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55 Fitzroy Park

Ecological Appraisal

Prepared by LUC
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Project Title: 55 Fitzroy Park: Ecological Appraisal

Client: The Turner Stokes Family and the Springer Family

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1.0	08/08/2017	Version 1	Charlotte Brennan	Peter Lawrence	Peter Lawrence
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1 Introduction

Scope

1.1 In April 2017, LUC was appointed by The Turner Stokes Family and the Springer Family to provide ecological support to the development of proposals for five new residential properties at 55 Fitzroy Park, Hampstead Heath, London (hereafter referred to as 'the Site'). Ecological support was provided from the outset to develop an ecologically led Landscape Masterplan, which was to in turn inform design development to ensure ecological impacts have been avoided where possible, and to incorporate robust mitigation and enhancement measures. In addition extensive consultation has informed the design, with particular relevance to ecological issues resulting in reductions of building footprints, relocation of Plot 5 further from the pond edge and the removal of a vehicle access route to the south of the pond in favour of a pedestrian access route, reducing the impact on ecological connectivity. Subsequently this Ecological Appraisal Report has been prepared to accompany a planning application.

1.2 The Ecological Appraisal has been supported by a desk study and ecological baseline surveys, including an Extended Phase 1 Habitat Survey, and a series of protected species surveys including for bats, great crested newt and reptiles. The findings and implications of these surveys and the appraisal are presented in this report, within the legal and policy context.

1.3 This report has been prepared for the exclusive use of The Turner Stokes Family and the Springer Family. No part of this report should be considered as legal advice.

Site Description

1.4 The Site is situated in Highgate in North London. Hampstead Heath lies immediately adjacent to the south west of the Site, over Millfield Lane (a public footpath). The Heath comprises a large expanse of public open space dominated by semi-natural woodland and grassland habitats, and with a series of ponds, watercourses and wetlands. The site is surrounded to the north, east and south by residential properties with large private gardens.

1.5 The Site itself mainly supports a linear residential property along the eastern edge, alongside Fitzroy Park (a private road), with a mature garden supporting a disused hard surfaced tennis court, a large overgrown and silted pond, an area of orchard, amenity grassland, planted beds and occasional mature and semi-mature trees. The property has been in the ownership of a single family for a large number of years, with the garden used by the owner, including localised management of lawns and planted beds, and frequently accessed by their dogs (currently three golden retrievers).

Project Description

1.6 In summary the proposals comprise the demolition of all existing buildings on the site and their replacement with five detached homes (Class C3).

1.7 This will include extensive landscaping including scrub, hedgerow and tree planting, and enhancement of the existing pond.

Policy and Legal Considerations

1.8 This appraisal has been prepared in cognisance of relevant legislation and policy. Further detail is provided in **Appendix 1**, with the key documents listed below:

- The Wildlife and Countryside Act 1981 (as amended);
- The Countryside and Rights of Way Act (CRoW Act), 2000 (as amended);
- The Natural Environment and Rural Communities Act (NERC Act), 2006;
- The Conservation of Habitats and Species Regulations 2010 (as amended);
- National Planning Policy Framework, 2018;
- Local planning policy including the London Plan, and the London Borough of Camden's Local Plan (July 2017) and Camden Planning Guidance.

2 Methods

2.1 The methods adopted in the survey and appraisals are outlined below. They accord with the best practice guidance documents for survey and appraisal produced by the Chartered Institute of Ecology and Environmental Management[1] and the British Standards Institute[2]. All surveys were completed by suitably qualified and experienced ecologists during suitable weather conditions.

Desk Study

2.2 To provide additional background to the appraisal and to highlight likely features or species groups of interest, a study of available biological records was undertaken to identify sites designated for their nature conservation value, and existing records of protected or notable species of relevance to the Site. A search of the following resources was undertaken, within a 1km radius from the Site:

- Multi-Agency Geographical Information for the Countryside (MAGIC)
- Ordnance Survey (OS) mapping;
- Aerial photography; and
- Species, habitat and designated site information purchased from Greenspace Information for Greater London (GIGL) in April 2017.

2.3 The absence of a species from biological records cannot be taken to represent actual absence. Species distribution patterns should be interpreted with caution as they may reflect survey/reporting effort rather than actual distribution.

Extended Phase 1 Habitat Survey

2.4 An Extended Phase 1 Habitat Survey was undertaken within the Site boundary (**Figure 1, Appendix 2**) in line with standard methods[3]. Phase 1 Habitat Survey provides a rapid means of classifying broad habitat types in any given terrestrial site.

2.5 The survey was 'extended' by considering the suitability of the Site to support notable or protected flora or fauna. Species considered included those identified during the desk study, or those considered appropriate by the surveyor during the survey. Detailed surveys were not necessarily completed for these species during the Phase 1 Survey; however, based on an understanding of species ecology, consideration was given to the Site's potential to provide sheltering or foraging habitat and/or connectivity to allow dispersal between populations.

2.6 The survey was undertaken on the 26th May 2017 by Peter Lawrence BSc MSc MCIEEM. Weather conditions during the survey were clear, mild and dry.

[1] Survey guidance is available at http://www.cieem.net/sources-of-survey-methods-sosm- and appraisal guidance is available at http://www.cieem.net/guidance-on-preliminary-ecological-appraisal-gpea-.
[2] British Standards Institute (2013). BS42020:2013 Biodiversity – Code of Practice for Planning and Development.
[3] Joint Nature Conservation Committee (1990). Handbook for Phase 1 Habitat Survey. JNCC, Peterborough

Bat Surveys

Assessment of Bat Roost Potential

1.1 The buildings/structures and trees within the Site were specifically considered for their potential to support roosting bats. A high powered torch (LED Lenser) and binoculars were used to search for and inspect features with potential to support bats, and to locate evidence of bat activity, such as droppings, staining, feeding remains and presence of bats (live/dead specimens).

1.2 The buildings and trees were classified as to their Bat Roost Potential (BRP), with due consideration to best practice guidance[4], as summarised in **Table 2.1**.

Table 2.1 Bat roost potential categories

Suitability	Description	Further survey implications
Confirmed bat roost	Bats or evidence of bats recorded, both of recent and/or historic activity.	Works affecting a roost are licensable. Further survey required to determine the bat species present, nature of roost and level of use before mitigation is can be determined.
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by large numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions[5] and surrounding habitat.	Three separate survey visits. Of which, at least one dusk emergence and a separate dawn re-entry survey. Subject to initial survey findings, the level of survey effort required may be reviewed.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions[5] and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation).	A single survey visit is required for buildings. No further survey is required for trees. Subject to initial survey findings, the level of survey effort required may be reviewed.
Negligible	Negligible habitat features on site likely to be used by roosting bats.	No further survey or mitigation required.

Emergence/Re-entry Surveys

1.3 Following the initial assessment, further specialist bat surveys were undertaken in 2017, comprising two evening emergence surveys in July and August and one dawn return survey in August. These surveys focussed on the main building and a single tree group which had been identified as having High Bat Roost Potential and which was likely to be directly affected by the proposals. Other trees with High Bat Roost Potential which were not proposed to be directly affected by the works were not surveyed.

[4] Collins, J. (ed). (2016) B*at Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edn). The Bat Conservation Trust, London

[5] For example, in terms of temperature, humidity, height above ground level, light levels or levels of disturbance.

1.4 The survey method followed best practice guidance[4]. Evening surveys commenced at least 15 minutes before sunset and lasted for at least 1.5 hours after sunset; whilst dawn surveys commenced at least 1.5 hours before dawn and continued for 15 minutes after.

1.5 Surveys were conducted using a range of bat detectors, including Bat Box Duet, Batscanner, SSF Bat 2, Pettersson frequency division bat detectors. Bat calls were also used to supplement surveyor positions, allowing for the recording of calls using Anabat SD2 or Anabat Express zero crossing bat detectors for subsequent analysis using Analook software if required.

1.6 Bat foraging and commuting activity was also recorded during the emergence/ re-entry surveys, with species, number, time and direction of flight recorded to gain an understanding of how the Site is utilised by foraging or commuting bats.

1.7 Detailed survey findings including weather conditions during the surveys are provided in **Appendix 3.**

Activity Surveys – Static Monitoring

2.7 As well as the above emergence/re-entry surveys and to provide additional data concerning use of the Site by bats, a Static Monitoring Point (SMP) survey was carried out between May and September 2017, in accordance with bat survey guidance[4]. The SMP locations are shown in **Figure 3, Appendix 2**, and described below in **Table 2.2**.

2.8 SMP locations were chosen to incorporate strategic features in the landscape likely to be of greatest importance for commuting and foraging (for example waterbodies and tree/woodland edges) as well as taking into consideration areas which could potentially be impacted by the proposed scheme, such as locations close to potential future development locations. Given the small size of the Site, data collected at these two locations are considered to have provided a representative picture of bat activity across the Site as a whole.

2.9 Detectors were left out for at least five consecutive nights per month in order to collect data for analysis in accordance with guidance. Further information about the SMP surveys, including weather conditions, is provided in **Appendix 4**.

Table 2.2 SMP locations

Reference	Location Description
1	Located on the south bank of the pond, attached to a 1m high fence post alongside willow trees, and facing north towards the pond.
2	Attached to trees on the west boundary of the Site, facing east into the garden within an area of scattered trees adjacent to amenity grassland, the orchard and ornamental beds.

Bat Call Sonogram Analysis

2.10 Bat calls recorded using Anabat Express or Anabat SD2 detectors were analysed using Analook software. All calls were analysed for static monitoring points, whilst roost data was only analysed where notable bat calls were recorded (e.g. bat roost emergence/re-entry and/or recording of species which could not be identified accurately using heterodyne detectors). All bat call analysis was undertaken by experienced surveyors, trained in bat call analysis and following appropriate guidance[6].

[6] British Bat Calls: A Guide to Species Identification. John Russ, 2012.

Reptile Surveys

2.11 Reptile surveys were undertaken with due consideration to best practice guidance[7&8]. On the 1st[th] June 2017, 21 artificial refugia (comprising roofing felt mats of approximately 1m x 0.5m) were placed across the Site in areas of suitable habitat (**Figure 4, Appendix 2**). During the placing of refugia consideration was given to the risk of disturbance by the resident's dogs which regularly use the garden and would pose a risk to any reptiles using the refugia, whilst also reduce the suitability of large areas of the garden to support reptiles due to disturbance and predation risk. Therefore the reptile survey was restricted to the northern part of the garden which was fenced off with no access for the dogs.

2.12 Refugia were left for a period of 14 days to allow reptiles to become accustomed to them. The refugia were then checked on seven occasions in suitable weather conditions throughout July to September. The presence of reptiles including species and life stage was recorded, as well as any other species such as amphibians and small mammals, both of which will also regularly shelter underneath refugia.

2.13 Suitable weather conditions are generally considered to be dry sunny spells after rainfall or periods of intermittent sunshine on warmer days, with temperatures between 9°C and 18°C. Further detail, including survey dates and weather conditions are provided in **Appendix 5.**

GCN Surveys

2.14 eDNA sampling was carried out for the pond to confirm presence/absence of GCN, and to inform requirements for full GCN surveys.

2.15 Samples were taken using the methods outlined in best practice guidance[9] (summarised below). Sample kits comprised 1 sterile bag, 2 pairs of sterile gloves, 1 sterile 30 mL sampling ladle, a sample box containing 6 x 50 mL sample tubes two thirds full of preserving fluid; 1 sterile 10 mL pipette. A new sample kit was used at each pond to ensure cross contamination of samples was avoided.

2.16 In line with best practice guidance 20 samples of 30 mL of pond water were collected from around the pond. Sample locations were spread out evenly around the pond edge, ensuring that samples were collected from both open water and vegetated areas if present, and where possible from areas of water greater than 10cm deep. Once all 20 samples were collected the bag was closed and shaken for 10 seconds to ensure any DNA present was mixed across the sample. 15 mL of water was then transferred from the bag into each of the 6 sample tubes containing preservative. Finally each tube was shaken for 10 seconds to mix the water sample and preservative. Samples were then sent to the relevant laboratory for analysis.

Limitations and Constraints

General Survey Limitations

2.17 It is important to note that ecological surveys provide information regarding the ecological baseline of a Site for only a 'snapshot' of time. Therefore, if significant time lapses between the surveys and the further development or implementation of proposals, updated ecological surveys may be required to identify any change in the baseline, such as natural succession of habitats, or local extinction or colonisation of species. Ecological surveys can generally be considered as up to date for 1 to 3 years dependent on the nature of the site, ecological baseline and proposals and likely impact. Therefore if a year lapses between the submission of a planning application or progression of proposals, it is recommended that further ecological advice is sought regarding the

[7] Herpetofauna Groups of Britain and Ireland (1998) *Evaluating Local Mitigation/Translocation Programmes: Maintaining Best Practice and Lawful Standards.* HGBI Advisory Notes for Amphibian and Reptile Groups.

[8] Froglife (1998) *The Planning System and Site Defence: how to Protect Reptile and Amphibian Habitats* Froglife Advice Sheet 9. Froglife, Halesworth.

[9] Biggs J, Ewald N, Valentini A, Gaboriaud C, Griffiths RA, Foster J, Wilkinson J, Arnett A, Williams P and Dunn F 2014. Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (Triturus cristatus) environmental DNA. Freshwater Habitats Trust, Oxford.

applicability of the current survey findings. In this case, surveys were completed in 2017 with the planning application submitted in 2018. Given the absence of significant changes in use and management of the Site it is confirmed that the surveys undertaken remain valid to support the application.

Bat Call Analysis Limitations

2.18 The data collected on the Anabats represents single bat passes. It cannot always be ascertained if multiple passes in an evening represent multiple bats, or a single bat foraging around the location of the Anabat. When weather conditions are good for foraging, i.e. stable temperatures, dry with low wind speeds then it is increasingly possible that multiple passes are as a result of foraging (i.e. one bat flying multiple times around the same area) rather than multiple bats. Given the limitations to the data, caution is taken when reviewing the data and high numbers of bat passes are not automatically assumed to demonstrate use of a site by a large bat population.

2.19 The analysis of bat detector calls is prone to subjectivity, but has been undertaken by experienced surveyors trained in bat call analysis, and following appropriate guidance. Bat species identification was interpreted using known call parameters[7] and existing literature on the ecology of UK bat species, including distribution, range, habitat associations and behavioural characteristics, in addition to professional judgement. Every attempt was made to identify bats to species level. However, it is not always possible to identify some *Myotis, Pipistrellus and Nyctalus* bats to species level. For example, differentiating between the echolocation calls of the common pipistrelle (which echolocates at a peak frequency of approximately 45kHz) and the soprano pipistrelle (which peaks at approximately 55kHz) is not always possible where recordings peak at the intermediate frequency of 50kHz. This is a widely accepted limitation and in such cases these passes are therefore classified at the Genus level only (i.e. *Pipistrellus* sp., *Myotis* sp., or *Nyctalus* sp.).

2.20 Particular care was taken when identifying members of the *Myotis* genus due to significant overlaps in their call parameters. These identifications should be considered as *Myotis* calls with the characteristics of the named species, based on comparison with a known call sequence from a bat flying in a similar situation, and should therefore be treated as highly likely, rather than definitive identifications.

Bat Surveys

2.21 During the July static monitoring survey which lasted for 7 nights, a technical fault with the Anabat Express detector at SMP1 resulted in the loss of 2.5 nights of data. However, 4.5 nights of data were still collected and all other monthly static monitoring was carried out successfully in suitable conditions. Therefore it is considered that sufficient static monitoring data was collected to give an overall picture of bat activity at this location and this technical fault is not considered to represent a constraint to the survey findings.

Reptile Surveys

2.22 Although June to August can be deemed sub-optimal for reptile surveys, the refugia were only checked on days considered suitable with a number of checks also undertaken through September. Surveys results were only considered from days with appropriate weather conditions, and at times of the day when weather conditions were acceptable (for example early or late in the day when conditions were cooler), with survey visits well spread-out between June and September. This survey is therefore considered robust to determine presence/absence of reptiles.

3 Baseline Data

Desk Study

3.1 The findings of the desk study are presented in the tables below. **Table 3.1** summarises both statutory and non-statutory designated sites within 1km of the Site. **Table 3.2** summarises records of protected and notable species of relevance given the Site.

Table 3.1: Statutory and Non-statutory Designated sites within 1 km radius of Fitzroy Park site

Site Name	Designation(s)	Description	Orientation/Distance (m) from the centre of the Site to nearest border of designated site (approx.)
Statutory Sites			
Hampstead Heath Woods	Site of Special Scientific Interest (SSSI)	The Woods are an example of long-established high forest woodlands comprising of old and over mature veteran trees that provides dead wood habitat for a range of invertebrates. The site also includes an acidic flush with developing bog-moss communities	360m NW of Site
Non-Statutory Sites			
Hampstead Heath	Site of Importance for Nature Conservation (SINC)	An area comprising of Acid grassland, Ancient woodland, Bog and Ponds/Lakes.	40m SW of site
Highgate Cemetery	SINC	An area of Secondary woodland, Semi-improved neutral grassland, Vegetated wall/tombstones	523m W of site
Waterlow Park	SINC	A large park with Amenity grassland, Hedge, Planted shrubbery, ponds/lake, Ruderal,	634m E of site

Site Name	Designation(s)	Description	Orientation/Distance (m) from the centre of the Site to nearest border of designated site (approx.)
		Scattered trees, Scrub, Semi-improved grassland, Tall herbs and Wet grassland.	
Holly Lodge gardens	SINC	Amenity grasslands, Planted shrubbery and Scattered trees	375m SE of site
Harrington Site	SINC	Community Horticultural Project and adjacent Sycamore woodland, with Scattered trees, Secondary woodland, Flowerbeds, Hedge and Rough land	696m NE of site
Regionally Important Geological Site (RIGS)	Kenwood House Quarry	Site of former small quarry for Eocene Bagshot Formation sands.	1036m NW of site

Table 3.2: Protected Species and Species of Conservation concern recorded within 1Km of Fitzroy park

Species Name	Status	Orientation/Distance (m) from centre of Site (approx.)
Invertebrates		
Stag beetle *Lucanus cervas*	Habitats Directives Annex 2, non-priority Species Natural Environment and Rural Communities Act 2006 Section 41 (NERC Act Section 41) Local Species of Conservation Concern Nationally Notable B	248m W of site
Marbled White *Melanargia galathea*	Local Species of Conservation Concern	377m SW of site
Red-eyed Damselfly *Erythromma najas*	Local Species of Conservation concern	512m SW of site
Nigma walckenaeri Spider *Nigma*	Local Species of Conservation Concern	700m N of site

walckenaeri		
Higher Plants (Flowering)		
Meadow Crane's-bill *Geranium pratense*	Local Species of Conservation Concern	144m W of site
Bluebell *Hyacinthoides non-scripta*	Wildlife and Countryside Act 1981 (Schedule 8) Local Species of Conservation Concern	196m NW of site
Amphibians and Reptiles		
Common Toad *Bufo bufo*	NERC Act Section 41 Local Species of Conservation Concern	74m SW of site
Common Frog *Rana temporaria*	Local Species of Conservation Concern	74m SW of site
Common Lizard *Zootoca vivipara*	NERC Act Section 41 Wildlife and Countryside Act 1981 Schedule 5 Section 9.1 (killing/injuring) Local Species of Conservation Concern	240 N of site
Palmate Newt *Lissotriton helveticus*	Local Species of Conservation Concern	972 N of site
Birds		
Starling *Sturnus vulgaris*	IUCN Bird Population Status- Red Local Species of Conservation Concern	167m N of site
Mute Swan *Cygnus olor*	Local Species of Conservation Concern	167m N of site
Kestral *Falco tinnunculus*	Local Species of Conservation Concern	167m N of site
Lesser Black-backed gull *Larus fuscus*	Local Species of Conservation Concern	240m N of site
House Martin *Delichon urbicum*	Local Species of Conservation Concern	240m N of site
House Sparrow *Passer domesticus*	NERC Act Section 41 IUCN Bird Population Status- Red Local Species of Conservation Concern	240m N of site
Dunnock *Prunella modularis*	Local Species of Conservation Concern	240m N of site
Goldcrest *Regulus*	Local Species of Conservation Concern	240m N of site

regulus		
Willow Warbler *Phylloscopus trochilus*	Local Species of Conservation Concern	240m N of site
Redwing *Turdus iliacus*	IUCN Bird Population Status- Red Local Species of Conservation Concern	240m N of site
Song Thrush *Turdus philomelos*	IUCN Bird Population Status- Red Wildlife and Countryside Act Schedule 1 part 1	240m N of site
Mistle Thrush *Turdus viscivorus*	Local Species of Conservation Concern	240m N of site
Swift *Apus apus*	Local Species of Conservation Concern	240m N of site
Grey Heron *Ardea cinerea*	Local Species of Conservation Concern	234m N of site
Mammals		
West European Hedgehog *Erinaceus europaeus*	NERC Act Section 41 Local Species of Conservation Concern	246m NW of site
Eurasian Common Shrew *Sorex araneus*	Local Species of Conservation Concern	835m NW of site
Mammals (bats)		
Noctule *Nyctalus noctula*	NERC Act Section 41 Conservation Regulations 2010 Schedule 2 Habitat & Species Directive Annex 4 Wildlife & Countryside Act Schedule 9 Local Species of Conservation Concern	70m N of site
Daubenton's Bat *Myotis daubentonii*	Conservation Regulations 2010 Schedule 2 Habitat & Species Directive Annex 4 Wildlife & Countryside Act Schedule 9 Local Species of Conservation Concern	74m SW of site
Common Pipistrelle *Pipistrellus pipistrellus*	Conservation Regulations 2010 Schedule 2 Habitat & Species Directive Annex 4 Wildlife & Countryside Act Schedule 9 Local Species of Conservation Concern	74m SW of site
Natterer's bat *Myotis nattereii*	Conservation Regulations 2010 Schedule 2 Habitat & Species Directive Annex 4	74m SW of site

	Wildlife & Countryside Act Schedule 9 Local Species of Conservation Concern	
Brown Long-eared bat *Plecotus auritus*	NERC Act Section 41 Conservation Regulations 2010 Schedule 2 Habitat & Species Directive Annex 4 Wildlife & Countryside Act Schedule 9 Local Species of Conservation Concern	97m NW of site
Soprano Pipistrelle Pi*pistrellus pygmaeus*	NERC Act Section 41 Conservation Regulations 2010 Schedule 2 Habitat & Species Directive Annex 4 Wildlife & Countryside Act Schedule 9 Local Species of Conservation Concern	97m NW of site
Nathusius's Pipistrelle *Pipistrellus nathusii*	Conservation Regulations 2010 Schedule 2 Habitat & Species Directive Annex 4 Wildlife & Countryside Act Schedule 9 Local Species of Conservation Concern	145m W of site
Serotine *Eptesicus serotinus*	Conservation Regulations 2010 Schedule 2 Habitat & Species Directive Annex 4 Wildlife & Countryside Act Schedule 9 Local Species of Conservation Concern	673m N of site

Extended Phase 1 Habitat Survey

Study Area Description

3.2 The Site comprised predominantly of buildings and associated hardstanding with large areas of amenity grassland and dense continuous scrub also present. Areas of orchard planting (over amenity grassland), introduced shrub, ornamental planting and broadleaved woodland were also recorded. A pond with marginal vegetation was recorded in the north of the Site. Japanese Knotweed *Fallopia japonica* was recorded in sparse clusters adjacent to the pond and along the western boundary.

Habitat Descriptions

3.3 Habitat descriptions are set out below. While considering this information, reference should be made to the Phase 1 Habitat Map presented in **Figure 1, Appendix 2,** and target notes in **Appendix 7**.

Building and associated hardstanding

3.4 A brick-built residential property was situated within the east of the Site. The roof was predominantly flat-roofed with a slate tiled extension at the rear, and was comprised of metal capped parapets/edges and areas of roofing felt. The garage comprised of a plastic roof extension.

3.5 Hardstanding was recorded in the east and west of the Site. In the east, the hardstanding was in the form of access roads and footpaths, whilst in the west it was associated with disused tennis court.

Amenity Grassland

3.6 Amenity grassland was the predominant habitat recorded throughout the southern, central and northern parts of the Site. The grassland was mown short and species-poor. Perennial rye grass *Lolium perenne* was the dominant species, with frequent common garden species such as white clover *Trifolium repens*, common daisy *Bellis perennis*, and plantain *Plantago sp.*

Scrub

3.7 Dense scrub was recorded throughout the Site, in particular in the southern corner, along the eastern boundary, and throughout the north and western parts of the Site. These habitats were subject to periodic management given the use of the private garden.

3.8 The scrub situated in the south, in the west and surrounding the northern pond was dominated by willow *Salix sp.* with occasional hazel *Corylus avellana*, young ash *Fraxinus excelsior* and elder *Sambuca nigra* also recorded. Holm oak *Quercus ilex* and ornamental holly *Ilex sp.* were rarely recorded. Mature ivy *Hedera helix* dominated the ground storey.

3.9 Along the eastern boundary, the dense scrub was dominated by ivy, with occasional to rare ash, sycamore *Acer psuedoplatanus, Pyracantha sp.,* rose *Rosa sp.*, and butterfly bush *Buddleja.*

Introduced Shrub

3.10 Introduced shrub with scattered trees were recorded along the southern and eastern boundary, whilst introduced shrub with ornamental planting was observed along the western side of the residential building. These habitats were subject to periodic management given the use of the private garden.

3.11 The canopies were comprised of species such as *Choisia sp.*, bay *Laurus nobilis*, yew *Taxus baccata*, butterfly bush *Buddleja*, lilac *Syringa vulgaris* and *Fuchsia sp.*

3.12 Herbaceous planting included *Geranium spp.*, garden forget-me-not *Myosotis sp.*, Spanish bluebell *Hyacinthoides hispanica*, elephant ears *Bergenia spp.*, ground elder *Aegopodium* and wood avens *Geum urbanum*.

Orchard

3.13 An orchard was situated within the centre of the Site. It was comprised of a variety of relatively mature fruit-bearing trees with an amenity grassland understorey. Tree species included apple *Malus sp.*, pear *Pyrus sp.,* and cherry *Prunus sp.* The orchard trees were located over regularly mown amenity grassland habitats as described above.

Semi-natural Broad-leaved Woodland

3.14 A small area classified as semi-natural woodland was recorded in the north-western region of the Site, supporting a continuous canopy of willow and sycamore with ivy. The understorey comprised bramble *Rubus fruticosus agg.* and elder scrub. The ground storey was dominated by dense ivy cover with bramble and ash regeneration. Lords-and-ladies *Arum maculatum*, wood avens and large bindweed *Calystegia sylvatica* were rarely recorded.

Bare Ground

3.15 An area of bare ground was recorded in the south of the Site associated with an area of composting and garden storage. Occasional areas of ornamental bushes comprised of *Euonymus sp.* and *Laburnum sp.* and two mature ornamental conifers were also recorded.

Standing Water

3.16 A pond was situated within the north of the Site. There was little emergent vegetation and margins were entirely shaded by neighbouring trees. Marginal vegetation was restricted to the northern edge of the pond, which was comprised of *Iris sp.* and greater pond sedge *Carex riparia*.

Invasive Species

3.17 Japanese knotweed was recorded throughout the Site, particularly in the western part of the Site and along the south-eastern banks of the pond.

Bats

Habitat

3.18 The mosaic of habitats within and immediately adjacent to the Site, such as the pond, scattered trees, scrub, orchard and semi-natural broadleaved woodland edge, provided foraging, commuting and roosting opportunities for bats; though features such as light spill from the building /external lighting and ornamental gardening practices reduced the habitat suitability in some areas. These habitats are ecologically connected to an extensive network of optimal habitats for bats, in particular large waterbodies and areas of woodland, scrub and rough grassland within Hampstead Heath to the west, as well as residential gardens and open spaces.

Assessment of Bat Roost Potential

3.19 The locations of features with Bat Roost Potential (BRP) are shown in **Figure 3, Appendix 2.** In summary, the following features with BRP were identified:

Buildings

- Numerous features with High Bat Roost Potential were identified around the southern half of the main building, on the southern, eastern and western elevations.
- One feature with Low Bat Roost Potential was identified in the northern half of the main building on a western elevation.

Trees

3.20 A small number of trees within the Site were identified as having High Bat Roost Potential. The majority of these are to be retained under the current scheme, however, a small group of ivy-covered trees adjacent to the tennis courts will be removed and were therefore subject to emergence/re-entry surveys.

Emergence/Re-entry Surveys

3.21 The location of the emergence/re-entry surveys are shown in **Figure 3, Appendix 2**, and full survey results, including timings and weather conditions, are provided in **Appendix 3**.

3.22 No bat roosts were confirmed during the emergence/ re-entry surveys.

Activity Surveys – Static Monitoring

3.23 The static monitoring point (SMP) locations are shown in **Figure 3, Appendix 2.** Full static monitoring results are provided in **Appendix 4** and are summarised for each SMP below and in **Table 3.3**.

SMP 1

3.24 This SMP was located among willow trees on the south bank of the pond, pointing over the water. It recorded the highest levels of bat activity, averaging 352.62 bat call registrations per night, reflecting the good foraging habitat offered by the waterbody.

3.25 Bat activity frequently commenced within 15 minutes after sunset, indicating the presence of bat roosts within the local area. Most bat call registrations represented common and soprano pipistrelles and *Myotis* bat species. The vast majority of *Myotis* registrations were consistent with the call parameters of Daubenton's bat (a species which commonly forages over water), with some calls with the characteristics of Natterer's bat also noted. Due to the limitations with distinguishing *Myotis* bat calls, the occasional presence of other species from this genus could not be ruled out.

3.26 Other species recorded at this location consisted of a small number of noctule and Leisler's bat registrations, two nathusius pipistrelle registrations and one brown long-eared bat call registration.

SMP 2

3.27 This SMP was located within an area of scattered trees near the south-west boundary of the Site. Lower levels of bat activity were recorded here when compared to SMP1, though activity levels were still considered to be relatively high, at an average of 201.46 registrations per night.

3.28 Bat activity usually commenced within 15 minutes after sunset, again indicating the presence of bat roosts in the local area. The recordings were dominated by common and soprano pipistrelle bat call registrations, with small numbers of registrations also recorded for *Myotis* sp. (species composition as noted above), noctule, Leisler's bat and nathusius pipistrelle. Of these other species, most recordings were single registrations, spaced hours apart, which suggests that they may be commuting along the site boundary rather than foraging extensively within the Site.

Table 3.3: Summary of Anabat Registrations at Static Monitoring Points (2017)

SMP Location	Common Pipistrelle	Soprano pipistrelle	Nathusius' pipistrelle	*Pipistrellus* sp.	*Pipistrellus* social call	Noctule	Leisler's bat	*Nyctalus* sp.	*Myotis* sp.	Brown long-eared bat	Total Registrations	Average Registrations per Night*	Total Species/ Species Groups Confirmed
1	4111	1695	2	43	96	31	5	1	2278	1	**8263**	**352.62**	**7**
2	2777	1935	38	25	311	58	11	10	73	0	**5238**	**201.46**	**6**
Total Passes	**6888**	**3630**	**40**	**68**	**407**	**89**	**16**	**11**	**2351**	**1**	**13501**		
* Taking into account 2.5 nights of missing data for SMP1 in July													

Reptiles

Habitats

3.29 The Site is ecologically connected to Hampstead Heath in the west, which provides optimal habitats for reptiles, with grass Snake recorded on the Heath.

3.30 The pond, dense scrub, woodland and introduced shrub habitats provided localised sheltering and foraging habitats for reptiles, although the majority of the garden was overgrown and heavily shaded, and therefore provided few basking opportunities. The amenity grassland, which provided most opportunities for basking in sunny conditions, was mown short and subject to regular disturbance, and was therefore not suitable for reptile species. In addition the majority of the garden was regularly accessed by the occupants dogs, further reducing suitable given disturbance and predation risk.

Presence/Absence Survey

3.31 Full survey results are presented in **Appendix 5**.

3.32 During the reptile surveys, one juvenile grass snake was recorded to the north of the pond.

Amphibians

Habitats

3.33 The pond, dense scrub, introduced shrub and woodland habitats within the Site provided optimal habitats for amphibians. The amenity grassland was too short for these species for anything other than dispersal.

3.34 The Site is ecologically connected to Hampstead Heath which offers optimal habitats for these species.

eDNA Survey

3.35 Results from the eDNA survey are provided in **Appendix 6**. The results were negative for the presence of GCN eDNA within the waterbody, concluding that GCN are not present within the waterbody.

3.36 Common toad and smooth newt were observed under reptile refugia during the reptile survey.

Birds

3.37 The Site was comprised of habitats which provided optimal foraging and nesting opportunities for local common garden and woodland bird species.

Other Species

Mammals

3.38 The Site provided suitable foraging and sheltering opportunities for small mammals, including hedgehog. Hedgehogs have been recorded in the neighbouring Hampstead Heath.

Invertebrates

3.39 The habitats present on site have the potential to support a variety of invertebrates, including aquatic species within the pond.

4 Discussion

Designated Sites

Discussion

4.1 The Site is located some 312m to the South East of the Hampstead Heath Woods SSSI. However, given the distance and scale/nature of the Site it is considered highly unlikely that the proposals will impact on the SSSI, as indicated by reference to Natural England's SSSI Impact Risk Zones for this SSSI.

4.2 The Site is also located in the vicinity of a number of locally designated nature conservation sites, most notably the Hampstead Heath SINC which is located some 15m from the Site boundary at the closest point on the far side of Millfield Lane. Other SINCs in the vicinity are at a greater distance from the Site and isolated from it by residential development. Hampstead Heath in the vicinity of the Site supports woodland habitats immediately alongside Millfield Lane, with the Hampstead ponds located further to the west down the slope.

4.3 There is the potential for the proposals to result in a number of impacts on the SINC given its close vicinity.

4.4 **Hydrological impacts**: given the local topography and location of springs, the development could result in alterations to surface and ground water flows to the west, through the Site, potentially reducing the hydrological inputs to the SINC. This could result in impacts on the woodland habitats, including alterations in vegetation composition and reduced health of trees, as well as impacts on the Hampstead Heath ponds by altering inflows.

4.5 **Contamination**: During demolition and construction works, contamination of the SINC could incur as a result of dust and accidental spillage / surface runoff from the Site, in particular with potential to impact on the adjacent woodland habitats. There would also be potential for Japanese knotweed from the Site to contaminate the SINC if vegetative material and contaminated soils were not disposed of responsibly in accordance with best practice guidance.

4.6 In the longer term, runoff from the proposed new access road could result in contamination of the SINC if pollution from the road and Fitzroy Park was directed to the SINC uncontrolled. However, given the minor nature of the access road, and the potential for existing contamination from the local road network, this would not be considered to cause a notable impact on the SINC.

4.7 **Disturbance**: Disturbance of the adjacent habitats will occur in the short-term given increased noise as a result of demolition and construction works, with potential to impacts species behaviour, most notably potential bird nesting in the adjacent woodland.

4.8 In the longer term, disturbance associated with greater recreational use of the SINC is considered unlikely to result in notable impacts on the SINC, firstly given the small scale of the development which would result in a very minor increase in use of the SINC compared to existing levels of recreation; and secondly given that the proposed residents (the applicants) are already local to, and use, Hampstead Heath, and the proposals will therefore not result in increased use of the Heath.

Mitigation

4.9 Mitigation proposals have been developed to address these potential impacts on the SINC.

4.10 The proposals have been informed by a thorough Hydrological and Hydrogeological Impact Assessment[10] to ensure a thorough understanding of the current hydrological conditions, including how ground and surface water pass through the Site to adjacent habitats. The drainage strategy

[10] LBH Wembley Engineering (2018) *Hydrological and Hydrogeological Impact Assessment of Proposed Redevelopment of Fitzroy Park*

has been developed with careful consideration to ensure hydrological inputs to these habitats are maintained as far as possible as at current. In and outflows from the pond are discussed further below, but in addition a series of French drains and buried pipes will channel ground and surface water through the Site from east to west, discharging in to a linear Sustainable Drainage feature along the boundary of the Site adjacent to Millfield Lane. This will comprise a linear swale/drain. This will allow water channelled through the Site to enter the ground and continue to pass to the adjacent woodland habitats within the Heath (and beyond).

4.11 In terms of contamination, the demolition and construction works will be delivered in accordance with best practice construction guidance[11] to be detailed within a Construction Management Plan (CMP). This will include the strict control of dust, and measures to minimise the risk of accidental contamination. In addition, the Sustainable Drainage strategy as above will reduce the risk of hydrological contamination of the SINC.

4.12 Japanese knotweed will be treated in strict accordance with best practice guidance, eliminating it from the Site in the long-term (minimising the risk of spread and contamination of the SINC through vegetative means), whilst excavation and disposal of contaminated material will be undertaken in accordance with best practice guidance also. The chemical control of Japanese knotweed on the Site commenced in June 2018. Further information is provided below, and in a draft Japanese Knotweed Management Plan (**Appendix 8)**.

Enhancement

4.13 The linear swale/drain along Millfield Lane will be swon with a damp grassland seed mix. Although small in area will diversify habitats in the vicinity of the SINC, with the new damp grassland habitats complementing the adjacent damp woodland.

Habitats

Discussion

4.14 The Site currently comprises buildings and hard standing (1472 m^2, or 29% of the Site) and a mosaic of predominately ornamental garden habitats. The habitat mosaic provides a range of opportunities for wildlife immediately adjacent to the extensive habitat of Hampstead Heath, although with disturbance associated with the management and use of the garden, including regular use by the owner's dogs. Of particular note are the orchard habitat, boundary scrub and treed vegetation and the pond.

4.15 The proposals will result in the loss of habitats in the short-term, although habitat loss has been avoided as far as possible with development focused on the existing built footprint and area of hard standing tennis court. In particular the layout has enabled the retention of the majority of boundary scrub/treed vegetation along the south, west and north boundaries, and retention of the pond and associated bankside habitats, with vegetated links provided between Plots 1-3. This layout has addressed the risk that development could reduce ecological connectivity through the Site, with in addition a proposed vehicle access route to the south of the pond removed from the proposals in favour of a narrower pedestrian route. As a result of these measures in combination the proposals are likely to result in improved connectivity through the Site for wildlife as detailed further below.

4.16 The majority of habitats to be lost comprise ornamental, garden habitats including ornamental beds supporting herbaceous and shrub planting and amenity grassland (of low species diversity), as well as buildings and hard standing. The planted areas are likely to provide habitat for a range of common wildlife species, including invertebrates and birds, as well as potentially amphibians and small mammals, but in their own right are of relatively low ecological value as ornamental, regularly managed and disturbed habitats which are common and widespread in the wider area.

4.17 In addition an area of orchard will be lost. The orchard is subject to low intensity management, with the ground flora comprising permanent grassland, albeit regularly managed amenity

[11] Including CIRIA Report 532 'Control of Water Pollution from construction Sites' and Environmental Agency Pollution Prevention Guidelines, principally PPG6 'Working at Construction and Demolition Sites'

grassland (rather than meadow type grassland). The orchard would therefore seem to meet the definition of a 'Traditional Orchard'[12] and would qualify as a habitat of principle importance in England, although it is likely of reduced value than other areas meeting the definition given its relatively small size, presence in a private garden and level of disturbance associated with garden maintenance and use by the residents and pets. The orchard provides a dense canopy cover which is likely to be of value to common garden and woodland birds in particular as well as pollinating insects. The fruit trees are in relatively good condition with minimal deadwood, which would otherwise provide enhanced habitats for invertebrates in particular.

4.18 In total 39 trees are due to lost as a result of the proposals. On the face of it, there is potential for this habitat loss to impact on ecological connectivity. On the most part boundary vegetation and canopy cover around the boundaries will be retained. It is also of note that the existing building location and associated hard standing along the entire width of the Site on to Fitzroy Park forms an existing barrier to wildlife movement through the site from east to west. Therefore in actual fact the proposals will enhance connectivity through the Site whilst maintaining and enhancing connectivity around the Site boundaries (see below).

4.19 As above direct impacts on the pond have been avoided though siting of the proposals to ensure that all areas of the pond and associated bankside habitats are retained. However, there is a risk of other impacts on the pond. In particular alterations in the local hydrological conditions of the Site could impact the inflows to and outflows from the pond, with a risk that inflows are reduced affecting water levels and risking the continued presence of the pond.

4.20 In addition, there is a risk of contamination of the pond as a result of surface water runoff entering the pond, including siltation and accidental spillage during construction; and in the longer term contaminated surface water from the access drive and Fitzroy Park entering the pond (although currently potentially polluted run-off from Fitzroy Park is being directed in to the pond, as detailed within the Hydrological and Hydrogeological Impact Assessment[13]). This could reduce water quality and impact the fauna of the pond, including invertebrates and amphibians.

4.21 Given changes in site levels, there is also a risk that excavation to the south of the pond in particular could reduce the integrity of the banks and ability of the pond to hold water, for example with increased ground water flow and seepage from the pond, or in the case of the collapse of any retaining structure that supports the western bank of the pond.

4.22 As described for designated sites, there is also the potential for other retained habitats to be subject to increased disturbance and contamination (including dust) during works, with retained trees at particular risk of declining health and mortality in the long-term as a result of excavation or soil compaction within their root protection zone. There is also the risk of increased contamination by Japanese knotweed, with works including excavation and vehicle movements potentially causing further spread of vegetative material and this species.

Mitigation

4.23 Mitigation proposals have been developed to address these potential impacts on habitats.

4.24 As described above, proposals have been informed by a thorough hydrological assessment with a drainage strategy developed to ensure inputs to and outflows from the pond are maintained as at current. This will include the diversion of drainage from the Fitzroy Park carriageway as well as new car parking via a system of interceptors to the combined sewer. This will improve the current situation with runoff from Fitzroy Park apparently being directed to the pond via drainage. Input of clean water to the pond will be maintained by directing drainage from the site, including the green roofs to the pond as detailed within the Hydrological and Hydrogeological Impact Assessment.

4.25 In terms of contamination, the demolition and construction works will be delivered in accordance with best practice construction guidance to be detailed within a CMP. This will include the strict control of dust, and measures to minimise the risk of accidental contamination. In addition, the Drainage Strategy as above will reduce the risk of hydrological contamination of the pond.

[12] jncc.defra.gov.uk/Docs/UKBAP_BAPHabitats-56-TraditionalOrchards.doc

[13] LBH Wembley Engineering (2018) *Hydrological and Hydrogeological Impact Assessment of Proposed Redevelopment of Fitzroy Park*

4.26 Japanese knotweed will be treated in strict accordance with best practice guidance, eliminating it from the Site in the long-term (minimising the risk of spread and contamination of the SINC through vegetative means), whilst excavation and disposal of contaminated material will be undertaken in accordance with best practice guidance also. Treatment of this species has already begun (June 2018). This is as previously discussed.

4.27 Habitat loss will be mitigated through replacement soft landscaping, with ecological considerations integral to the development of the Landscape Masterplan from the outset. In particular this will include the following elements:

4.28 **External boundary treatment**: The existing concrete fence along the west boundary with Hampstead Heath will be replaced with a native hedgerow. The retained tree and scrub vegetation along this boundary will be supplemented by planting a range of native tree and scrub species, enhancing the extent and quality of wildlife habitat and maintaining connectivity. This will be supplemented by a new linear swale with wet grassland habitat as described above. Similar supplemental native scrub/tree planting will be undertaken along the south and north boundaries of the Site.

4.29 **Hedgerow planting:** A network of native hedgerows will be planted along the boundaries within the Site, including between plots 4 and 1-3, and north of Plot 1, and along the frontage with Fitzroy Park (including with occasional native and specimen trees). These will provide continuous habitat connectivity through the Site as far as possible, excluding entrance points, including between Plots 1, 2 and 3 with grassland supplemented by tree and shrub/herbaceous planting. This will improve east-west connectivity compared to the current situation with the existing building and hardstanding forming a continuous barrier to movement.

4.30 **Internal planting:** In addition to hedgerows, planting beds located between Plots 1-3 and Plots 4 and 5 have been designed to maintain a sense of openness through the Site whilst delivering ecological connectivity. This will be planted with a range of native and ornamental species of known wildlife benefit (such as those identified in the Royal Horticultural Society Perfect for Pollinator plant lists[14]), as well as native, specimen and orchard trees. This along with the proposed hedgerow planting will improve east-west connectivity compared to the current situation with the existing building and hardstanding forming a continuous barrier to movement.

4.31 **Orchard planting**: In addition replacement fruit tree planting will be provided through the gardens. The orchard will be complemented by wildflower grassland creation providing more species rich habitats than the existing amenity grassland. Seed mixes will be chosen which include species tolerant of regular mowing in acknowledgement that these areas may be mown more frequently than meadow habitat[15].

4.32 **Living roofs**: In addition, each of the five new buildings will support a living roof designed to benefit wildlife. These will provide flower-rich habitats of value for invertebrates, and in turn for foraging birds and bats, and will also provide habitats subject to reduced disturbance compared to garden habitats. The living roofs will support the following features:

- Species-rich wildflower rich grassland will be created using commercially available pre-grown turf or sown.
- This will be lain on a substrate depth as suggested by the supplier specifications, expected to be in between 150-200mm depth. This will allow sufficient water retention to maintain a healthy sward whilst discouraging growth of woody species.
- Sheltering habitats and variations in micro-topography will be created for invertebrates, comprising at least two log piles (using logs from on-site felling) and two rubble piles per roof (each measuring approximately 0.5m x 0.5m at the base)
- The roofs will also support PV cells, also increasing diversity by providing more shaded areas likely to be of denser vegetation growth than more exposed areas. This will utilise a

[14] https://www.rhs.org.uk/science/conservation-biodiversity/wildlife/plants-for-pollinators
[15] For example, https://wildseed.co.uk/mixtures/view/56/flowering-lawn-mixture

specifically designed system to ensure green roof and solar are compatible, for example Bauder BioSOLAR[16].

4.33 **Retaining walls**: To achieve the required ground levels for construction of the five properties, and to ensure usable gardens, retaining wall structures will be required. This will include north-south between Plots 1-3 and Plot 4, and a retaining structure around the south west / west of the pond in Plot 5. If vertical, these structures would have significant potential to reduce ecological connectivity through the Site. Again, these have therefore been designed with ecological input from the outset:

- The retaining wall between Plots 1-3 and Plot 4 will be near vertical but will be planted with a range of wildflower species and flanked by hedgerow and planting beds, providing opportunities for wildlife such as mammals and amphibians to pass.
- The retaining wall within Plot 5 along the pond edge has been located as far as possible from the pond edge, forming the boundary of the building itself. Areas between the building and pond will be planted to provide wildlife habitat and maintain connectivity.

4.34 As a result of the above measures, a total of 3961m^2, or 78%, of the Site will form vegetated habitats. This compares favourably to the existing coverage (at 3596ha or 71%), with habitat features specifically designed to replace existing habitats, provide enhanced habitat (including hedgerows and living roofs) and to maximise ecological connectivity through the gardens. Further information regarding the areas of habitats present within the existing Site and those proposed are presented in **Appendix 9**, demonstrating an increase in area and diversity of habitats.

4.35 Furthermore the proposed habitats have been designed with ecological input to ensure an increase in the quality of the habitats present which will be assured in the long-term by the development and delivery of a **Landscape and Habitat Management Plan** (recommended to be secured by Condition).

Enhancement

4.36 In addition to the above measures, it is proposed to enhance the pond for wildlife. The existing semi-natural marginal and scrub willow habitats around the north and east banks will be retained and enhanced with additional boundary planting (as above) and the creation of at least three log piles (measuring at least 1m long and wide, and 0.5m high) using logs sourced from on-site tree felling.

4.37 The pond will be further enhanced by selective coppicing or removal (cutting and stump treatment) of scrub vegetation on the south banks in particular, whilst retaining existing tree and scrub planting to provide screening from Plot 5. This selective clearance will allow more light in to the pond, which is currently overshaded around much of its margins, whilst also reducing leaf fall in to the water. The marginal habitats will be enhanced through the installation of pre-planted coir rolls along the banks. These will be planted with native wetland herbaceous and sedges/grass species. Vigorous, invasive species such as common reed and bulrushes will be avoided which may otherwise create a management issue and even threaten the open water habitats of the pond.

4.38 An additional wetland area will also be created to the south of the pond in the form of a rain garden taking runoff from Plots 1-3 to the pond. This will be planted with a range of native and ornamental species of known wildlife benefit (such as those identified in the Royal Horticultural Society Perfect for Pollinator plant lists[17]) specifically to accommodate the damp and shaded conditions at this location.

Bats

Discussion

4.39 Relevant legislation afforded to bats is detailed in **Appendix 1.**

[16] https://www.bauder.co.uk/solar-pv/biosolar-system
[17] https://www.rhs.org.uk/science/conservation-biodiversity/wildlife/plants-for-pollinators

4.40 The Site is immediately adjacent to extensive areas of semi-natural habitats within Hampstead Heath, including woodland and wetland habitats of high value for bats. The Site itself supports a mosaic of habitats of value for foraging and commuting bats as part of the wider area of high quality habitat provided by other private gardens and open spaces, as well as the Heath. Surveys identified particular activity along the scrub and tree lined boundary habitats and also over the pond. In total seven species/species groups were recorded. The Site is therefore of value to bats, although in the context of the wider habitats provided by Hampstead Heath and residential gardens, the Site provides a relatively small area of foraging and commuting habitat.

4.41 The proposals include the retention of the pond and north, south and west boundary habitats which will therefore continue to provide foraging and commuting habitats for bats. However, habitat loss within the remainder of the Site would reduce the area of foraging habitat available for bat species, and could reduce ecological connectivity through the Site.

4.42 There is also the potential for increased lightspill as a result of the proposals which can reduce the suitability of habitats for foraging and commuting, and also disrupt bat behaviour by altering invertebrate distribution. The current garden provides dark areas of habitat at night, with lightspill restricted to alongside Fitzroy Park and in the vicinity of the existing building. Should lightspill affect the pond or boundary habitats in particular, this could reduce the value of the Site for roosting bats. However, it should also be noted that as a residential area, there is currently lightspill in the wider area which will already impact on local bat populations and invertebrate distribution. In addition, the bat species recorded in the most part are less sensitive to light pollution, and will be habituated to some extent to light spill in the wider area. There is also extensive habitat suitable for bats in the wider area, associated with the Heath and other gardens, and therefore it would not be expected that increased lightspill on the Site would necessarily adversely impact on the conservation status of the local bat population.

4.43 In terms of impacts on roosting bats, no bat roosts have been confirmed within the Site including within the building. Ivy covered trees on the west Site boundary have potential to support roosts, although again no roosting was confirmed during surveys. However, given that bats may use numerous features on an occasional basis for roosting, or should there be a delay before works start, there remains a low risk of roosting bats being present during demolition and felling works, presenting the low risk of an illegal activity occurring as a result of damage/destruction to a shelter and killing and/or injury of bats (although the survey results suggest that even should this occur it would be restricted to low numbers of bats and would be unlikely to impact on the nature conservation status of bat species in the local area).

Mitigation

4.44 In terms of habitat loss, measures previously identified will ensure that foraging habitats continue to be provided for bats, including:

- Additional planting along north, south and west boundaries will reinforce these habitats as movement and foraging corridors, including planting of a more diverse range of native species;
- Native hedgerow, scrub and herbaceous planting, replacement orchard planting and flower-rich grassland will provide replacement foraging opportunities;
- Living roofs will provide additional areas of flower-rich habitat, providing foraging opportunities certainly unaffected by any lightspill;
- Enhancement of the pond habitats, increasing invertebrate prey.

4.45 Any external lighting will be restricted to strongly directional, downward angled lighting at the entrances to the properties with no other external lighting (such as along paths). This will limit areas lit to those which would be unlikely to provide foraging habitats, i.e. those closely associated with the buildings, and would prevent upward lighting of boundary and other habitat features.

4.46 Given the vicinity of Plot 5 to the pond, with approximately 3m between the building and pond edge, there is a greater risk of lightspill impacting this habitat feature. In terms of external lighting, this will be restricted to low height entrance lighting and therefore this will not impact the pond given that the lighting will be below the height of the retaining wall and downward angled.

However, there is a risk associated with internal lightspill from windows. This will be addressed through the following measures:

- Careful consideration of the rooms adjacent to the pond, with the main living space / reception rooms on the ground floor, with bedroom/study/bathroom on the second floor overlooking the pond. These would be expected to have lights on for a reduced time than reception rooms, whilst although bedrooms are more likely to be lit at night it would be expected that curtains/blinds would be drawn for privacy.
- Reducing the amount of window on the east elevaton of the building, and inclusion of fins, again to reduce lightspill;
- Retaining existing scrub/trees and additional native scrub planting along the western pond edge will provide screening.

4.47 Additional boundary planting will reinforce these retained habitat features for foraging and commuting bats. In particular planting along the western boundary will increase screening of the adjacent Millfield Lane and woodland edge habitats, maintaining a dark green lane feature as a flight line for bats.

4.48 In terms of the low risk of impact on roosting bats, given potential for occasional use of features, precautionary measures will be put in place to address this risk. For the building, features with potential to support roosting bats (namely roofing materials at the edges of the roofs) will be stripped by hand under the supervision of a licenced bat ecologist prior to full demolition. Should a bat or signs of bat be recorded, works will halt and the bat ecologist will advise how best to proceed, potentially including consultation with Natural England.

4.49 Prior to the felling of the trees with bat roost potential, the ivy will be cut at least one month prior to tree works allowing the ivy to die back. Immediately prior to felling, the tree will be carefully inspected for roosting bats.

Enhancement

4.50 Fifteen integrated bat boxes will be provided on the south and/or east elevations of the buildings (two for plots 1 and 2, three for plot 3 and four for plots 4 and 5). The exact models used will depend on the proposed building cladding.

Reptiles and Amphibians

Discussion

4.51 A single juvenile grass snake was recorded within the Site on one occasion. Records of common lizard in the vicinity were provided by GIGL, whilst grass snake are also known to be present on the Heath[18]. Legislation afforded to reptiles is summarised in **Appendix 1**.

4.52 Amphibian surveys of Hampstead Heath ponds[19] have recorded common frog, common toad and smooth newt, with palmate newt also identified in the vicinity within biological records provided by GIGL. Common toad and smooth newt were recorded during reptile surveys, and it is likely that common frog are also present. Although these species are not specifically protected, they include species identified as Species of Principle Importance in England and Local Species of concern. The absence of great crested newt was confirmed by eDNA sampling.

4.53 There is a low risk of reptiles species (in particular grass snake) roaming to the Site prior to works, and being killed or injured during construction. There is a high risk of harm to amphibians during works, particularly during clearance of sheltering habitat such as dense vegetation, debris and compost piles.

4.54 In terms of habitat loss, this could result in a decrease in terrestrial sheltering and foraging habitats for these species, although it is noted that there is an abundance of such habitats in the

[18] http://www.hampsteadheath.net/files/reptile-survey-of-hampstead-heath-2008-2009.pdf
[19] http://www.hampsteadheath.net/files/amphibian-report-main.pdf

vicinity of the pond and Site including the woodlands on the edge of the Heath and other gardens and open spaces.

4.55 The proposals present a risk of habitat severance for amphibian species in particular, with built development potentially restricting the movement of such species, including areas of hard standing as well as retaining walls.

4.56 Finally, there is a risk of contamination of the pond during and post construction which could impact on amphibian health.

Mitigation

4.57 In terms of the risk to reptiles and amphibians during works, an extensive destructive search will be undertaken with debris, compost piles etc. dismantled by hand. This will be supervised by ecologists, with any animals caught relocated to newly constructed log piles around the north edge of the pond (which will also provide replacement sheltering habitat for these species in the short-term prior to completion of the gardens). Exclusion fencing around the pond to prevent amphibians accessing the Site during works is not currently proposed as this could be more harmful in the longer term to the local amphibian population by preventing dispersal of animals to and from the pond, restricting breeding or the movement of young, whilst also impacting tree roots.

4.58 The risk of severance and restriction of animal movement has been addressed as above, with a range of landscape measures proposed to address this including hedgerow planting without the use of solid fencing, the reinforcement of boundary planting and the design and/or planting of retaining walls. In addition, the narrower pedestrian route to the south of the pond (replacing a previous proposal for a vehicle access route) will not pose a significant constraint to amphibian and reptile movements to and from the pond, whilst the rain garden which passes beneath a section of boardwalk provides a vegetated movement corridor for such species.

4.59 Mitigation proposed to address the risk of contamination has been described earlier and will be detailed within a drainage strategy and CMP.

Enhancement

4.60 The enhancement of the pond as previously described will result in enhanced aquatic habitat for amphibians, improving opportunities for breeding and foraging.

Birds

Discussion

4.61 Relevant legislation afforded to nesting birds is detailed in **Appendix 1.**

4.62 The Site is likely to support a number of common garden and woodland bird species for breeding and foraging, with use by rarer species unlikely given disturbance as a result of use and management of the gardens, including regular use by dogs.

4.63 During enabling works there is a risk of harm to nesting birds, their nests, eggs and young during removal of trees and scrub and also demolition of buildings.

4.64 Habitat loss may also reduce the available habitat for nesting and foraging species, whilst in the long term the more widespread disturbance associated with the five properties may reduce the abundance of nesting.

Mitigation

4.65 To avoid impacts any nesting birds, the removal of trees, scrub and buildings within the Site will be undertaken between September-February (inclusive) where possible to avoid the season during which birds are most likely to nest. Where clearance of suitable habitat, including building demolition works, is programmed during the bird breeding season (which is typically March to August inclusive) prior to works features will either be rendered unsuitable for nesting or a suitably qualified person will undertake a survey to determine whether birds are nesting in the

area. If an active nest is discovered, clearance or other construction works will be delayed within an exclusion zone. Works may only recommence once it is confirmed that chicks have fledged and that no active nests are present within the exclusion zone.

4.66 The habitat measures previously described will maintain opportunities for birds, including for nesting as well as foraging. In particular this will include hedgerow planting, reinforcement boundary planting, orchard replanting, and the creation of living roofs.

Enhancement

4.67 Additional nesting opportunities will be provided for house sparrow, a Species of Principle Importance for Nature Conservation in England and local priority species. This will comprise the incorporation of ten integrated bird nesting boxes within the new buildings, with two on each of the buildings located at the eaves of the north elevations.

Small Mammals

Description

4.68 Small mammals, including hedgehog (a Species of Principle Importance for Nature Conservation in England and local priority species) have been recorded in the vicinity and are likely to use the Site for foraging and shelter.

4.69 Many of the risks identified as for amphibians may apply to small mammals, including the risk of killing and injury associated with Site clearance works, habitat loss and severance.

Mitigation

4.70 The mitigation measures detailed for reptiles and amphibians will similarly address impacts on small mammals. Of particular importance is that plot boundaries will continue to allow the movement of small mammals through the Site, with the narrow pedestrian access route south of the pond and rain garden ensuring movements of small mammals through the Site are not impeded.

5 Conclusion

5.1 In conclusion, it is considered that the proposed development can be delivered whilst enhancing the value of the Site for wildlife.

5.2 The Site currently comprises a residential building and associated hardstanding along the eastern boundary, with a disused hard-surface tennis court in the west, and a mosaic of habitats forming a private garden including scrub, trees, ornamental beds, a pond and a small orchard. The value of the garden for wildlife is reduced given disturbance associated with its use and management, including regular access by dogs. Habitats of greater value within the site include a pond and associated marginal and scrub habitats (although its value is currently reduced due to overshading and siltation), an area of orchard which would likely meet the definition as a Habitat of Principle Importance in England, and scrub and treed Site boundaries.

5.3 Wherever possible impacts on more sensitive habitats has been avoided, with the retention of the pond and boundary habitats, and the majority of the orchard trees. Mitigation has been incorporated from the outset through the early provision of ecological input to the design development, with a number of landscaping proposals incorporated including (but not restricted to) using native hedgerows and areas of wildlife friendly planting to form plot boundaries whilst maintaining the openness of the Site, replanting of orchard habitats including flower-rich grassland habitats, reinforcement of boundary planting, and the creation of living roofs designed primarily to benefit wildlife (comprising meadow grassland).

5.4 In addition, a number of enhancement measures have been incorporated, including the enhancement of the pond's marginal habitats, creation of log piles and integration of bat roosting and bird nesting features within the proposed buildings.

5.5 As a result the proposals will result in an enhancement of the Site's ecology, providing a greater area, diversity and quality of vegetated habitats as demonstrated in **Appendix 9** and to be assured in the long-term by the development and delivery of a **Landscape and Habitat Management Plan** (recommended to be secured by Condition).

Appendix 1
Policy and Legal Considerations

Statutory nature conservation sites and protected species are a 'material consideration' in the UK planning process (DCLG 2012). Where planning permission is not required, for example on proposals for external repair to structures, consideration of protected species remains necessary given their protection under UK and EU law.

Natural England Standing Advice aims to support Local Planning Authorities decision making in respect of protected species (Natural England 2012). Standing advice is a material consideration in determining the outcome of applications, in the same way as any individual response received from Natural England following consultation.

The Conservation of Habitats and Species Regulations 2017 transpose the requirements of the European Habitats Directive (Council Directive 92/43/EEC) and Birds Directive (Council Directive 79/409/EEC) into UK law, enabling the designation of protected sites and species at a European level.

The Wildlife and Countryside Act 1981 (as amended) forms the key piece of UK legislation relating to the protection of habitats and species.

The Countryside Rights of Way Act 2000 provides additional support to the Wildlife and Countryside Act 1981; for example, increasing the level of protection for certain species of reptiles.

The Protection of Badger Act 1992 provides specific protection for this species.

The Wild Mammals Protection Act 1996 sets out the welfare framework in respect to wild mammals, prohibiting a range of activities that may cause unnecessary suffering.

Species and Habitats of Principal Importance for Conservation in England and Wales and priority habitats and species listed on the **Local Biodiversity Action Plans** (BAPs) are species and habitats which are targeted for conservation. The government has a duty to ensure that involved parties take reasonable practice steps to further the conservation of such species under **Section 41 of the Natural Environment and Rural Communities Bill 2006**. In addition, the Act places a biodiversity duty on public authorities who 'must, in exercising their functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity' (Section 40 [1]). Criteria for selection of national priority habitats and species in the UK include international threat and marked national decline.

The **National Planning Policy Framework** (Ministry of Housing, Communities and Local Government 2018) states that the planning system should minimise impacts on biodiversity, providing net gains in biodiversity where possible.

The **London Borough of Camden Local Plan (2017)** includes the following policies of relevance to wildlife:

Policy C1 Health and Wellbeing:

- Access to open space and nature – the benefits of open space are seen to be particularly important for physical exercise, relaxation and stress relief, reducing pollutants, cooling the urban heat island and providing areas for local volunteer groups and food growing (Policy A2 Open space). We will protect, maintain and enhance Camden's parks, open spaces and green corridors and seek to tackle deficiencies and meet increased demand for open space.

Policy A2 Open Space:

- Enhancing our green infrastructure - The term 'green infrastructure' refers to the network of green and open spaces, green features such as trees and green roofs and water bodies, such as the Regent's Canal, which taken together provide multiple quality of life benefits. There is a particular opportunity to continue improving links between open spaces to improve access for recreation and corridors which allow species to move between habitats. Schemes should contribute to the implementation of green infrastructure strategies (e.g. All London Green Grid) and wider strategies seeking to enhance green infrastructure, such as the Thames River Basin Management Plan.

Policy A3 Biodiversity:

- Assess developments against their ability to realise benefits for biodiversity through the layout, design and materials used in the built structure and landscaping elements of a proposed development, proportionate to the scale of development proposed.
- Secure improvements to green corridors, particularly where a development scheme is adjacent to an existing corridor.

Policy CC2 Adapting to Climate Change:

All development should adopt appropriate climate change adaptation measures such as:

- The protection of existing green spaces and promoting new appropriate green infrastructure;
- not increasing, and wherever possible reducing, surface water runoff through increasing permeable surfaces and use of Sustainable Drainage Systems;
- incorporating bio-diverse roofs, combination green and blue roofs and green walls where appropriate; and
- measures to reduce the impact of urban and dwelling overheating, including application of the cooling hierarchy.
- Any development involving 5 or more residential units or 500 sqm or more of any additional floorspace is required to demonstrate the above in a Sustainability Statement.

Key messages in the **Camden Planning Guidance, Biodiversity (Draft, 2017)** which supports the Local Plan are below:

A biologically diverse natural environment has an important role in economic prosperity, health and well being of Camden residents, workers and visitors.

Councils have a statutory duty to have regard to the purpose of conserving biodiversity, particularly where there are protected species and habitats

Proposals must demonstrate:

- *how biodiversity considerations have been incorporated into the development;*
- *how the five-point Mitigation Hierarchy has been addressed; and*
- *what positive measures for enhancing biodiversity are planned.*

Bats

All British species of bat are listed on the Wildlife and Countryside Act 1981 (as amended) Schedule 5. It is an offence to deliberately kill, damage, take (Section 9(1)) a bat; to intentionally or recklessly disturb a bat whilst it occupies a place of shelter or protection (Section 9(4)(b)); or to deliberately or recklessly damage, destroy or obstruct access to a bat roost (Section 9(4)(c)). Given the strict nature of these offences, there is an obligation on the developer and owner of a site to consider the presence of bats.

All British bats are listed on the Conservation of Habitats and Species Regulations 2017, Schedule 2. Regulation 41 strengthens the protection of bats under the 1981 Act against deliberate capture or killing (Regulation 41(1) (a)), deliberate disturbance (Regulation 41(1) (b))[1] and damage or destruction of a resting place (Regulation 41(1) (d)).

A bat roost is defined as any structure or place which is used for shelter or protection, irrespective of whether or not bats are resident. Buildings and trees may be used by bats for a number of different purposes throughout the year including resting, sleeping, breeding, raising young and hibernating. Use depends on bat age, sex, condition and species as well as the external factors of season and weather conditions. A roost used during one season is therefore protected throughout the year and any proposed works that may result in disturbance to bats, and loss, obstruction of or damage to a roost are licensable.

[1] Relates specifically to deliberate disturbance in such a way as to be likely to significantly affect i) the ability of any significant group of animals of that species to survive, breed or rear or nurture their young or ii) the local distribution of that species.

Application for a Natural England EPS Licence

Development works that may cause killing or injury of bats or that would result in the damage, loss or disturbance of a bat roost would require a Natural England (NE) Bat Mitigation Licence.

For a Mitigation licence to be granted three tests must be met. Evidence is needed to determine these three tests: whether there is a need for the development which justifies the impact on the European Protected Species (EPS); whether there is an alternative which would avoid the impact and need for an EPS licence; and whether mitigation proposed is sufficient to maintain the conservation status of the EPS in question.

A Mitigation Licence application will generally only be considered by NE on receipt of planning consent, and once any pre-commencement conditions of relevance to ecology have been discharged.

There are two licensing routes now available for bats, which comprise:

Full NE England EPS Mitigation Licence:

- NE aim to determine the application within six weeks (although this can take longer).
- The application comprises three components including an application form (broad details of the applicant, site and proposals); a detailed Method Statement providing the survey methods and findings, impact assessment and mitigation measures (including detailed maps and schedule of works); and a Reasoned Statement outlining the 'need' for the development and consideration of alternatives.

NE Low Impact Class Licence

- This new route provides an alternative, quicker route (with a much reduced application form, and a target of 10 days to determine an application).
- This Low Impact Class Licence is only available to Registered Consultants identified by NE.
- This is available for sites which support up to three low status roosts (day roosts, night roosts, feeding roosts and transitional roosts) of a maximum of three common species. The common species which can be covered by this licence include common pipistrelle, soprano pipistrelle, brown long-eared, whiskered, Brandts, Daubenton's and Natterer's bat.
- All licensed works require evidence that there is a need for the development and that appropriate mitigation, including seasonal constraints and provision of alternative habitat and/or roosting structures is considered.
- Before Natural England can confirm the site is registered and licensable works can commence, an assessment of the three tests must be undertaken by the Registered Consultant. Although this does not need to be submitted to NE, NE may subsequently undertake a review of the project and request to see all evidence as collected by the Consultant. This can only be undertaken following a survey and impact assessment which must be carried out in accordance with licence conditions and BCT survey guidelines.
- This licence cannot be used in relation to trees.

Several species of bat, including brown long-eared and soprano pipistrelle are listed as species of principal importance under the NERC Act (2006). Section 41 of the Act is used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty under section 40 of the Natural Environment and Rural Communities Act 2006, to have regard to the conservation of biodiversity in England, when carrying out their normal functions.

Reptiles

All UK reptiles and amphibians are legally protected from intentional and reckless killing and injury under the Wildlife and Countryside Act 1981 (as amended).

Great Crested Newt

GCN and their places of shelter are afforded the same level of protection subject to the same legislation as bats (see above).

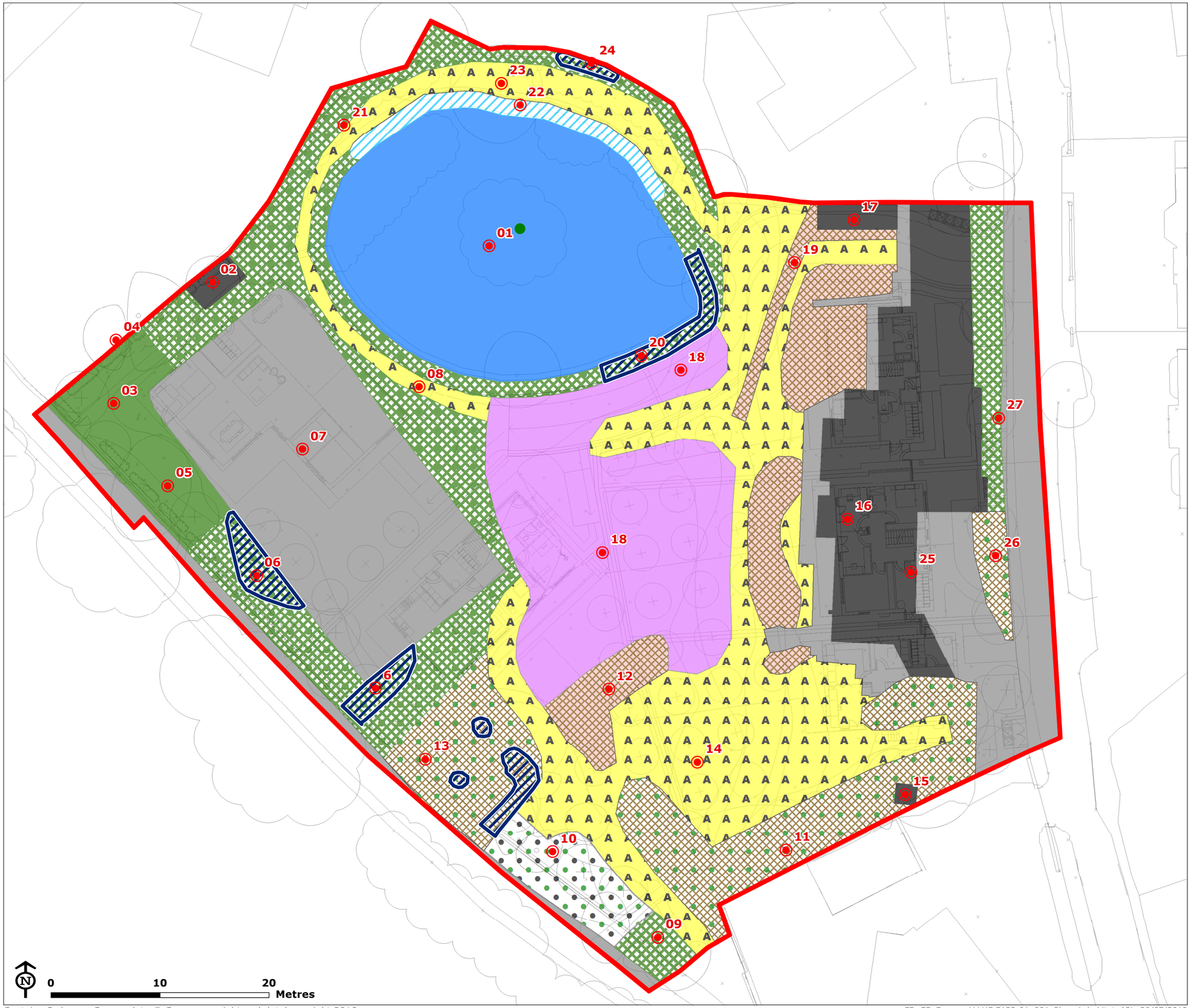
Nesting Birds

Birds and their nests are protected by the Wildlife and Countryside Act 1981 (as amended). This Act gives protection to all species of bird with regard to killing and injury, and to their nests and eggs with regard to taking, damaging and destruction. Certain species listed on Schedule 1 of the Act, are afforded additional protection against protection.

Appendix 2
Figures

55 Fitzroy Park: Ecological Appraisal

Figure 1 : Phase 1 Habitat Survey



- Survey boundary
- Target Note
- Japanese Knotweed
- Scattered tree
- Amenity grassland
- Bare ground/Broadleaved scattered trees
- Broadleaved woodland (semi-natural)
- Building
- Hardstanding
- Introduced shrub/Broadleaved scattered trees
- Introduced shrub/Ornamental planting
- Marginal and inundation - marginal vegetation
- Orchard/Amenity grassland
- Scrub (dense/continuous)
- Scrub (dense/continuous)/ Broadleaved scattered trees
- Standing water

Map Scale @A3: 1:340

LUC

CB: EB:Goosen_V LUC 7122-01_001_Phase1_habitat_A3L 30/07/2018

Source:

55 Fitzroy Park: Ecological Appraisal

Figure 2 : Bat Survey

SMP1

SMP2

Survey boundary

Building

Activity Surveys

SMP location

Emergence/Re-entry Surveys

Survey locations

Bat Roost Potential

Features with bat roost potential

High

Low

0 10 20 Metres

Map Scale @A3: 1:340

LUC

CB: EB:Goosen_V LUC 7122-01_004_BatSurvey_A3L 30/07/2018

Source: LUC

55 Fitzroy Park: Ecological Appraisal

Figure 3: Reptile Survey

Reptile refugia

Map Scale @A3: 1:340

LUC

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

CB: EB:Goosen_V LUC 7122-01_003_ReptileSurvey_A3L 30/07/2018

Source: LUC

Appendix 3
Bat Emergence/ Re-entry Surveys Results

Table A3.1: Weather Conditions and Sunrise/ Sunset Times for All Emergence and Re-entry Surveys (2017)

Survey Date	Survey Start	Survey End	Sunrise	Sunset	Wind[1]	Cloud Cover[2]	Rain[3]	Weather
13/07/2017	20.58	22.43	NA	21.13	2	7	0	Mild, humid, slight breeze and fairly cloudy 19°C
02/08/2017	3.55	5.40	5.25	NA	1	7	0	Mild, dry but muggy 14°C
15/08/2017	20.09	21.54	NA	20.24	2	1	0	dry, mild, slightly breezy

Table 5A3.2: Dusk Emergence and Dawn Re-entry Full Survey Results (2017)

Survey Date	Surveyor	Detector	Location	Time Observed	Species from Sonogram	Species from observation	No. bats	Seen/not seen (S/NS)	Activity Type (E/R/C/F)	Comments
	Amy C	Batbox het.	SW corner of main house	21.17		45 Pip	1	NS		Brief call
				21.25		45 Pip	1	NS		Brief call
				21.29		55 Pip	2	S	F	Bat observed circling round to feed for several minutes, then heading NE. Bat was foraging over the lawn and was joined by a second bat.
				21.42		45 Pip	1	S	C	Brief pass southwards
				21.47		55 Pip	1	S	F	Bat was foraging over the lawn (marked1 on map)
				21.51		55 Pip	1	S	F	Brief pass southwards
				21.55		45 and 55 Pip	2	S	F	2 bats flew from bushes in front of house (marked 2

										on map)
13/07/2017				21.58		55 Pip	1	S	F	Bat was circling above surveyor before heading NE
				22.04		55 Pip	1	S	F	Bat flew from trees/front of building southwards
				22.25		45 Pip	1	NS		
				22.27		45 Pip	1	S	C	Bat flew southwards from other side of house (to surveyor)
				22.33		45 Pip	1	NS		
	Rory G	Batbox duet het.		21.56		45 Pip	1	NS	C/F	Brief pass
				21.58		45 Pip	1	NS	C/F	Brief pass
				21.59		45 Pip	1	NS		Brief but close pass. Bat seemed to appear from trees, and it was hard to observe anything due to dense veg obscuring the view. Surveyor moved over slightly at this point.
				22.04		45 Pip	1	NS	F	Brief pass
				22.16		55 Pip	1	NS	C/F	Foraging pass
				22.18		55 Pip	1	S	C	Bat flew E to W from behind the surveyor and over and past the house
				22.22		55 Pip	1	NS	C	Very faint, brief pass
				22.23		45 Pip	1	NS	C	Very faint, brief pass
				22.26		45 Pip	1	NS	C/F	Brief pass
				22.31		55 Pip	1	NS	C/F	Brief pass but close
				22.32		45 Pip	1	NS	F	Feeding buzzes heard
				22.33		45 Pip	1+	NS	C/F	A few brief but close passes heard
				22.40		Pip	1	NS	C/F	Brief pass
				22.41		Noctule	1	NS	C/F	Strong "chops" heard as bat commuted past.

	Jess S	Batbox duet het/ Express #2	SE of ivy covered trees, in tennis court	21.19		55 Pip	1	S	C	Bat behind tree and flew from trees across tennis court
				21.33		45 Pip	1	S	F	Foraging over trees
				21.38		?	1	NS		very quiet call, bat not seen
				21.44		45 Pip	1	S	F	Bat foraging around tennis court
				21.47		45 Pip	1	S	F	Bat foraging around tennis court, and above trees
				21.50		55 Pip	2	S		bats following each other over the tree line
				21.53		45 Pip	1	S	F	Over treeline
				21.57		Pip	1	S	F	Over treeline
				21.58		Pip	1	S	F	Over treeline
				21.58		45 Pip	1	S	F	Over treeline
				22.00		Pip	1	S	F	Over treeline
				22.01		45 Pip	1	S	F	Over treeline
				22.01		45 Pip	1	S	F	Over treeline
				22.02		45 Pip	1	NS	F	
				22.03		Pip	3	S	F	Bats flying in all directions along tree line
				22.05		Pip	2	S	F	Bats flying in all directions along tree line
				22.08		45 Pip	1	S	F	Above tennis court
				22.11		45 Pip	1	S	F	Above tennis court
				22.12		Pip	1	S	F	Above tennis court
				22.14		45 Pip	1	S	F	Above tennis court
				22.16		Pip	2	S	F	Above tennis court
				22.18		Pip	3+	S	F	Constant foraging until survey ended
				22.42		Serotine?		NS		Pass heard
	Ben N	Batlogger	N of ivy covered trees, in	21.19		Noctule	1	S	C	Bat passed W to E across pond
				21.19		45 Pip	1	NS	F	

			tennis court	21.20		55 Pip	1	S	C	From trees, it then flew towards the house
				21.33		55 Pip	1	S	F	Bat flew over top of tree towards the house, possibly from over the pond?
				21.42		Noctule	1	S	F	Bat was observed flying high and twisting
				21.45		45 Pip	1	S	F	Bat foraging over the tennis court
				21.48		45 Pip	1	S	F	Bat foraging over the tennis court
				21.50		45 and 55 Pip	2	S	C	Bats chased each other towards the pond
				21.55		45 Pip	1	S	C/F	bat flew from east to west past tree
				21.58		45 Pip	1	S	F	Bat followed treeline
				22.02		45 and 55 Pip	2	NS	F	Constant foraging back and forth along treeline
				22.04		55 Pip	1	S	C	Bat flew towards the pond
				22.07		55 Pip	2	S	F	Foraging above tree top
				22.11		45 Pip	1	S	F	Constant foraging along treeline and over tennis court
				22.23		45 and 55 Pip, and Myotis sp.	3	NS	F	constant foraging possibly near pond and beyond Site boundary
				22.26		45 and 55 Pip	2	S	F	Constant foraging along treeline and over tennis court
				22.32		45 Pip	2	S	F	Bats circled by trees
				22.41		45 and 55 Pip, and Myotis sp.	2(?)	S	F	Along treeline
				22.42		Serotine?	1	NS	C	Brief call heard
	Charlotte B	Echometer	NW of Annex	21.19		Noctule?	1	NS	C	Very faint, brief pass

		touch/Batscanner het.	building, next to main house	21.42		45 Pip	1	S	C	Bat appeared over roof of annex and flew E to W overhead of surveyor and past
				21.45		45 Pip	1	NS	F	Feeding buzz heard close by surveyor
				21.51		55 Pip	1	S	C	Bat flew N to S across and above annex roof
				21.59		45 Pip	1	S	C/F	Bat flew N to S across garden directly behind surveyor
				22.00		45 Pip	1	NS	F	Bat heard feeding close to surveyor
				22.08		55 Pip	1	NS	F	Bat heard feeding close to surveyor
				22.08		45 Pip	1	S	F	Bat flew and was foraging E to W across annex roof and past surveyor
				22.14		45 Pip	1	NS	C	Brief pass
				22.15		55 Pip	1	S	F	Bat flew W to E past surveyor and back across annex roof, whilst feeding
				22.18		45 Pip	1	NS	C	Brief pass heard close to surveyor
				22.20		pip	1	NS	C	Bat heard close by surveyor at 43 Khz
				22.22		45 Pip	1	S	C/F	Bat flew S to N across annex roof
				22.24		45 and 55 Pip	2	NS	C/F	Continuous feeding buzzes and passes for a couple of minutes
				22.27		45 and 55 Pip	2	S	F	Passes with feeding buzzes over garden to S of surveyor
				22.30		45 Pip	1	NS	F	Continual foraging passes heard over garden behind surveyor
				22.34		45 Pip	1	NS	C/F	Close pass to surveyor

				22.35		pip	1	NS	C/F	A couple of passes close by surveyor at 43 kHz
				22.27		nathusius pip and 45 Pip	2+	NS	C/F	A couple of bats heard together near to surveyor foraging and passing
				22.39		45 Pip	1	NS	F	Bat heard close by surveyor, flying around garden behind?
	Becky T	Express #5/ Batbox duet het.	Facing NW corner of main house	21.55		45 Pip	2	S	C	Bats flew along house NW to SE towards SW corner of main house
				21.56		45 Pip	1	NS	C	Brief pass, possibly behind surveyor
				21.57		45 Pip	1	S	C	Bat flew along house S to N and over surveyor
				21.59		45 Pip	1	NS	C	Brief pass
				22.00		45 Pip	1	S	F	Bat flew W to E towards the house then northwards
				22.04		Pip	1	NS	C/F	
				22.05		55 Pip	2	S	C/F	one bat flew S to N, circled then flew westwards. The other flew southwards and was foraging behind surveyor and in front of house too.
				22.13		45 Pip	1	S	C/F	
				22.23		45 and 55 Pip	2	S	F	Foraging continued as before but with 55 Pip too until 22.36
				22.41		Noctule	1	NS	C	
02/08/2017	Amy C	Bat box duet	SW corner of main house	4.07		Pip	1	S	C	Brief pass towards the southeast
				4.17		Pip	1	S	C	passed behind surveyor, across garden north west to south of surveyor
				4.23		Pip 45	2	S	C	Bats appeared form east of main house and trees and flew south past surveyor

				4.27		Pip 45	1	S	C/F	bat flew southwards
				4.32		Pip 45	1	NS		
				4.39		Pip 55	2	S	C	Bats appeared from east of main house and trees and flew southwards
				4.42		Pip 55	1	S	F	Bat circled above surveyor
				4.48		Pip 45	1	NS	C/F	
				5.01			1	S	C	Bat flew north eastwards past corner of main house
				5.09		Pip 45	2	S	C	Bats flew north eastwards between trees
	Ben N	Batlogger	North of ivy covered tree in tennis court	4.03		Noctule	1	NS	F	Distant foraging heard
				4.03		Pip 45	1	S	F	bat passed, following tree line north to southwards
				4.08		Pip 55	1	NS	F	
				4.17		Pip 45	1	NS	F	
				4.18		Pip 45	1	S	F	Bat passed tree flying south to north above the tree canopy
				4.20		Pip 45	1	S	F	bat flew north to south past tree
				4.22		Pip 45	1	S	F	Bat foraged by trees and flew southwards
				4.24		Pip 45	1	S	F	Bat was observed foraging by the ivy covered tree to to the south
				4.26		Pip 45	1	S	F	Bat was continually foraging close to the ivy covered tree and around tennis court
				4.29		Pip 45	1	S	F	Bat flew above tree canopy towards the pond
				4.30		Pip 55	1	S	F	Bat flew above tree canopy towards the pond

				4.33		Pip 45	1	S	F	
				4.34		pip 45 and 55	2	S	F	Bats chased each other in a northwards direction
				4.38		pip 45 and 55	2	S	F	Bats passed surveyor and flew above the ivy covered tree and towards the pond
				4.40		Pip 55	1	S	F	Bat was foraging in north to south direction within the tennis court
				4.41		Pip 55	1	S	F	Bat passed surveyor in north to south direction
				4.45		Pip 55	2	S	F	
				4.48		Pip 45	1	S	F	Bat observed foraging around tennis court
				4.53		Pip 45	1	S	F	Bat foraged around ivy covered tree and tennis court
				4.55		Pip 45	1	S	F	
				4.59		Pip 45	1	NS	F	
				5.01		Pip 45	1	S	F	
				5.03		Pip 45	2	S	F	Bat foraged to the south of the ivy covered tree
				5.07		Pip 45	1	S	F	
				5.09		Pip 45	1	S	F	
				5.15		Pip 55	1	NS	C	
	Jess S	Batbox duet and zoom recorder	To south of ivy covered tree in tennis court	4.04		Pip 45	1	NS	F	
				4.07		?	1	NS	F	
				4.11		Pip 45	1	NS	F	
				4.14		Pip 45	1	NS	F	
				4.18		Pip 45	1	NS	F	
				4.20		Pip 45	1	NS	F	
				4.21		Pip 45	1	NS	F	
				4.24		Pip 45	1	S	F	Bat observed foraging above trees
				4.27		Pip	1	NS	F	
				4.28		Pip 45	1	NS	F	
				4.29		Pip 45	1	S	F	Bat observed foraging above trees
				4.32		Pip 45	1	NS	F	

				4.33		Pip	1	S	F	Bat observed foraging along tree line
				4.34		Pip 45	1	NS	F	Continual passes
				4.38		Pip 55	1	S	F	Bat observed foraging along tree line
				4.39		Pip 55	1	NS	F	
				4.40		Pip	2	S	C?/F	Bats observed flying and following each other along tree line
				4.41		Pip	1	S	F	Foraging above tennis court
				4.43		Pip	3	S	F	Several bats observed foraging along tree line and in particular around the ivy covered tree
				4.44		Pip 45	2	S	F	Bats observed flying and chasing each other along tree line
				4.48		Pip 45	1	NS	F	
				4.51		Pip 55	1	S	F	Foraging above tennis court
				4.54		Pip 45	2	S	F	Bats observed foraging around ivy covered tree
				5.01		?	1	S	C	bat flew northwards across tennis court, but no echolocation picked up
				5.02		Pip 45	1	S	F	Bat observed foraging along tree line
				5.07		Pip 45	2	S	F	Foraging above tennis court
				5.09		Pip 45	2	S	F	Bats observed foraging along tree line
				5.11		Pip		NS		Brief calls heard
	Rory G	Petterson het.	Front of main house	4.01		Pip 45	1	NS	C	Brief quiet pass
				4.11		Pip 55	1	NS	C	Brief pass
				4.17		Pip 45	1	NS	C	Brief quiet pass
				4.23		Pip 55	1	NS	C	Brief quiet pass

				4.27		Pip 45	1	NS	C	Two brief passes in succession
				5.13		Pip 45	1	S	F	Bat flew over the top of the southern half of main house, brief pass with feeding buzz heard.
	Nick B	Batbox het.	NW corner of main house	4.07		Pip		NS	C	Brief quiet pass
				4.27		Pip 45		NS	C/F	
				4.43		Pip 45		NS	F	
				4.44		Pip 45		NS	C	
				4.48		Pip 45	1	S	C	Bat flew past SW corner of main house towards the south/south east
				4.49		Pip 45	1	S	F	Bat flew north westwards across gardens/trees
				4.51		Pip 45	1	S	C	Bat flew westwards over roof top
				4.54		Pip 45	1	NS	C/F	
				5.13		Pip 45	1	S	C	Bat flew from SW corner of main house towards trees/ garden
	Pete L	SSF Bat 2	North end of building (by annex)	4.00		Pip	1	NS	F	First bat pass, then occasional foraging passes of Pip 45 & 55 throughout survey
				4.20		Noctule?	1	NS	F?	Single brief pass
				4.25		Pip 45	1	S	C	Bat flew over building and through site in straight line from SE to NW towards neighbouring property/Heath?
				4.38		Pip 45	1	S	C/F	Bat observed flying northwards over building to neighbouring property, and heard to briefly forage, with further foraging around neighbours mature tree on Site boundary at around 4.45

				4.58		Pip 45	1	S	F	Bat observed foraging around mature tree in Neighbours property on North boundary of site and across to gardens / property to east. Last pass at approx. 5.05
15/08/2017	Charlotte B	Express #3/Batscanner het.	SW corner of main house	20.32		45 pip	1	NS	C	Heard to west of surveyor, over garden
				20.34		noctule	1	NS	C	Heard to west of surveyor, over garden
				20.36		45 pip	1	S	C	Bat flew over from neighbouring property in the south and across the garden to the west
				20.37		45 pip	1	NS	C	
				20.41		45 pip	1	NS	C	Brief pass close by
				20.45		55 pip, 45 pip	2	NS	F	Bats heard in amongst garden trees
				20.47		55 pip	1	S	F	Bat observed to west of surveyor near garden trees
				20.51		45 pip	1	S	F	Bat circled above garden lawn and surveyor, feeding heard
				20.52		45 pip	1	NS	F	Bat heard foraging over garden to west of surveyor
				20.54		55 pip	1	S	F	Bat observed foraging and flying next to west facing side of main house
				21.00		55 pip	1	S	F	Bat observed foraging over garden lawn and above surveyor
				21.02		55 pip	1	S	F	bat flew behind surveyor towards garden trees form neighbours trees to south of Site
				21.05		45 pip	1	S	F	as above

				21.08		45 pip	1	S	F	Bat observed flying above surveyor and tree canopy to south of Site
				21.11		noctule	1	NS	C/F	Brief pass close by
				21.17		45 pip	1	NS	F	Bat heard foraging over garden to west of surveyor
				21.18		55 pip	1	NS	F	Bat heard foraging over garden to west of surveyor
				21.24		45 pip	1	NS	F	Bat heard foraging over garden to west of surveyor
				21.26		45 pip	1	S	F	Bat heard flying and feeding around SW corner of main house
				21.33		pip	1	NS	C/F	Brief pass close by, echolocating at 43Khz
				21.37		BLE?	1	NS	C?	Very brief pass, echolocation at 30Khz
	Veni	Express #5/Batbox duet het.	NW building	20.42		pip		NS		
				20.58		pip		NS		
				21.11		pip	1	S	C	Bat flew from west to east
				21.19		pip		NS		
				21.22		45 pip		NS		
				21.28		55 pip		NS		
				21.32			1	S	F	Bat observed foraging and circling low
				21.38				NS		
				21.42				NS		
	Ben N	Batlogger	By ivy covered tree	20.28		55 pip	1	S		Bat flew from the north towards the survey tree
				20.33		55 pip	1	NS	F	Distant foraging heard
				20.34		noctule	1	S	F	Bat flew from the north towards the pond

20.37		55 pip	1	S	F	Bat observed flying from stand of trees by pond, over the surveyorand tree to forage around the tennis court area
20.42		45 pip	1	S	F	Bat passed from behind the surveyor towards the surveyed tree
20.48		Myotis sp.	1	S	F	Bat passed between surveyed tree and scrub to the north
20.51		55 pip	2+	S	F	Bats chasing each other going southwards
20.53		45 pip	1	S	F	around tennis court area
20.57		55 pip	1	S	F	Foraging near surveyor and by surveyed tree
20.59		55 pip and Myotis sp.?	2	S	F	More than two bats, flew from north to south
21.04		55 pip	1	S	F	foraging around tennis court area
21.06		45 pip	2	S	F	Foraging above the tennis court and along tree line
21.11		noctule	1	NS	F	Foraging nearby
21.14		45 pip, 55 pip	2	NS	F	Constant foraging nearby
21.20		45 pip	2	NS	F	Constant foraging nearby
21.22		BLE?, 45 pip	2	S	F	BLE foraged close to surveyor
21.26		BLE?	1	S	F	Bat passed and flew towards other tree surveyor (Jess)
21.29		BLE?, 45 pip	2	S	F	Around tennis court area, and close to scrub
21.34		45 pip	1	NS	F	Constant foraging nearby
21.38		45 pip, 55	2	NS	F	foraging nearby

						pip				
				21.41		BLE	1	S	F	Nearby surveyor and tree line
				21.45		45 pip, Myotis sp.	2	S	F	
				21.51		55 pip	1	NS	F	
	Jess S.	Express #4/Batbox and zoom recorder	By Ivy covered tree , tennis court	20.28		pip	1	NS		Distant brief call heard
				20.33		?	1	NS	F	Distant foraging heard
				20.34		noctule	1	S	C	Bat flew high overhead towards the Heath (park)
				20.37		45 pip	1	S	F	From direction of park into the garden close to surveyed tree
				20.38		pip	1	S	F	From direction of park into the garden close to surveyed tree, poss nathusius? (low 40Khz)
				20.42		45 pip	1	NS	F	
				20.43		45 pip	1	S	F	foraging around tennis court area
				20.49		45 pip	1	NS	F	
				20.50		pip	1	S	F	foraging around tennis court area
				20.51		pip	2	S		Two bats observed chasing each other
				20.53		pip	1	S	F	foraging around tennis court area, poss a nathusius? (40Khz)
				20.53		45 pip	1	S	F	Foraging around tennis court area
				20.57		45 pip	1	S	F	Foraging around tennis court area
				20.58		pip	3	S	F	Three bats seen chasing each other and foraging (poss 55 and 45 pip?)
				21.01		?	1	S	F	foraging around tennis court area

				21.04		BLE?	1	S	F	Foraging around tennis court area
				21.06		pip	2	S	F	Foraging and chasing each other around tennis court area
				21.07		45 pip	1	S	F	foraging around tennis court area
				21.10		45 pip	1	NS	F	
				21.13		45 pip	1	NS	F	
				21.17		45 pip	1	NS	F	
				21.19		45 pip	1	S	F	foraging around tennis court area
				21.21		45 pip	3	NS	F	continual foraging of 2 to 3 bats above and around surveyor
	Peter L.	SSF Bat2	west/ middle of main building	20.47		55 pip	1	S	C	Bat flew from pond and past house
				20.51		45 pip, 55 pip	2	S	F	Foraging around garden close to surveyor
				21.09		45 pip		NS	F	occasional distant passes
				21.20		45 pip,55 pip		NS	F	occasional distant passes throughout survey, most likely from around pond where constant foraging taking place
				21.51		45 pip		NS	F	Single pass

Appendix 4

Bat Activity Survey Results – Static Monitoring

Table A4.1: Weather Conditions and Sunrise/ Sunset Times for All Static Monitoring Nights (2017).

Date	Sunrise	Sunset	Min Temperature (night)	Max Temperature (night)	Weather Conditions (night)
26/05/2017	04.54	21.03	13°C	16°C	Dry, moderate- gentle breeze, mild.
27/05/2017	04.53	21.04	10°C	16°C	Dry, gentle breeze, mild.
28/05/2017	04.52	21.05	14°C	18°C	Brief heavy rain, gentle breeze, mild.
29/05/2017	04.51	21.06	14°C	18°C	Brief light rain, gentle breeze, mild.
30/05/2017	04.50	21.07	12°C	18°C	Dry, gentle breeze, mild.
31/05/2017	04.50	21.09	12°C	18°C	Dry, light breeze, mild.
27/06/2017	04.45	21.23	15°C	16°C	Dry, light breeze, mild.
28/06/2017	04.46	21.23	11°C	14°C	Dry, gentle breeze, mild.
29/06/2017	04.47	21.23	13°C	16°C	Dry, gentle breeze, mild.
30/06/2017	04.48	21.22	14°C	18°C	Dry, gentle breeze, mild.
01/07/2017	04.48	21.22	16°C	18°C	Dry, gentle breeze, warm.
02/07/2017	04.48	21.22	14°C	18°C	Dry, gentle breeze, mild.
03/07/2017	04.49	21.21	12°C	19°C	Dry, light breeze, mild.
04/07/2017	04.50	21.21	14°C	20°C	Dry, light breeze, mild.
05/07/2017	04.51	21.20	18°C	20°C	Dry, gentle breeze, warm.
06/07/2017	04.51	21.20	17°C	23°C	Dry, gentle breeze, warm.
02/08/2017	05.26	20.48	15°C	18°C	Light drizzle, moderate breeze, warm.
03/08/2017	05.57	20.46	15°C	17°C	Dry, gentle breeze, mild.
04/08/2017	05.29	20.44	14°C	18°C	Dry, light breeze, mild.
05/08/2017	05.31	20.43	9°C	15°C	Dry, light breeze, cool.
06/08/2017	05.32	20.41	12°C	16°C	Dry, light breeze, mild.
07/09/2017	06.23	19.34	14°C	17°C	Very brief light rain, gentle breeze, mild.
08/09/2017	06.25	19.31	9°C	14°C	Very brief light rain, light breeze, cool.
09/09/2017	06.26	19.29	7°C	13°C	Dry, light breeze, cold.
10/09/2017	06.28	19.27	11°C	16°C	Brief rain at start, moderate breeze, cool.
11/09/2017	06.30	19.25	10°C	15°C	Brief rain and thunderstorms, moderate breeze, cool.

Table A4.2: Anabat Express Data for SMP1 (May 2017)

Row Labels	Daub	Leislers	Myotis	Natterer	Noctule	Pip.sp.	Pip45	Pip55	Pipsoc	Grand Total
26/05/2017							11	2	3	16
27/05/2017		1	2	1	5		142	2	4	157
28/05/2017	1				3		149	7	6	166
29/05/2017						1	75	35		111
30/05/2017					1		136	3		140
31/05/2017					1	1	122	7		131
01/06/2017	2						80	1		83
Grand Total	**3**	**1**	**2**	**1**	**10**	**2**	**715**	**57**	**13**	**804**

Table A4.3: Anabat Express Data for SMP1 (June 2017)

Row Labels	Daub	Myotis	Noctule	Pip.sp.	Pip45	Pip55	Grand Total
27/06/2017		2			1		3
28/06/2017	206		1	4	149	50	410
29/06/2017	164		1		153	88	406
30/06/2017	282		4	5	138	139	568
Grand Total	**652**	**2**	**6**	**9**	**441**	**277**	**1387**

Table A4.4: Anabat Express Data for SMP1 (July 2017)

Row Labels	BLE	Daub	Leisler	Myotis	Noctule	Nyctalus	Pip.sp.	Pip45	Pip55	Grand Total
01/07/2017		247		26	1			75	139	488
02/07/2017		102	2	15	3		4	163	117	406
03/07/2017		157		26	2		11	110	102	408
04/07/2017	1	112		13		1	1	80	68	276
05/07/2017		8		1				1		10
Grand Total	**1**	**626**	**2**	**81**	**6**	**1**	**16**	**429**	**426**	**1588**

Table A4.5: Anabat Express Data for SMP1 (August 2017)

Row Labels	Daub	Leisler	Myotis	Noctule	Pip.nath	Pip.soc.	Pip.sp.	Pip45	Pip55	Grand Total
03/08/2017	114	1	151			4	2	378	20	670
04/08/2017	31	1	42	4		2	6	308	33	427
05/08/2017	48		53	1		13	7	398	43	563
06/08/2017	62		36	1	1	3	1	317	9	430
07/08/2017	43		11	1		1		73	3	132
Grand Total	**298**	**2**	**293**	**7**	**1**	**23**	**16**	**1474**	**108**	**2222**

Table A4.6: Anabat Express Data for SMP1 (September 2017)

Row Labels	Daub	Myotis	Noctule	Pip.nath	Pip.soc	Pip45	Pip55	Grand Total
07/09/2017					5	278	7	290
08/09/2017	23	10		1	21	157	212	424
09/09/2017	41	22	1		11	281	304	660
10/09/2017	55	23	1		7	211	159	456
11/09/2017	47	5			16	125	133	326
12/09/2017	91	3					12	106
Grand Total	**257**	**63**	**2**	**1**	**60**	**1052**	**827**	**2262**

Table A4.7: Anabat Express Data for SMP2 (May 2017)

Row Labels	Leislers	Myotis	Noctule	Nyctalus	Pip.sp.	Pip45	Pip55	Pipsoc	Grand Total
26/05/2017	2					104	26	6	138
27/05/2017			9		1	143	108	27	288
28/05/2017			10		4	92	57	17	180
29/05/2017			1	1		71	21	9	103
30/05/2017		2	4			61	57	11	135
31/05/2017	1	1	2			156	69	5	234
01/06/2017						25	9	3	37
Grand Total	**3**	**3**	**26**	**1**	**5**	**652**	**347**	**78**	**1115**

Table A4.8: Anabat Express Data for SMP2 (June 2017)

Row Labels	Daub	Myotis	Noctule	Nyctalus	Pip.soc.	Pip.sp.	Pip45	Pip55	Grand

									Total
28/06/2017	2	1			2	1	69	38	113
29/06/2017	2	2	3				48	58	113
30/06/2017	4		4	2	7	1	43	132	193
Grand Total	**8**	**3**	**7**	**2**	**9**	**2**	**160**	**228**	**419**

Table A4.9: Anabat Express Data for SMP2 (July 2017)

Row Labels	Daub	Leisler	Myotis	Noctule	Nyctalus	Pip.nath	Pip.soc.	Pip.sp.	Pip45	Pip55	Grand Total
01/07/2017	2		3		1		2		87	105	200
02/07/2017	2	2	1	3	1		5	1	93	171	279
03/07/2017	3		2	3		1	8	4	42	203	266
04/07/2017	4		7	1		6	6	1	38	126	189
05/07/2017	2		2	1		2	4	2	68	185	266
06/07/2017	2		3		1	1	4	3	192	250	456
07/07/2017	2		1		2		2	1	43	18	69
Grand Total	**17**	**2**	**19**	**8**	**5**	**10**	**31**	**12**	**563**	**1058**	**1725**

Table A4.10: Anabat Express Data for SMP2 (August 2017)

Row Labels	Daub	Leislers	Myotis	Noctule	Nyctalus	Pip.nath	Pip.soc.	Pip.sp.	Pip45	Pip55	Grand Total
02/08/2017			5			1	9		90	10	115
03/08/2017		1	1				17		59	15	93
04/08/2017		1	1	3		1	56	3	82	24	171
05/08/2017		1		2		2	37		33	17	92
06/08/2017	1	1	3	1	1		17		26	3	53
07/08/2017			1		1	2	11		2	3	20
Grand Total	**1**	**4**	**11**	**6**	**2**	**6**	**147**	**3**	**292**	**72**	**544**

Table A4.11: Anabat Express Data for SMP2 (September 2017)

Row Labels	BLE	Daub	Leislers	Myotis	Noctule	Pip.nath	Pip.soc.	Pip.sp.	Pip45	Pip55	Grand Total
07/09/2017			1	1	2	2	10		520	83	619
08/09/2017		1			6	3	5	1	423	52	491

09/09/2017		3		1	1	6	24		33	42	110
10/09/2017	2		1	1	2	4	6	1	126	21	164
11/09/2017	1	1		2		6		1	8	27	46
12/09/2017				1		1	1			5	8
Grand Total	**3**	**5**	**2**	**6**	**11**	**22**	**46**	**3**	**1110**	**230**	**1438**

Appendix 5

Reptile Refugia Survey Results

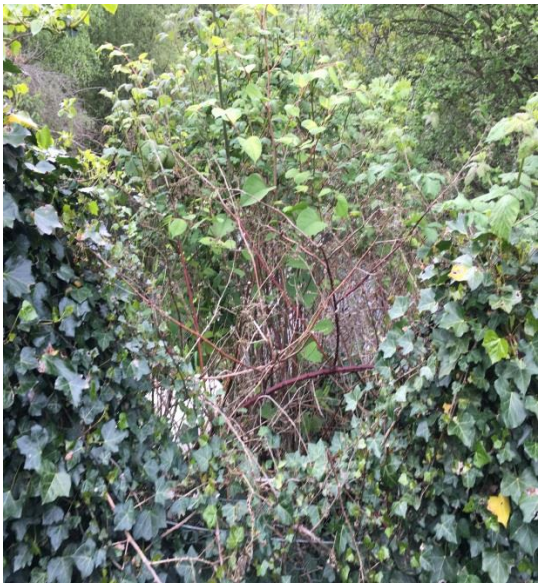
Visit	Date	Surveyor	Start time	Temperature	Weather	Amphibians	Reptiles	Location
1	03/07/17	Rory G	11.00	18°C	Damp, humid, had been raining prior to survey	0	0	N/A
2	13/07/17	Charlotte B	20.15	19°C	Dry, humid.	0	0	N/A
3	18/07/17	Charlotte B	9.30	19°C	Dry, humid, cloudy	1 Common toad *Bufo bufo* (Juvenile)	0	Refugia number 8 in Pond section, next to gate west side
4	30/08/17	Rory G	17.00	12°C	Cloudy, light drizzle, rain all day prior to survey, wet ground	2 Toads (1 juv. 1 adult)	1 juvenile grass snake	6th refugia along from the left, pond section
5	07/09/17	Rory G	11.00	16°C	Warm, 80% cloud cover, slightly damp ground, no breeze	1 Common Toad *Bufo Bufo* (1 juv.) 1 Smooth Newt (*Lissotriton vulgaris*)	0	Toad found under the 2nd refugia from the right (north side of pond). Newt found 2nd refugia from the left (north side of pond)
6	12/09/17	Charlotte B	8.00	10°C	Dry, overcast	0	0	N/A
7	19/09/17	Charlotte B	10.00	10°C	Dry, overcast, humid	1 Common toad *Bufo bufo* (juvenile)	0	Refugia number 8 in pond section, next to gate west side

Appendix 6
GCN eDNA Survey Results

Appendix 7
Phase 1 Habitat Survey – Target Notes

Peter Lawrence, 26th May 2017

Target note	Description	Photographs
1	A pond situated within the North of the Site. Nesting Canada geese *Branta canadensis*, moorhen *Gallinula chloropus*, coot *Fulica atra* were observed. The banks were heavily shaded by adjacent willow *Salix sp.*, occasional silver birch *Betula pendula* and dense scrub. A single willow had formed an island in the centre of the pond. No aquatic vegetation visible, marginal on bank (very little in water) including *Iris sp.* and greater pond sedge *Carex riparia*.	
2	Wooden shed with shiplap boarding and a bitumen-lined roof. Very draughty and open. Occasional gaps under roofing felt with cobwebs and debris. Shed very over shaded. **Negligible bat roost potential**.	
3	Semi natural broadleaved woodland. Canopy continuous with ivy *Hedera helix*, willow and sycamore *Acer pseudoplatanus.* The understorey is comprised of bramble *Rubus fruticosus* agg. and elder *Sambucus nigra* scrub. The ground storey was comprised predominantly of dense ivy cover with bramble and ash *Fraxinus excelsior* regeneration. Rare recordings comprised of Lords and Ladies (*Arum maculatum),* Wood Avens *Geum urbanum* and large bindweed *Calystegia silvatica*. Mammal trails observed (most likely fox).	
4	Overhanging ivy covered *Eucalyptus sp*. Thin covering of ivy and semi mature trees. **Negligible**	

	bat roost potential.	
5	One ivy covered semi natural Sycamore and one Walnut *Juglans regia*. Given size and density of ivy cover this tree was classified as having **high bat roost potential**.	
6	Stand of japanese knotweed *Fallopia japonica.*	
7	Overgrown hard standing tennis court. Vegetation was predominantly yorkshire fog *Holcus lanatus* and bryophytes. Frequent species included creeping thistle *Cirsium arvense,* cat's ear *Hypochaeris radicata* and herb robert *Geranium robertianum*. Locally frequent bramble was recorded, with occasional elder, sycamore and silver birch regeneration also observed.	
8	Linear scrub encompasses the southern site boundary, tennis courts and the northern pond. Willow was the dominant species recorded, with occasional hazel *Corylus avellana,* young ash and elder. Holm oak *Quercus ilex* and ornamental holly *Ilex sp.* were rare recordings. Mature ivy dominated the ground flora and was forming scrub.	
9	Dense scrub and large hazel bush.	
10	An area used for composting and garden storage dominated by bare ground with occasional areas of ornamental bushes (*Euonymus sp.* and *Laburnum sp.*) and two mature conifers.	
11	Introduced scrub along the southern boundary with a canopy of mixed mature ornamental bushes including *Choisia sp.*, bay *Laurus nobilis*, yew *Taxus baccata,* hazel, lilac *Syringa vulgaris*, Rose of	

	Sharon *Hibiscus sp.*, *Camellia sp.* and butterfly bush *Buddleja*. Herbaceous planting included *Geranium spp.*, garden forget-me-not *Myosotis sp.*, spanish bluebell *Hyacinthoides hispanica*, elephant ears *Bergenia spp.* and ground elder *Aegopodium podagraria*, herb robert, hedge mustard *Sisymbrium officinale*, common nettle *Urtica dioica* and wood avens.	
12	As above with further species including privet *Ligustrum sp.,* michaelmas daisy *Aster amellus*, *Sedum spectabile*, ornamental *Iris*, *Geranium spp.*, peony *Paeonia sp*., and cowslips *Primula veris*.	
13	Mature ivy-covered ash. Given that the ivy obscures the view of any potential features, the maturity of the tree and the likelihood of the tree exhibiting features, it is classified as having **high bat roost potential.**	
14	Amenity grassland dominated by perennial rye grass *Lolium perenne*. Frequent species included white clover *Trifolium repens,* common daisy *Bellis perennis*, and plantain *Plantago sp*.	
15	Small wooden shiplap boarded shed. Overlapping boards with cobwebs and gaps under roofing felt. **Negligible bat roost potential**. A cavity was recorded underneath the shed. Could have been a rotten stump, or dug out by resident dogs.	
16	Western aspect of the residential property. Predominantly flat-roofed sections with a slate tiled extension at rear. Flat roofed sections with metal capped parapets/edges and areas with roofing felt. Localised gaps at edges may provide access for bats although much of the roofing felt appears in good condition. Slated sections have gaps at ends, near the guttering, which may allow bats access. Blue tits were observed nesting in Southern part. Potential gaps also under barge board. Northern parts of the parapets were capped with corner slabs. These appeared to be tight fitting, although rear balcony has possible gaps under barge board. Northern most single storey extension. Roofing felt seen to be in good condition along the edges. Any potential access to cavities along the eaves was blocked by guttering. Single potential entrance to soffit.	
17	Glasshouse.	

18	Orchard. Comprised of apple *Malus sp.,* pear *Pyrus sp.* and cherry. Further apple and pear trees observed near the pond. Mature trees but no cavities observed, trunks and branches were small in diameter, therefore these trees classified as having **negligible bat roost potential**.	
19	Ornamental bed and ivy covered concrete retaining wall.	
20	One large stand of japanese knotweed at eastern end of pond with scattered stems extending around the southern side within dense rose *Rosa* bush.	
21	Dense scrub down by willow including around pond edge. A large fallen willow with numerous split limbs and raised bark was observed. Deemed as to having **high bat roost potential**.	
22	Large section of north pond bank supports dense greater pond sedge with occasional *Iris*.	
23	Large willow with previously pruned limbs. Light ivy cover on lower half. Appears to be in good condition, therefore considered as having **negligible bat roost potential**.	
24	Japanese knotweed along site boundary.	

25	Dense ivy cover on front of the house. Roofing felt at edge with some raised areas and parapet with metal capping loose by garage entrance, therefore this building is classified as having **high bat roost potential**. Garage has plastic roofed extension with **negligible bat roost potential**.	
26	Ornamental beds either side of entrance drive include jasmine *Jasminum sp*., *Choisia sp.*, cherry *Prunus sp*., holly, lilac *Syringa vulgaris*, butterfly bush *Buddleja* and *Fuchsia sp*.	
27	Dense scrub in raised bed with retaining wall. Dominant species was ivy, with occasional to rare ash, sycamore, *Pyracantha sp.*, rose *Rosa*, and butterfly bush *Buddleja* also recorded.	

Appendix 8
Draft Japanese Knotweed Management Plan

Site Report and Management Plan for Control & Eradication of Japanese Knotweed for LUC

At

55 Fitzroy Park

Hampstead Heath

Highgate

Survey carried out by

Dan Webber

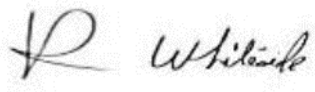
Assessment & Report prepared by

Dan Webber

Cost & Report signed off by

Peter Whiteside

Signed



Date: 09.05.18

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1. INTRODUCTION

1.1 General Site History

The site consists of a residential property with gardens and a pond.

1.2 Proposed Use

Housing development.

1.3 Knotweed History

The presence of Knotweed on site was noted by client. Knotweed has been known to be present on this site for a number of years but no treatment in known to have taken place.

1.4 Elcot Environmental (E.E.) Involvement

Peter Lawrence of LUC invited E.E. to carry out a site survey to assess for and provide a cost effective Knotweed Management Plan that would enable construction to proceed on program, and in the longer term, a warranted eradication of Knotweed.

2. SURVEY AND REPORT

2.1 Site Visit

Dan Webber of E.E. visited the site on 26.04.18 and collected information as set out below.

2.2 General Observations

Site was secure to vehicular and pedestrian access.

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2.3 Site Wide Check

For the interpretation of the term 'site', 'surrounding areas' and 'Knotweed locations', for the purpose of this report see following marked up sketch or drawing, which is for reference purposes only, not for setting out.

The whole of the site was accessible and checked, together with relevant surrounding areas.

This check is sufficient to provide the following site wide Management Plan on a fixed price basis.

2.4 Knotweed Location

Area No	Max visible m^2	Status	Estimated below ground m^3	Treatment Method
1	24 m^2	Well established JK growing around pond bank. Growing in tree protection area.	72 m^3	Part excavation
2	16 m^2	Well established JK growing around pond bank. Growing in tree protection area.	-	Treatment only (excavate on edge of area if needed for retaining wall).
3	8 m^2	Well established JK growing along boundary fence. Growing in tree protection area.	-	Treatment only
4	60 m^2	Well established JK growing alongside old tennis court	168 m^3	Excavation
5	120 m^2	Well established JK growing on corner of old tennis court. Growing in and around protected tree area.	-	Treatment only (excavate on edge of area if needed for retaining wall).
6	6 m^2	Well established JK growing on corner of old tennis court on sloping bank. Growing in tree protection area.	50 m^3	Part excavation
7	3 m^2	Established JK growing in flower bed in lawn area.	42 m^3	Excavation

Most likely volume of controlled waste from proposed managed dig 332m^3
With estimated parameters from 249 – 416 m^3

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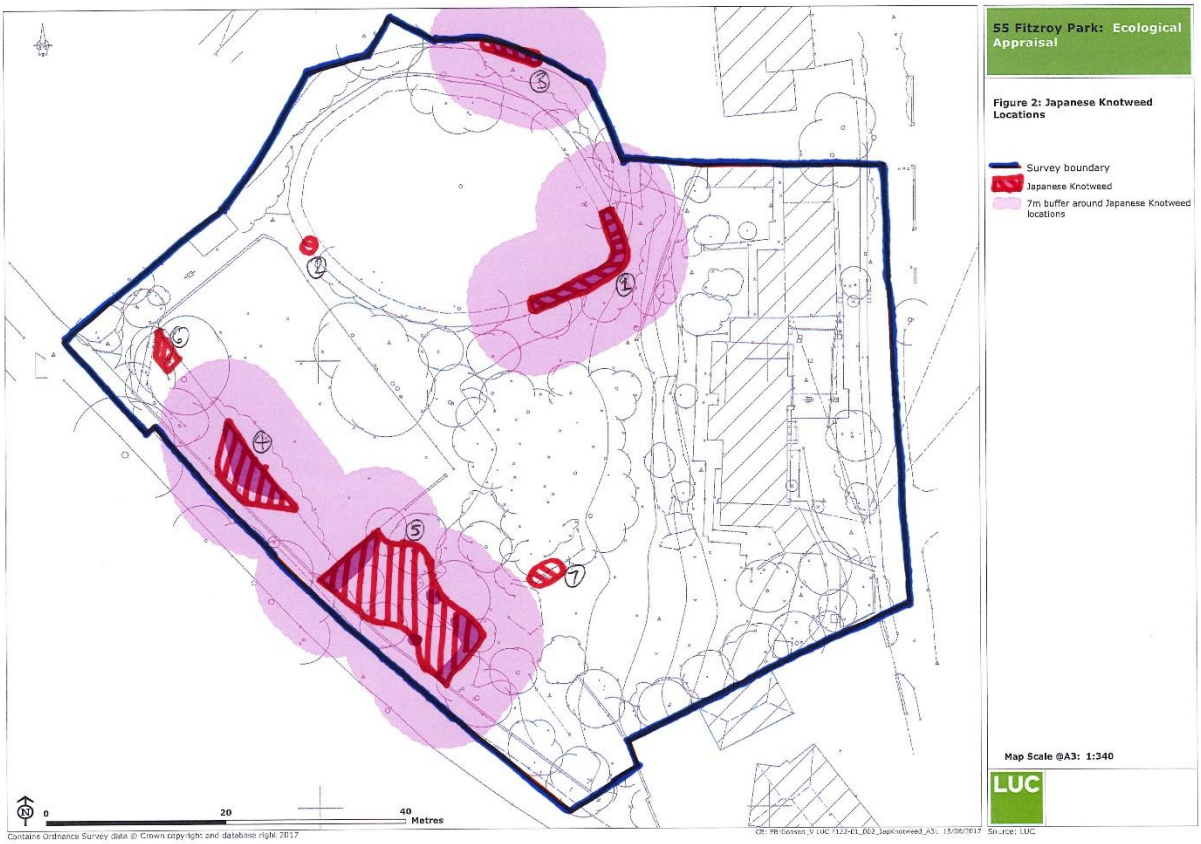
Knotweed Location Plan



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3. ASSESSMENT AND CONCLUSION

3.1 Current Position

Untreated and ignored, the Knotweed will continue to grow and spread by underground extension of the rhizome system. (This creates a slow but steady increase in eventual management costs).

There is a risk of spread to new areas on site by physical movement of viable parts of the plant e.g. by persons legitimately or illegitimately on site pulling up stems and dropping elsewhere on site, or below ground site investigations which carry a particularly high risk of serious spread. (This can cause an immediate and very significant increase in management costs).

As all material consisting of, or containing Knotweed is controlled waste, there are legal implications set out below, these particularly apply to any persons who move, or who allow Knotweed to be moved off site.

The known presence of Knotweed has a detrimental effect on the value of a site.

3.2 Implications of Existing Knotweed in relation to Development Proposals

3.2.1 Legal

Section 34 of the Environmental Protection Act 1980 (EPA90) imposes a duty of care on persons concerned with controlled waste. The duty applies to any person who produces, imports, carries, keeps, treats or disposes of controlled waste, or as a broker has control of such wastes. Breaching the duty of care is an offence, with a penalty of an unlimited fine if convicted on indictment.

All material containing Knotweed is controlled waste.

Japanese Knotweed is included in Part II of Schedule 9 of the Wildlife & Countryside Act 1981. Section 14 of the Act states that "If a person plants or otherwise causes to grow in the wild any plant which is included in Part II of Schedule 9, he shall be guilty of an offence".

Anyone convicted of an offence under Section 14 of the Wildlife & Countryside Act 1981, may face a fine of £5,000 and/or 6 months imprisonment, or 2 years and/or an unlimited fine on indictment.

Environmental Agency Code of Practice Version 2 for management of Knotweed requires an acceptable Management Plan to be set up and implemented with management on site the first choice and removal to landfill a last resort.

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3.2.2 Practical

Development works will include demolition, excavation and construction of roads and buildings etc., in location of, or in proximity of Knotweed. Unless all relevant Knotweed containing material is identified and removed or otherwise sufficiently managed before commencement of these works, the following risks arise.

- Controlled waste may be removed from site in breach of the above legal requirements.
- Knotweed containing material may be mixed with "clean" material, increasing volumes.
- Knotweed material may be lost on site in existing or new locations and cause damage to new structures.
- Sales of completed properties may be prevented as many Mortgage Lenders are currently refusing to provide funds where Knotweed is present, or in proximity to (up to 30 meters) the boundary of the property, unless an acceptable Management Plan together with an insurance backed Warranty is provided by a recognized Knotweed Specialist.

  Generally cost of managing Knotweed material is high, particularly disposing off site to landfill. Spreading and increasing controlled waste has a considerable impact on these costs.

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4. KNOTWEED MANAGEMENT PLAN

4.1 Objectives

- Demonstrate intent to provide and record ample duty of care.
- Meet the requirements of the Environment Agency and Property Care Association Knotweed Codes of Practice.
- Minimize and define the final total cost of Knotweed management.
- Reduce risks of spread of viable Knotweed material by any means as soon as possible.
- Enable construction program to be maintained without above or any further risks.
- Completely eradicate all on site, and any off site Knotweed which is a threat to the integrity of this plan.
- To provide a permanent documented and photographic record to prove the carrying out of duty of care.
- Provide a satisfactory answer regarding Knotweed issues to any interested third party.
- Cover the site against risk of knotweed return by an insurance backed guarantee
- Enhance the value of the site.

4.2 Initial controls

- Identify and set out safe working margin around Knotweed locations, provide marker tape and warning signage.
- Apply systemic herbicide to Knotweed to commence weakening of the plant system, and to reduce viability and risks if accidentally spread, using an appropriate number of visits relevant to terrain and size of Knotweed stands, to ensure a uniform dose to whole of the plant (subject to seasonal constraints).

4.3 Pre construction start enabling works

- Carefully dig out material containing Knotweed to agreed levels with client in areas 1,4,6 & 7. Install membrane if necessary.
- Treat areas 2,3 & 5 with Herbicides, excavate Knotweed on edge of area if needed for retaining wall.

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- Set aside all dug material in designated re-handling area, sift out and bag rhizome material, remove bagged material from site and incinerate, bury processed material on site in location TBA.

- Clean spoil left from the bury cell, will be left in a trimmed pile next to where we excavate or if want it moved to a certain location then this will include extra costs.

- Check whole site for any traces of Knotweed previously unidentified, include in Management Plan.

4.4 Continuing controls during construction

- Maintain signage around risk areas (this will primarily be boundary lines of site in locations of off-site Knotweed).

- Ensure management controls are set up for, and prior to any perceived works inside risk areas (e.g. fence post hole digging on boundary with retained Knotweed.)

4.5 Throughout whole management period

- Monitor whole site and relevant adjacent boundary areas.

- Provide a remedy for any other Knotweed issues which may arise.

- Collect documented and photographic records to provide permanent evidence of duty of care and proof of implementation and completion of Management Plan.

Monitoring: Throughout whole management period as section 4.5

Year	Minimum Visits
2018	2
2019	2
2020	1
2021	1

Any additional visits required during or after this time are FOC.

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UPGRADE OF SERVICES

As part of our aim to provide increasing levels of customer care, we are now ISO 9001, ISO 14001 and OHSAS 18001 registered, for quality, environmental and Health & Safety standards in the control and management of Japanese Knotweed.

We believe this returns the compliment of confidence placed in us by our many clients of the past ten years or so.

Among the many detailed improvements we are implementing, we have identified a need to set a benchmark standard to measure the success of Knotweed controls and to ensure that this is achieved in every contract package we carry out for our clients.

In outline, this is as follows:-

1. To achieve and record a history of controls as set out in our site specific proposals, to the procedures and standards in our ISO 9001 and ISO 14001 documents, for a minimum of four or five years dependent on circumstances and control proposals.

2. To achieve and record a history of a minimum of two years with no visible live Knotweed on site and with no herbicide treatment carried out in that time (treatment by herbicide may suppress or conceal live Knotweed)

3. At no further cost to our client *

   (a) To increase the number of visits per year, if required, to maximize controls as soon as possible.

   (b) To extend the monitoring period beyond the minimum years, if required, to achieve item 2.

* Excludes costs incurred by breach of controls by third parties.

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KEY ELEMENTS TO THE CONTROL OF JAPANESE KNOTWEED
BY ELCOT ENVIRONMENTAL

The Environmental Agency recommends combination methods and the use of methods developed by reputable specialists which may go beyond information contained in the Code of Practice

Elcot Environmental has developed enhanced combination methods which follow, but are developed beyond the guidelines. We have used these methods successfully for more than fifteen years.

Key elements are:-

If time and season permit an initial uniform application of herbicide at the legal maximum rate. This may require two or three visits at 2 – 3 weeks apart on larger stands. This has achieved an apparent 99-100% kill in one season. This concurs with the latest field trials by Nomix Chipman (the herbicide suppliers) in conjunction with the Environmental Agency.

- Provision of expert management to conduct a dig which removes only material containing Knotweed. This regularly produces arisings in the region of 15 – 40% of the Environmental Agency's "worst case" guidelines (3m deep and 7m beyond visible Knotweed) with the obvious consequential cost savings.

- The dig is operated to slice, rather than scoop material, this ensures that the rhizome mass in reduced to much smaller sections, this reduced the amount of stored energy in any one entity and thus reduces the ability to support regrowth.

- Following the process of digging, the bulk of the rhizomes are removed by hand, bagged up and carted off site for incineration. Although the remaining material must still be treated as controlled waste, the vigor and risk of re-growth is greatly reduced, enabling the material, where practical, to be buried on site with only a shallow cap. Due to the fact that the vegetation has been removed from this material, it can be placed, if otherwise suitable, under car-parking areas etc, subject to further precautions.

A recognition that is it impossible to be certain that a site is entirely clean of Knotweed in the short term is essential (however much money may be spent in the attempt). This issue is addressed by:-

- Side-wide monitoring program for several years, with a target of two years with no return, after all other control measures have taken place. Issues concerning Knotweed beyond site boundaries, but in close proximity to the site are also addressed in a suitable manner. This ensures that the entire method demonstrates an ample "duty of care" to deal with all the Knotweed issues relating to the site.

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METHOD STATEMENT FOR APPLICATION OF HERBICIDE
PRELIMINARY AND ONGOING

Herbicide application is by knapsack spraying using a telescopic or extended lance to assist reach high foliage or in difficult terrain. Pressure limitation valve set at one bar and course droplet nozzle to reduce drift to a minimum.

Application to be over the target foliage, and as much as possible to the underside as well. Foliar application to obtain maximum application to target and minimum collateral application to non-target plants or ground.

Operatives to be qualified to recognized national standards applicable to the works, and extensively 'in house' trained to achieve E.E specialist methods and standards and to follow all training guidelines and label recommendations or DEFRA off-label recommendations, where applicable.

Herbicides used from:-

1. GLYPHOSATE

   A non-residual herbicide which in certain formulas, may be applied near watercourses (subject to approval from the relevant Environmental Agency Department).

2. SYNERO

   A medium term residual. The most effective herbicide for controlling Knotweed, where conditions allow its use. Care needed due to its ability to damage non-target trees or shrubs. May be applied as an extra control to cleared areas, or as a precaution to floor slabs or road bases.

In conjunction with the above herbicides, adjuvants such as rain-fast additives or surfactants may be used at the manufacturers recommended rates at the operative's discretion.

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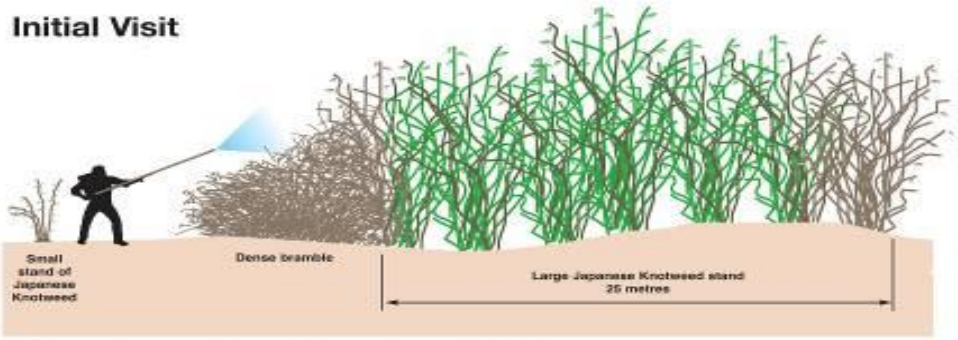
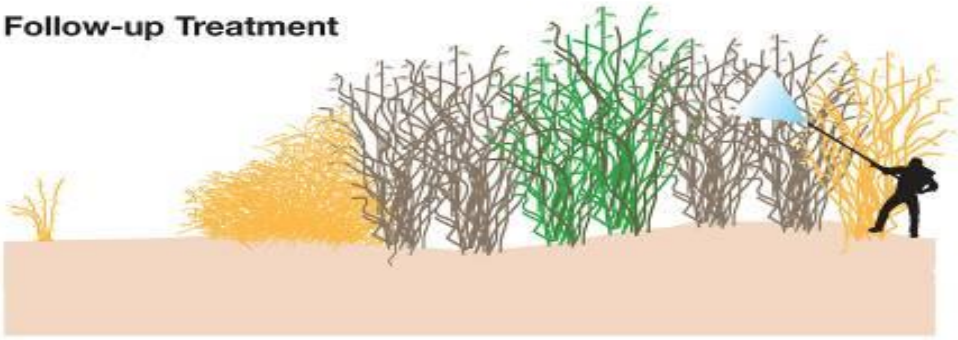
Initial Visit



- Treat all Japanese Knotweed that can be reached without:
  1. Danger to operator (dangerous objects, steep slopes hidden to dense vegitation).
  2. Walking into Japanese Knotweed and breaking off target stems.
  3. Overdosing by trying to reach more than is practical.

  Normally a 3-5 metre band into stand from outside margin.

Follow-up Treatment



- 1. Walk through treated, defoliated Japanese Knotweed.
  2. Check for, and treat, any patches missed with spot spray.
  3. Treat next band towards the core of stand.
  4. Start treatment on previously dangerous to reach parts, through safe defoliated approaches - use fall arrest systems, extra lance extensions as part of safe means of access.

Second Follow-up Treatment

- 1. Walk through treated, defoliated Japanese Knotweed.
  2. Treat all previously untreated Japanese Knotweed.
  3. Check for, and spot treat, any new shoots beyond previous boundary.
  4. Ensure dose does not exceed legal limits.

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METHOD STATEMENT FOR THE EXCAVATION AND HAND SIFTING OF KNOTWEED RHIZOME AREA

Areas of Knotweed contamination are dug through as set out below. Material is moved to a designated re-handling area and rhizomes and root crowns are manually removed from the material during a sift by a 360° excavator and placed in bags marked "Japanese Knotweed for incineration". A target of 70-80% by weight, of root being removed, (if material is to be moved to a designated area on site for further controls), or a target of 60-70% by weight, (if area is to be cleared as far as possible and left in site for further controls).

The bagged Knotweed is then taken off site and transported to SN25 5DL using Elcot Environmental Waste Carriers Licence No: CBDU 54905 for incineration under and exemption from Waste Management Licensing Exemption Ref – WEX 080869.

LIMITING AMOUNT OF ARISINGS BY USING SKILLED PERSONNEL

Whilst the E.A recommend areas containing Knotweed are excavated to 3m deep and 7m beyond where Knotweed can be seen, this is a "worst case" scenario and if followed blindly, will generally produce vast quantities of previously contaminated material. The method used to reduce this is as follows:-

- Wherever possible, dig from inside the contaminated areas to the visible edges and in depth, only as far as Knotweed is visible.
- When an area or section appears to be clean, a careful search of the surface is carried out by skilled personnel. If no rhizomes are perceived, a further approximately 100mm layer is removed and examined and treated as controlled waste.
- If no more Knotweed is found a further 200 – 300mm of material is loosened and searched. If on this third check, no rhizome is found, material is left in site.
- The above stages are attended by a skilled and experienced Dig Manager who will be present not merely on site, but will be in the vision line of and directly signal and control the Operator of the excavator and continuously observe the surfaces exposed by excavation.
- This method generally reduces the volume of arisings to some 15 – 40% of the E.A. guidelines "worst case" scenario, whilst not limiting a particular excavation to any assumed depth or lateral width.
- To avoid spread of contaminated material during excavations, tracks and wheels of machines are cleaned before moving off area. To prevent spillage bags of knotweed are top tied before moving, stored if required in secure designated area and transported in closed vans.

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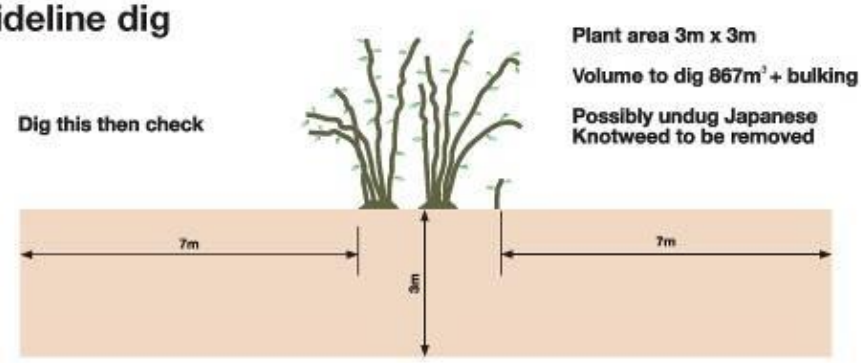
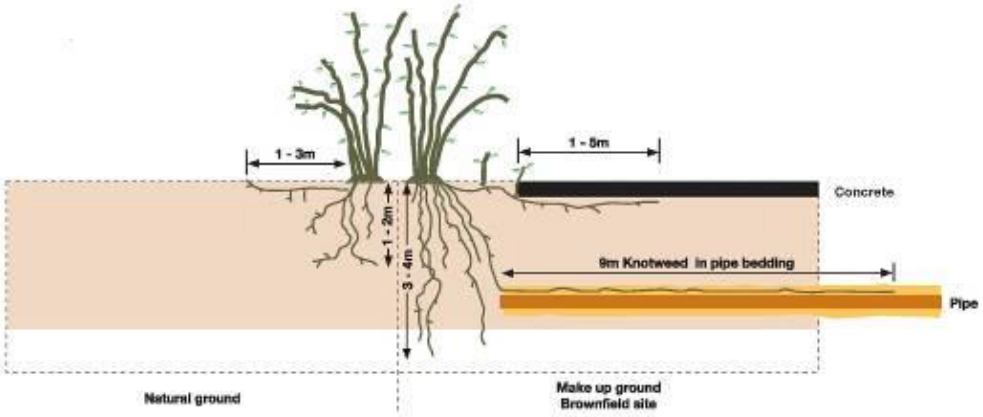
Guideline dig

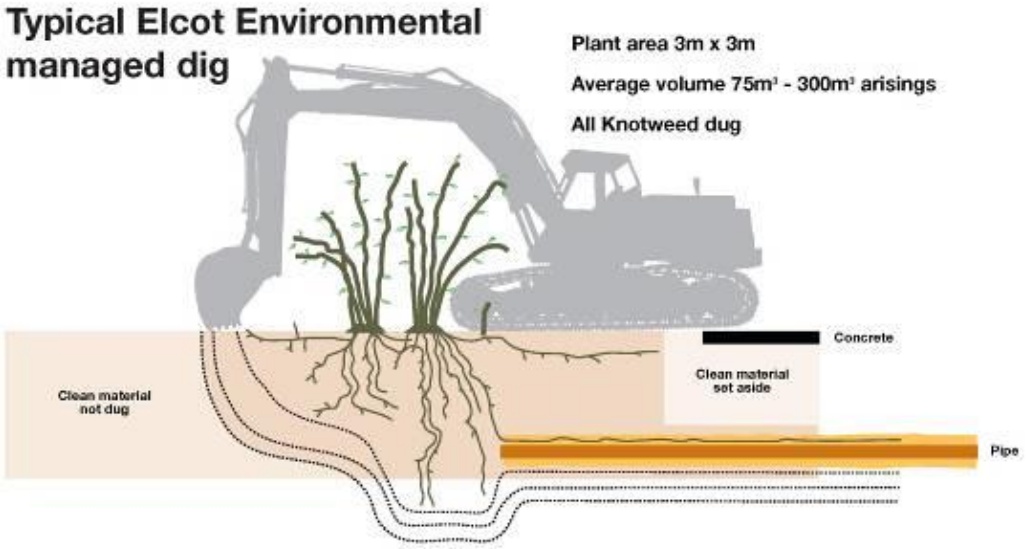


Elcot Environmental experience of Japanese Knotweed below ground habit

Based on numerous full depth digs from 1997-2008



Typical Elcot Environmental managed dig



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METHOD STATEMENT FOR THE BURYING OF DE-GRADED MATERIAL

Prior to the excavation, formation of any proposed works to be determined and any location of service runs that may be deeper than formation level. Location and height of fill of controlled waste material is positioned to avoid service runs and to maintain a minimum depth of 500mm below formation level.

Depth of dig will be determined by the safety and practicality specific for site. If material is to be placed under a car park area, suitability of materials is assumed good for this use. Due to the fact that vegetative material i.e. Knotweed rhizomes and if required for the purpose, any other roots etc, will be picked out of this material settlement due to decomposing vegetation will not be a problem.

If material is to be placed in a proposed car park area, this will be compacted in a manner to be specified by yourselves, which is acceptable for ground engineering purposes, for the application.

If however material is to be placed in a proposed soft landscape area, material will be compacted by bucket and machine as fill proceeds.

All due care will be taken to avoid spillage on the haul route to the fill and entire area will be checked and cleaned prior to capping.

Issues relating to any other containments in otherwise clean (Knotweed free) excavated material from pit, will be dealt with as proposed for main contract. (This material is already on site and the issues already there).

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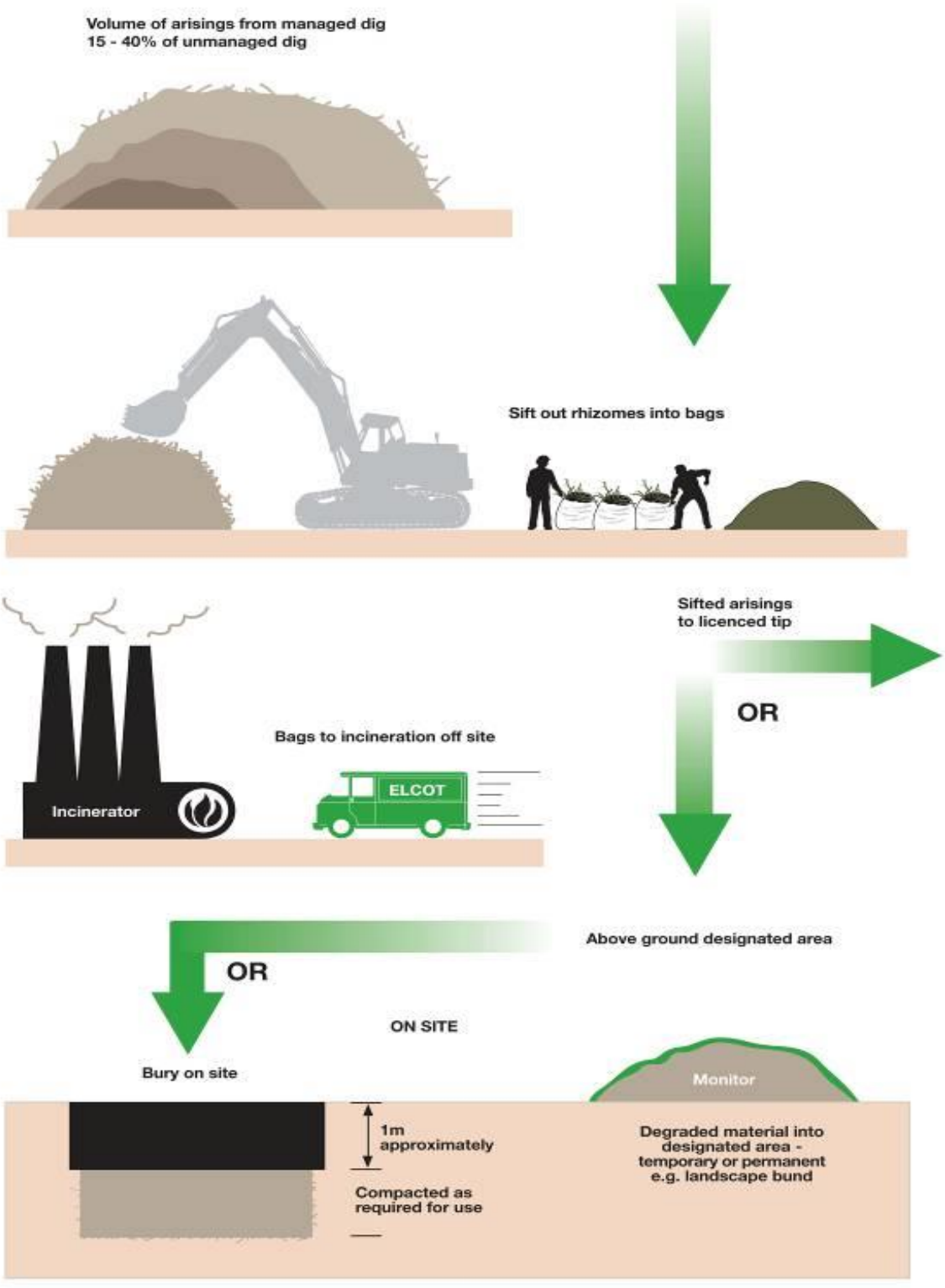

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ONGOING MONITORING

The purpose of ongoing monitoring is to achieve and prove to achieve a complete eradication of Knotweed on site and any Knotweed off, but sufficiently close to site to create an obvious threat to the integrity of the on-site treatment.

It is not intended to be a substitute for best practice in earlier, different parts of the Knotweed Management Program, **but is recognition that a guarantee to eradicate Knotweed site wide in one year does not prevent Knotweed from re-growing** due to a number of fairly obvious reasons.

In most cases the only herbicide application during this period will be knotweed locations on, or off site where this method of control was proposed in the Management Plan.

MEASUREMENT OF ACHIEVEMENT OF ERADICATION

After 26 years of experience of managing Knotweed, comparing the former Welsh Development Agency viability test results and other test measures with hundreds of long term 4-10 year's plus site wide results (including sites with construction over unrecognized established Knotweed), we have established a consistent historic record where a combined method of control is applied site wide.

- Established Knotweed does not generally remerge in location more than three years after last record of visible growth.

- Fragments of emerging recently spread Knotweed can be eliminated in one year by herbicide.

Based on this and to provide an optimum margin of safety which is moderated by site specific history, we have set a benchmark measure to achieve standards required by our ISO 9001 and ISO 14001 quality and environmental standards.

"To monitor a site for the **longer of** 4 or 5 planned years **or,** 2 years with no treatment and no visible live Knotweed is achieved",

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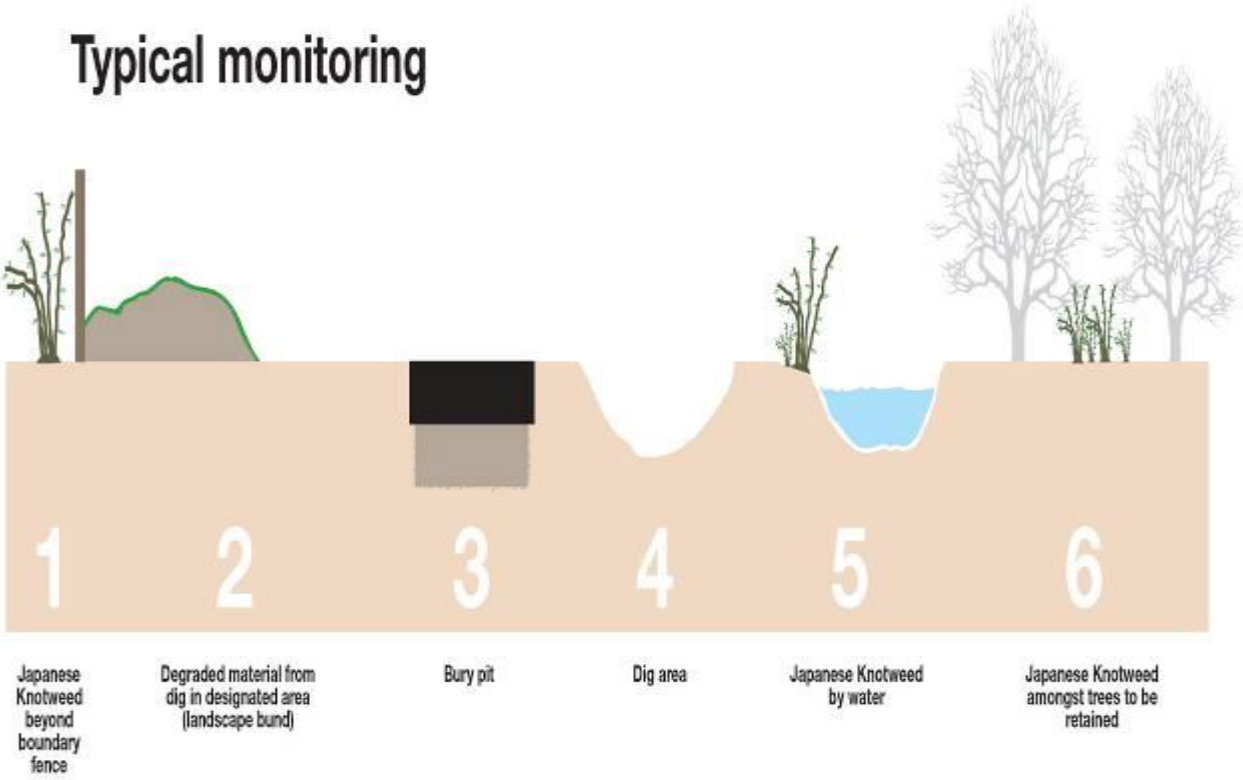
Typical monitoring



	YEAR ONE	YEAR TWO	YEAR THREE	YEAR FOUR
1	Obtain permission from landowner to commence treatment	Spot treatment may be required	Spot treatment may be required	No Knotweed - no treatment
2	Treat at the begining of the year with residual herbicide. Possibly plant up and end of season.	No Knotweed - no treatment	No Knotweed - no treatment	2 or more years in 4 year plan with no Knotweed - end of scheduled controls
3	Monitor - if no Knotweed, no treatment will be necessary.	No Knotweed - no treatment	No Knotweed - no treatment	
4	Monitor - if no Knotweed, no treatment will be necessary.	No Knotweed - no treatment	No Knotweed - no treatment	
5	Treat with Round-up Biactive, adjacent to water.*	5 - 10% may need re-treatment	1 - 2% may need re-treatment	Possibly 5 years monitoring needed in this context - 3 to treat and 2 to confirm
6	Careful treatment	5 - 10% may need re-treatment	1 - 2% may need re-treatment	

* *Obtain approval from Environment Agency*

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HERBICIDE TREATMENT OF JAPANESE KNOTWEED IN PROPERTIES ADJACENT TO SITE

It is our view that any responsible proposals to manage Japanese Knotweed on site must also include measures to prevent re-infestation from any Japanese Knotweed that is off site but in close proximity. These measures should take into consideration and as far as practical, provide protection against all the ways which Japanese Knotweed can re-encroach.

Normally this is best dealt with by herbicide application and monitoring.

Other methods such as root barriers on the boundary do not fully prevent the risk of site re-infestation for the following reasons:-

- Integrity to root barrier may be difficult to obtain or any given depth may not be sufficient.
- Vigorously growing Knotweed will support persistent attempts of below ground rhizomes to penetrate weaknesses in barrier, in some soil conditions to reach under a barrier at a depth of 3m plus.
- Changes in surface ground levels later may enable rhizomes to grow over top of root barrier.
- Stems or rhizomes may be thrown over boundary fence.

All these situations mean that whilst vertical barriers provide a resistance and delay to re-encroachment, it is more of a psychological "comfort" barrier than an actual comprehensive appraisal and addressing of long term issues.

Herbicide application will almost immediately slow down growth and metabolism of the plant. Stems and near surface rhizomes are rendered inert quite quickly. Longer term, monitoring and spot spraying will kill the entire plant system, fully preventing the long term risk of re-encroachment. Costs of including herbicide treatment and monitoring to Japanese Knotweed in adjacent properties, in the on-site program are minimal, often less than 10% of the cost of a root barrier and as can be seen from the above, a far more certain control measure.

Our approach to occupiers of adjacent properties is subject to our client's preference, but is always discreet and diplomatic.

There is no need to insist on an immediate start to a program of treatment and monitoring. Treatment can include foliar spray to established Knotweed, where desirable non-target shrubs are not present, through to discreet cut down and removal of bulk of foliage, with injections into lower remaining stems.

The herbicides used - Synero and Glyphosate – are extremely target specific and are not harmful to humans or animals, unless the concentrate is taken in impossibly large quantities. Both are rated by the World Heath Authority as less harmful to the body than common table salt.

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CONTRACTOR'S DUTY OF CARE RESPONSIBILITY

In engaging Elcot Environmental (E.E.) to provide a Knotweed Management Plan (KMP), your company has identified and accepted the need to provide duty of care in managing Knotweed issues to minimize costs and avoid risk of prosecutions leading, in the worst case, to unlimited fines and or imprisonment.

E.E. have provided a KMP which identifies risks and provides management controls to minimize these risks and enable construction works to proceed on program.

E.E. staff will be present on site at times and will implement and manage certain specific parts of this plan. They will also enact and record duty of care provisions.

However, E.E. cannot and do not accept responsibility to control actions of others on site (other than persons who are employed by E.E. or directly and specifically under the direction of E.E. management at the time).

It is the responsibility of the E.E. client to understand, follow and to ensure that all others present on site understand and follow control measures to maintain best practice duty of care.

In particular to prevent the spread and loss of identification of Knotweed containing material;

1. Areas which have been identified as containing or suspected of containing Knotweed should not be;

    - Used to store materials.
    - Driven over.
    - Dug into.

2. Areas in which E.E. have buried processed material should not be excavated into, closer than 500mm above top of processed material.

To assist the implementation of these controls E.E. have provided information to identify these areas as set out in the attached documents. It is the contractor's responsibility to maintain and if necessary improve fencing or other demarcation lines.

Should the following occur;

- A breach of control such as points 1 & 2 above, but not limited to these.
- Alteration to proposals that would imply the likelihood of a breach.
- Any person believes Knotweed is discovered elsewhere on site.

It is essential to inform E.E. by phone (01793 700100), fax (01793 709919), or email (enquiries@elcotenviro.com), and where relevant include photos and as much other concise information as is available. If this is done, E.E. will provide a remedy for any breach of controls to ensure the maintenance of any contractual warranties.

Failure to inform E.E. or to implement remedies may;

- Void E.E. contractual warranties.
- Increase cost of further remedies.
- Incur risk of prosecution for failing to provide duty of care.

Remember, we are here for your benefit. Help us to help you.

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MODEL Invasive Weed Guarantee (ASSIGNMENT)

Client:

Property:

Report No:

Report Date:

Date work completed:

Invoice No:

Work carried out and covered by this company guarantee to control the following invasive weeds-

Japanese knotweed (*Fallopia japonica*) 

TERMS OF GUARANTEE

1. **Elcot Environmental** hereinafter referred to as "The Company" hereby **GUARANTEES** that, save as hereinafter provided or as provided in the Company's standard Terms and Conditions of business applicable at the date of the Client's acceptance, in the event of the person entitled to the benefit of this Guarantee notifying the Company in writing within a period of **TEN YEARS** from the date of completion of the work of:

   (i) any continuance or recurrence of the invasive weed indicated above respectively to the work carried out in the areas identified in the report as the "treatment area"

   the Company, upon production of this Guarantee and all original relevant survey reports, quotations, specifications, drawings, plans, completion certificates and receipted invoices, with any amendments thereto issued by the Company (photocopies will not be accepted), will arrange for the land to be inspected at a mutually convenient time upon payment by such person of the Company's then current inspection fee, provided that the continuance or recurrence at issue is of a kind against which the Company carried out control treatment in the area in which such continuance or recurrence has taken place.

2. If upon such inspection it appears to the Company that the treatment carried out by the Company was in any way defective so as to have resulted in re-growth of the invasive weed within the treated areas, the Company will carry out, without further charge, such further treatments as shall to the Company appear to be necessary to control the invasive weed and will reimburse in full the inspection fee paid.

3. This Guarantee does not cover any loss (including consequential loss see 9 below) or damage sustained by the person entitled to the benefit of this Guarantee save as set out in 2 above, whether caused by the Company's negligence or otherwise.

4. This Guarantee shall be of no validity or effect and shall be unenforceable against the Company in any one or more of the following circumstances:

   (a) where the person entitled to the benefit of this Guarantee does not give written notice of the claim under this Guarantee to be received by the Company within three months from the date upon which

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the existence of such a claim could, with the exercise of reasonable diligence by a continuous occupier of the affected premises, have been discovered;

(b) where all Works advised or recommended by the Company prior to, at the time of, or subsequent to, treatment carried out by the Company were not fully carried out effectively with good and proper materials and in a workmanlike manner by the Client's contractor.

(c) where the Client failed to pay the full price, any properly payable additional costs, and any interest due within six months of the date upon which the same fell due;

(d) where the land and property has not been kept in a good and proper state, so as to detect and prevent tipping or the early detection of growth by invasive weeds.

(e) where any recommendation given by the Company has not been complied with, whether such recommendation was given in the Company's report/quotation, or by separate leaflets. This may relate to cutting or pruning, the removal of waste, site clearance of the exclusion of plant materials from areas adjacent to the treatment area.

(f) where, subsequent to the completion of treatment by the Company, there has been any disturbance to the works carried out by the Company. This may include excavations in areas where herbicide treatments have been undertaken, where root barriers have been installed or contaminated waste has been subject to burial on site.

(g) where invasive plants have been re-introduced adjacent to watercourses or areas that have been subject to flooding, or by tipping or the uncontrolled propagation from adjacent land.

5. This Guarantee is to be read subject to, and is limited by, the Company's standard Terms and Conditions of business current at the date of the Client's acceptance of the Company's offer to carry out the treatment which shall be deemed to be incorporated herein. In the event of any ambiguity or uncertainty arising the Terms and Conditions of this guarantee shall apply.

6. In the event of disposal of the property, being the subject of this Guarantee, this Guarantee shall be assignable by the Client above named, to the new owner in which case the provisions hereof set out at 1-5 above shall apply in respect of that new owners as if the name of that new owner were substituted for any reference to the client PROVIDED THAT

Within three months of the change of ownership of the property, the new owner shall have:

(a) given written notice of the change to the Company;

(b) paid the Company's then current transfer fee; and

permitted the Company's surveyor to inspect the property (so as to discover any defects as might prejudice the works carried out by the Company) if the Company in its absolute discretion so require.

7. For the purposes of this Guarantee and the Contracts (Rights of Third Parties) Act 1999, the person entitled to the benefit of the rights conferred by this Guarantee shall be the owner from time to time of the Property ("the Relevant Third Party") **provided always that** the Relevant Third Party acknowledges and agrees that its rights under this Guarantee shall be subject to the terms and conditions set out in this Guarantee.

8. The Company shall be entitled in any action or proceedings by any Relevant Third Party to rely on any term in the Guarantee and to raise any equivalent rights in defence of liability as it would have against the Client or any previous Relevant Third Party. Furthermore, the Relevant Third Party agrees that it will be bound by any previous acts, omissions or default of the Client or any previous Relevant Third Party.

9. For the avoidance of doubt, the Client and each subsequent Relevant Third Party acknowledges and agrees that when it is no longer the owner for the time being of the Property, it shall no longer be entitled to the benefit of the rights conferred by this Guarantee and that furthermore, neither the Client, nor any Relevant Third Party shall be entitled to assign or transfer its rights and / or obligations under this Guarantee.

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10. All consequential losses are excluded from this Guarantee, and for the purposes of this Guarantee consequential loss means any indirect, special or consequential damages or losses suffered or incurred by the Guarantee holder and for the purposes of this guarantee indirect, special or consequential damages or losses shall include, but not be limited to damages to or losses of data, furniture or equipment, economic loss or damage, damage to or loss of profits, interest, business revenue, anticipated savings, business or goodwill, any losses costs or expenses which are not directly incurred by the Guarantee holder wholly in respect of or which are additional to the remedial work for which indemnity is provided by this guarantee, the costs and expenses of any redecoration, repainting or retiling work, the costs and expenses of removing and/or replacing any cupboards, carpets or other furniture, or any other fixtures or fittings and the incurring of liability for losses or damages of any nature whatsoever suffered by third parties (including in each case incidental and/or punitive damages), even if the Company is advised in advance of the possibility of any such losses and/or damages;

11. In the event of you wishing to make a claim under this guarantee, a fee (at the rate prevailing at the time of the claim) is payable and the following **ORIGINAL** documents must be produced by you:

(a) Report(s), estimate and any drawings or plans relating to it
(b) Receipted invoice or proof of payment
(c) Certificate or letter of completion
(d) This guarantee

If the claim is justified, your payment will be returned in full. If your claim cannot be processed due to incomplete documentation or you decide not to pursue your claim, then an administration fee (at the rate prevailing at the time of the claim) will be deducted and the balance will be refunded.

11. In the event of a dispute arising under this guarantee as to the amount to be paid or the work to be performed the dispute may by agreement between the parties be referred for determination by an expert chosen by mutual agreement between the parties. If the parties are unable to agree on an expert within 7 days after the request by one party to another or if the expert agreed upon is unable or unwilling to act either party may apply to the General Manager of the Property Care Association for the appointment of a suitably qualified and experienced expert for the dispute in question.

Signature: ……
(For and on behalf of the Company)

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Your Demands and Needs

This product meets the demands and needs of those who have had Invasive weed eradication work carried out on an existing property by a Property Care Association registered company and require insurance protection to provide financial recompense in the event that the original contractor has ceased to trade for specifically defined reasons and is unable to honour the terms of their written guarantee. Because Guarantee Protection Insurance Ltd ('GPI') have not reviewed your individual circumstances we are not in a position to provide you with a personal recommendation relating to this product. GPI have provided you with information about the product in order for you to determine whether this product is suitable to your needs, you should read the associated documentation and decide if this policy suits your particular requirements.

Policy Summary

This is a summary of the policy and does not contain the full terms and conditions of the cover, which can be found in the policy, named the Policy of Insurance. It is important that you read the Policy of Insurance carefully when you receive it.

Name of the Insurer
The Insurer of this policy is Guarantee Protection Insurance Limited (GPI)

Type of Insurance and Cover
An Insurance Backed Guarantee underwrites the contractor's written guarantee given to you in relation to the re-growth of the invasive weed in the treated area. If the installing contractor ceases to trade as defined within the policy, the insurance will take the place of their guarantee and honour its terms and conditions for the remaining period of the cover.

Significant Features and Benefits
If the original contractor ceases to trade the Insurer will meet the cost of remedial works required that would have been covered by the original contractor's written guarantee to you.
You will be required to pay a survey fee of £250 on making a claim. Should the claim be accepted then this fee will be refunded to you.

Significant and Unusual Exclusions or Limitations
Like every insurance policy, your policy excludes some situations and you should read the Exceptions section on the reverse of your policy carefully.
The policy specifically defines the instances where a Contractor has Ceased to Trade, this includes by reason of an Insolvency Procedure as well as death or retirement of the principal(s). You will find the full definition of Cease To Trade within the Definitions Section on the front of your policy. The policy will not cover you in the event that a Contractor has not failed for these reasons, such as a Contractor moving premises or applying for voluntary strike off at Companies House.
The policy is designed to meet the cost of remedial treatment of regrowth that would have been covered by the original Contractor's written guarantee to you. Treatments which fall out with the terms of your written guarantee will not be covered by the policy.
The maximum amount which can paid out under your policy is the contract value shown on the front of your policy Whilst your policy will pay for appropriate remedial treatments to the original treated area, it will not meet the cost of any Consequential Loss. You will find the definition of a Consequential Loss on the front of the policy.
Any remedial work after cessation of trade has to have the Insurer's permission before it can take place.
The policy excludes situations where you are protected by legislation such as the Consumer Credit Act 1974. Therefore, where you have made payment to the Contractor under a finance agreement or by credit card and are protected by legislation, you will require to seek recourse through the credit provider in the first instance.

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Duration of the Policy
The policy will remain in force for the period shown on your certificate which is usually 10 years or the period of the contractor's written guarantee to you, whichever is the lesser period. You do not need to review the level of cover during the term of the policy.

Right of Cancellation
You may cancel this policy from the date of commencement if you decide within 14 days of receipt of the policy that you no longer want the cover. A full explanation of how to cancel the cover can be found on the reverse of the policy

How to Make a Claim
Should you discover a regrowth in the treated area you should without delay contact the installing contractor. However, if you discover that the contractor has ceased trading then you should contact GPI without delay in writing at 37 Carrick Street, Ayr, KA7 1NS or by telephone during office hours on 01292 268020.
As part of the claims process, we will request copies of the following documentation, a copy of your Policy of Insurance and a copy of your original contract and written guarantee from the Contractor.

Complaints
GPI hope that you will be happy with the service they provide. However, if for any reason you are unhappy with this, they would like to hear from you. In the first instance, please write to GPI Administration, 37 Carrick Street, Ayr, KA7 1NS or telephone 01292 268020. If you are still not satisfied, please write to the CEO, Guarantee Protection Insurance Ltd, 3rd Floor, 37-39 Lime Street, London EC3M 7AY.
The Insurer is a member of the Financial Ombudsman Service. If you have complained to the Insurer and they have been unable to resolve your complaint, you may then be entitled to refer it to this independent body.

Financial Services Compensation Scheme
GPI Ltd are covered by the Financial Services Compensation Scheme (FSCS). You may be entitled to compensation from the scheme if the Insurer cannot meet their obligations. This depends on the type of business and the circumstances of the claim.

Guarantee Protection Insurance Ltd, Registered in England No 3326800
Registered Office: 3rd Floor, 37-39 Lime Street, London EC3M 7AY.

Guarantee Protection Insurance Ltd is authorised and regulated by the Financial Services Authority

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Knotweed Location Photos

JK Area 1

JK Area 2

JK Area 3

JK Area 4

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JK Area 4

JK Area 5

JK Area 6

JK Area7

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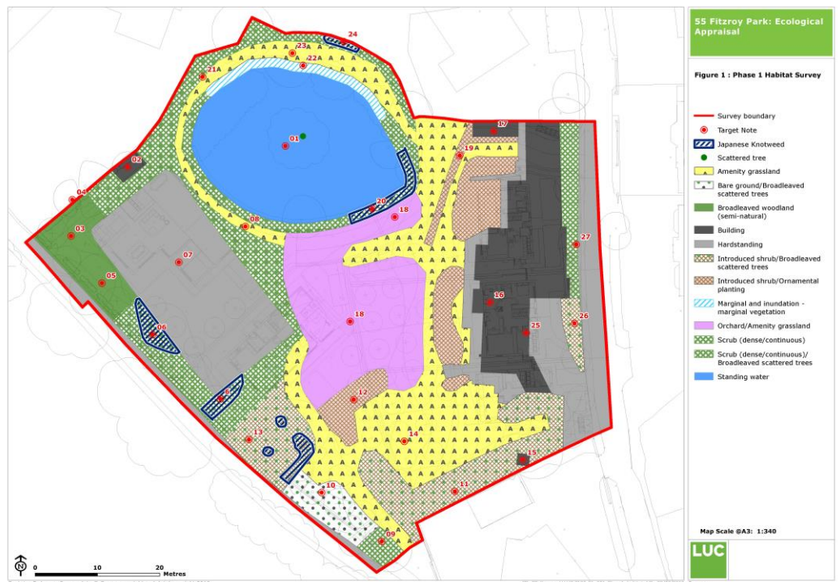
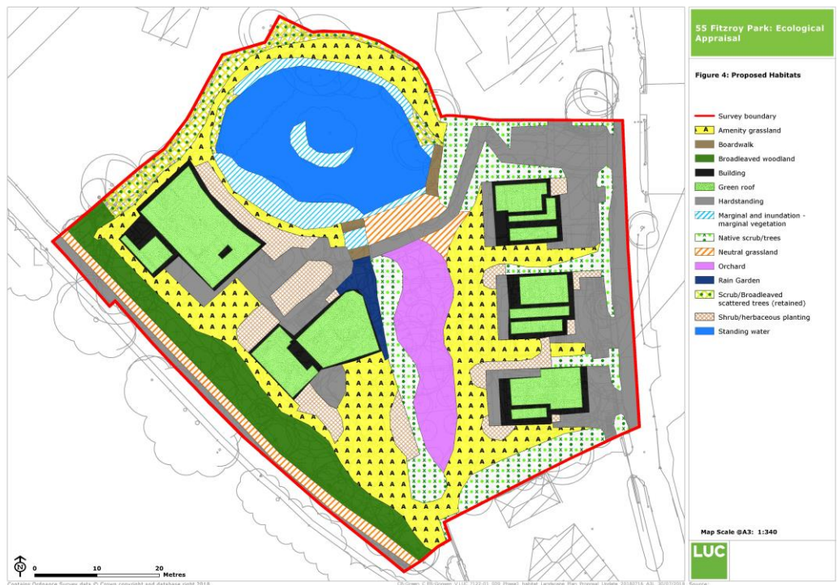
Appendix 9
Habitat Areas Pre- and Post-Development

Fitzroy Park – Comparison between existing and proposed habitats

Existing habitats



Proposed habitats



Existing and Proposed Habitat Areas (obtained from GIS)

Existing Habitats	Area (sqm)	Proposed Habitats	Area (sqm)	Notes re proposed
Built Development (Hard)	**1472**		**1107**	
Building (hard)	431	Building (hard surface)	229	Areas surrounding green roofs
Hardstanding	1041	Hardstanding	853	
		Boardwalk	25	Vegetated beneath
Built Development (Green)	**0**		**518**	
	0	Building (green roof)	518	Meadow grassland
Formal landscaping	**1116**		**1254**	
Amenity grassland	868	Amenity grassland	998	
Introduced shrub/Ornamental planting	248	Shrub/herbaceous planting	256	Planting to provide connectivity with wildlife-friendly planting
Semi-natural grassland habitats	**0**		**186**	
	0	Semi-improved neutral grassland	186	Millfield Lane verge, pond edge
Orchard habitats	**510**		**237**	
Orchard/Amenity grassland	510	Orchard/Meadow grassland	237	
Woodland / scrub / treed habitats	**1282**		**997**	
Broadleaved woodland (semi-natural)	141	Broadleaved woodland	356	Millfield Lane boundary
Bare ground/Broadleaved scattered trees	83	Scrub/Broadleaved scattered trees (retained & enhanced)	185	Includes existing, enhanced boundary habitats
Introduced shrub/Broadleaved scattered trees	398	Native scrub/Broadleaved scattered trees (new)	456	Includes replaced boundary habitats along fitzroy Park
Scrub	94			
Scrub/Broadleaved scattered trees	566			
Wetland habitats	**688**		**769**	
Marginal vegetation	50	Marginal vegetation	194	
Standing water	638	Standing water	535	Reduction relates to increase in marginal vegetation
		Rain garden	40	
Summary				
Hard Development	**1472**		**1107**	
Soft Landscape / Greenspace	**3596**		**3961**	
TOTAL	**5068**		**5068**	