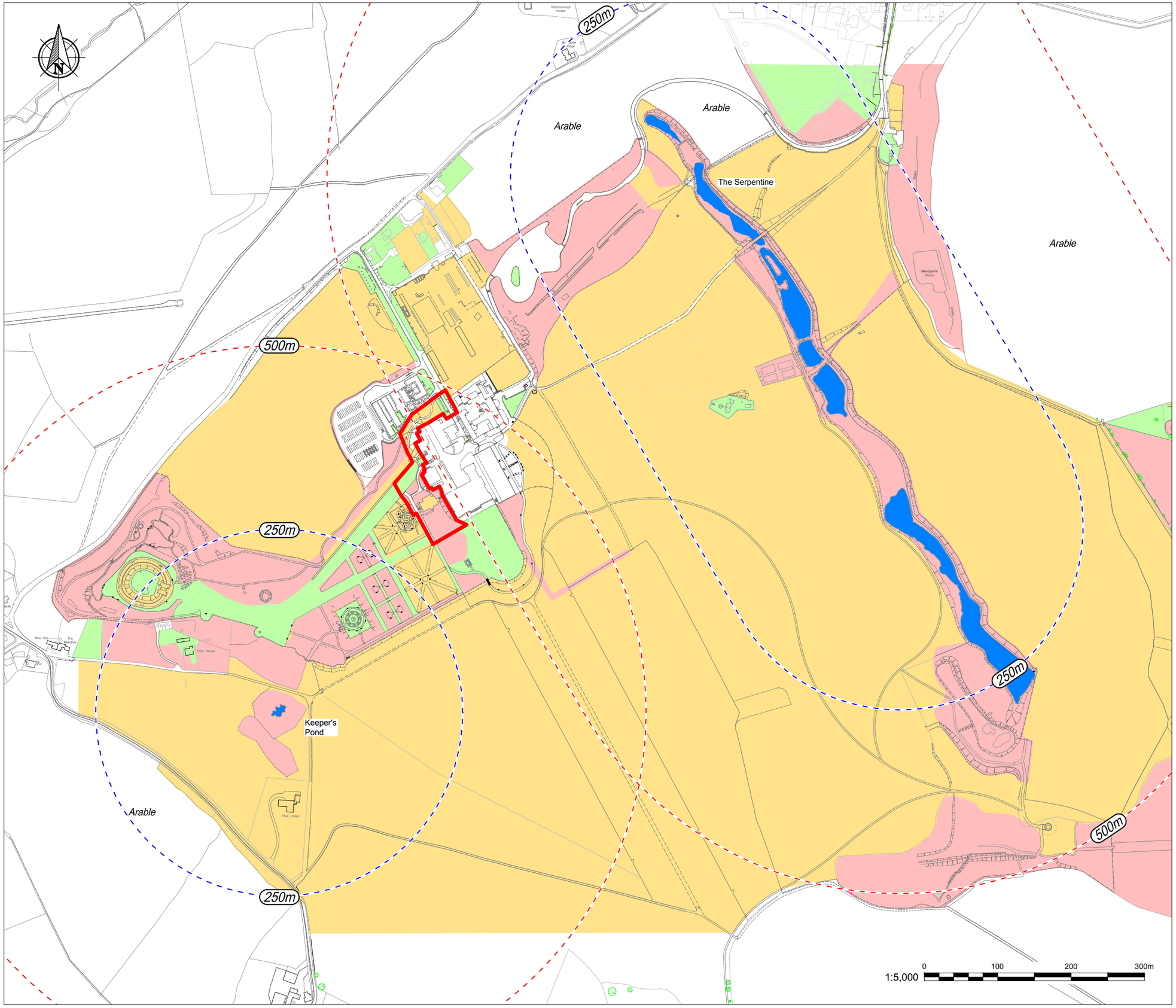
Created by	Requested by	Proj Manager	Reviewer	Date
AJ	AHJ	DP	PW	15/10/10

File No.	Project No.
584272	08514520259

Size	Scale	Status
A3	1:600	Report

Drawing No.	Rev
01	-

© Golder Associates (UK) Ltd
Golder Associates
Golder House
Tadcaster Enterprise Park
Station Road
Tadcaster
North Yorkshire
LS24 9JF
+44 (0)1937 837 800



Legend

- Site Boundary
- 250m Radius from Great Crested Newt breeding ponds
- 500m Radius from Great Crested Newt breeding ponds
- Pond with Great Crested Newt Population

Habitat Suitability for Great Crested Newts within the Site Boundary

- High Suitability
- Moderate Suitability
- Low Suitability
- Unsuitable

Client	Wentworth Castle & Stainborough Park Trust
Project	The World at Wentworth
Title	Great Crested Newt Terrestrial Habitat Suitability

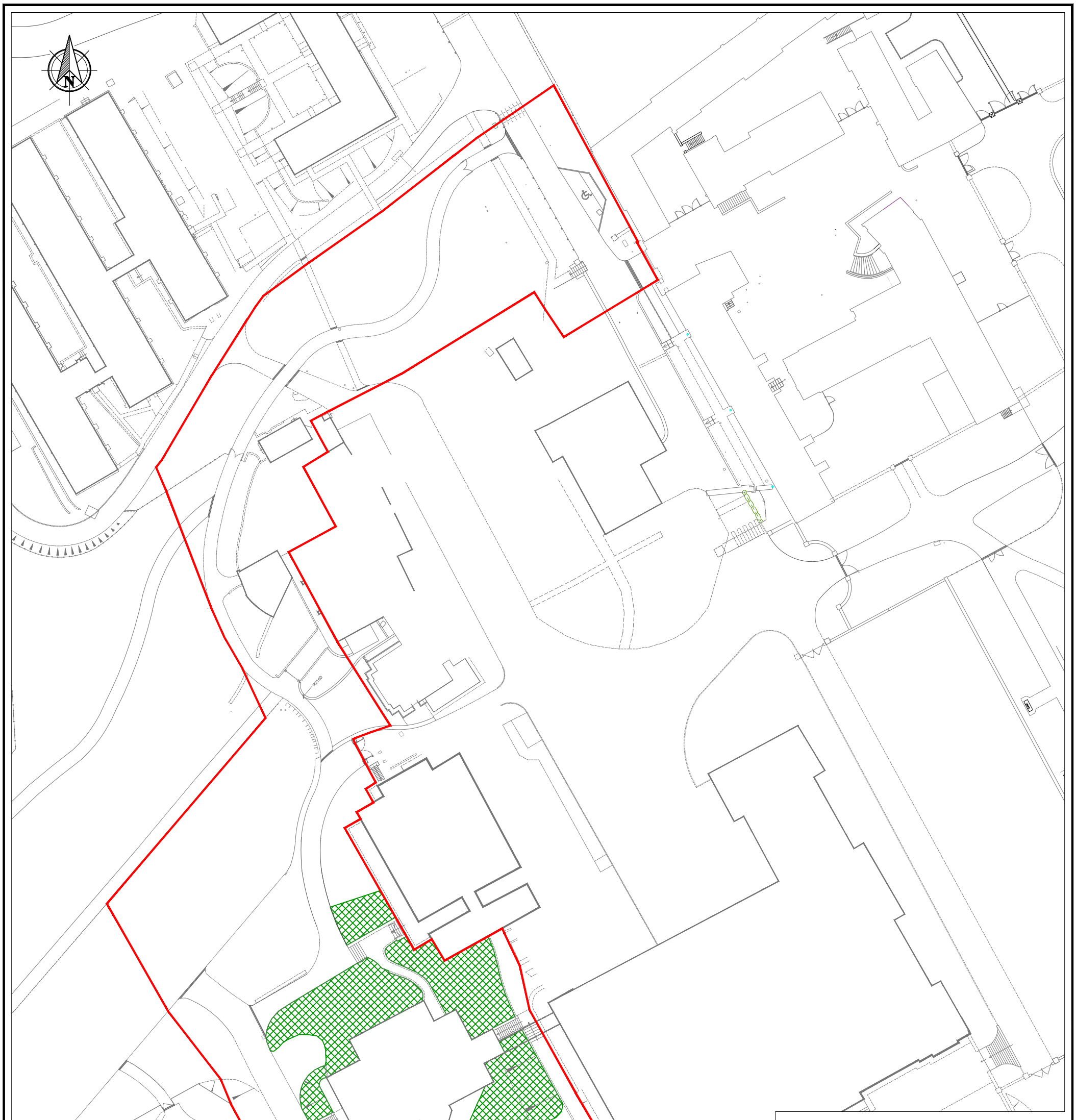
Created by	Requested by	Proj Manager	Reviewer	Date
AJ	AHJ	DP	PW	15/10/10

File No.	Project No.
584273	08514520259

Size	Scale	Status
A3	1:5,000	Report

Drawing No. **02** Rev

© Golder Associates (UK) Ltd
Golder House
Tadcaster Enterprise Park
Station Road
Tadcaster
North Yorkshire
LS24 9JF
+44 (0)1937 837 800



Legend

- Site Boundary
- Suitable Habitat (Dense Scrub)
- M — Disused Main Sett

Client	Wentworth Castle & Stainborough Park Trust
Project	The World at Wentworth
Title	Badger Survey Results (Confidential)

Created by	Requested by	Proj Manager	Reviewer	Date
AJ	AHJ	DP	PW	15/10/10

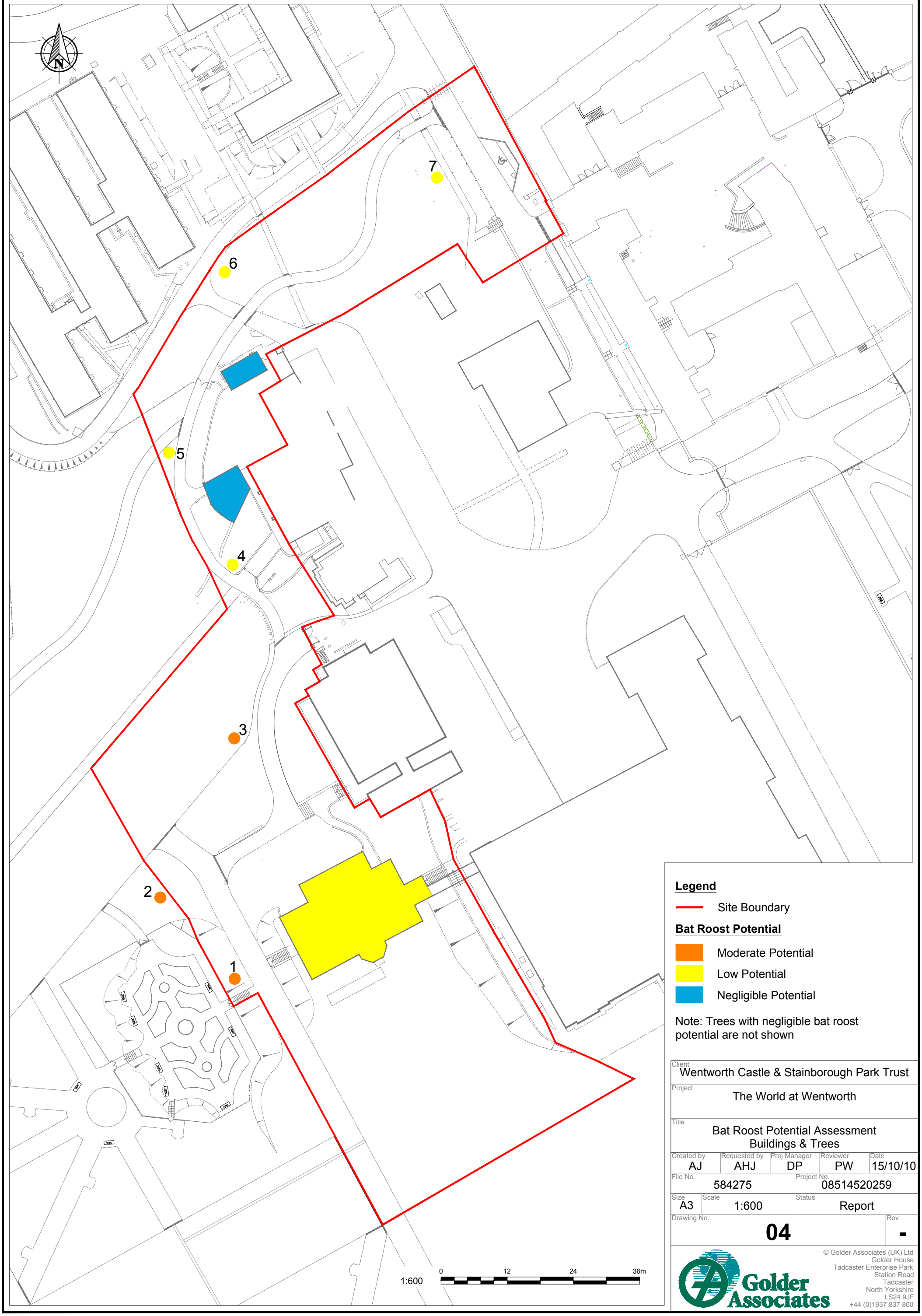
File No.	Project No.
584274	08514520259

Size	Scale	Status
A3	1:600	Report

Drawing No.	Rev
03	-

© Golder Associates (UK) Ltd

Golder Associates
Golder House
Tadcaster Enterprise Park
Station Road
Tadcaster
North Yorkshire
LS24 9JF
+44 (0)1937 837 800



Legend

Site Boundary

Bat Roost Potential

Moderate Potential

Low Potential

Negligible Potential

Note: Trees with negligible bat roost potential are not shown

Client	Wentworth Castle & Stainborough Park Trust
Project	The World at Wentworth
Title	Bat Roost Potential Assessment Buildings & Trees

Created by	Requested by	Proj Manager	Reviewer	Date
AJ	AHJ	DP	PW	15/10/10

File No.	Project No.
584275	08514520259

Size	Scale	Status
A3	1:600	Report

Drawing No.	Rev
04	-

© Golder Associates (UK) Ltd

Golder Associates
Golder House
Tadcaster Enterprise Park
Station Road
Tadcaster
North Yorkshire
LS24 9JF
+44 (0)1937 837 800

APPENDIX B

Extended Phase 1 Habitat Survey – Target Notes

Target Note 1

Common name	Scientific name	Frequency (DAFOR)[1]
heather	*Calluna vulgaris*	D
wavy hair-grass	*Deschampsia flexuosa*	A
a haircap moss	*Polytrichum* sp.	A
bilberry	*Vaccinium myrtillus*	A
bramble	*Rubus fruticosus* agg.	A
rosebay willowherb	*Chamerion angustifolium*	LA
Yorkshire-fog	*Holcus lanatus*	F
a hawkweed	*Hieracium* sp.	F
rhododendron	*Rhododendron ponticum*	F
tormentil	*Potentilla erecta*	O
common bent	*Agrostis capillaris*	O
heath bedstraw	*Galium saxatile*	O
pedunculate oak	*Quercus robur*	R

Description

Small area of mature acid dry heath and dry heath/acid grassland mosaic. Heath scrubbing over with bramble and in need of management.





[1] DAFOR scale: D = Dominant; A = Abundant; F = Frequent; O = Occasional; and R = Rare.

Target Note 2

Common name	Scientific name	Frequency (DAFOR)
rhododendron	*Rhododendron ponticum*	D
common ivy	*Hedera helix*	LA
bracken	*Pteridium aquilinum*	LA
bramble	*Rubus fruticosus* agg.	F
holly	*Ilex aquifolium*	F
a cypress	Cupressaceae family	F
yew	*Taxus baccata*	F
rosebay willowherb	*Chamerion angustifolium*	F
silver birch	*Betula pendula*	O
pedunculate oak	*Quercus robur*	O
ash	*Fraxinus excelsior*	O
sycamore	*Acer pseudoplatanus*	R
beech	*Fagus sylvatica*	R
hazel	*Corylus avellana*	R
soft shield fern	*Polystichum setiferum*	R
hart's-tongue fern	*Phyllitis scolopendrium*	R
broad buckler fern	*Dryopteris dilatata*	R

Description

Dense scrub dominated by rhododendron surrounds conservatory. Shady and mostly lacking a ground flora. Recent scrub clearance has created two rides to the south of the conservatory.





Target Note 3

Description

Derelict iron frame Victorian conservatory supported by steel scaffold. Broken glass, open to elements. Some ornamental planting survives inside. Adjacent potting shed roof supports a fallen tree trunk and thick ivy.





Target Note 4

Common name	Scientific name	Frequency (DAFOR)
a bent-grass	*Agrostis* sp.	LA
creeping buttercup	*Ranunculus repens*	LA
wall lettuce	*Mycelis muralis*	F
smooth sow-thistle	*Sonchus oleraceus*	O
herb-robert	*Geranium robertianum*	O
common nettle	*Urtica dioica*	O
honeysuckle	*Lonicera periclymenum*	O
common dandelion	*Taraxacum officinale* agg.	O
white clover	*Trifolium repens*	O
nipplewort	*Lapsana communis*	O
wood-sorrel	*Oxalis acetosella*	O
common figwort	*Scrophularia nodosa*	R
common sorrel	*Rumex acetosa* subsp. *acetosa*	R
hedge bindweed	*Calystegia sepium*	R
foxglove	*Digitalis purpurea*	R

Description

Beds of ornamental planting and areas around scrub edges support a richer native ground flora.

Target Note 5

Common name	Scientific name	Frequency (DAFOR)
holly	*Ilex aquifolium*	A
yew	*Taxus baccata*	F

Description

Mature mixed plantation of yew and holly trees over shady bare ground, with no understory and a sparse ground flora of ornamental planting.





At Golder Associates we strive to be the most respected global group of companies specialising in ground engineering and environmental services. Employee owned since our formation in 1960, we have created a unique culture with pride in ownership, resulting in long-term organisational stability. Golder professionals take the time to build an understanding of client needs and of the specific environments in which they operate. We continue to expand our technical capabilities and have experienced steady growth with employees now operating from offices located throughout Africa, Asia, Australasia, Europe, North America and South America.

Africa	+ 27 11 254 4800
Asia	+ 852 2562 3658
Australasia	+ 61 3 8862 3500
Europe	+ 356 21 42 30 20
North America	+ 1 800 275 3281
South America	+ 55 21 3095 9500

solutions@golder.com
www.golder.com

Golder Associates (UK) Ltd
Golder House
Tadcaster Enterprise Park
Station Road
Tadcaster
North Yorkshire
LS24 9JF
UK
T: [+44] 01937 837800

Golder Associates