

Camberwell Old Cemetery, Area Z Extended Phase I Survey and Impact Assessment

June 2015



Camberwell Old Cemetery, Area Z

Client

Southwark Council

Author

Tony Wileman CIEEM

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Executive Summary

London Wildlife Trust was commissioned by Southwark Council to undertake an Extended Phase I survey and impact assessment of a compartment within Camberwell Old Cemetery, Forest Hill Road, Honor Oak, London, SE22. The surveyed area is known as Area Z and is located in the northwest corner of the cemetery and 1.25ha in area. The survey was commissioned to identify and evaluate the current biodiversity value of Area Z, assess the impacts of the proposals to re-use the area for 700 burial plots, and provide recommendations for mitigation of these impacts, and enhancements for biodiversity where appropriate.

The survey was carried out on 30th April 2015 and recorded a total of five habitats within the surveyed area. For this survey Area Z has been divided into two parcels of roughly equal size (0.6ha each): The boundary of area Z and the Stockpile to differentiate an area in Area Z where unauthorised soil dumping took place around 12 years ago. The stockpile therefore has habitats which are 12 years old at most although there are some older trees on the edges.

The site supports habitats of ecological importance on a local level: broad-leaved secondary woodland; semi-improved neutral grassland; and ruderal scrub, all typical of a cemetery of this age, management and location. The boundary of area Z contains the majority of the broad-leaved secondary woodland habitat with some tall herb habitat while the stockpile supports some young woodland, most of the tall herb and all of the scrub and grassland habitats. Cemeteries are a priority London BAP habitat, covered under the Churchyards & Cemeteries Habitat Action Plan (HAP).

A preliminary bat survey was undertaken in April and May by London Wildlife Trust and several bat species were shown to use the site for foraging. No bat roosts were located but some trees within Area Z may support roosts. These include two trees that are located on the edge of the stockpile area. Wild onion was found to be present within the broad-leaved woodland habitat in small numbers and entirely within the boundary of area Z. This plant is considered a London notable species but has undergone little change in distribution since 1962 (Preston et al. 2002). The current proposals are highly unlikely to impact upon this population. No other rare or Biodiversity Action Plan priority species were recorded in any of the habitats and overall fauna species recordings were low. A low recording of fauna species is typical when undertaking Phase I surveys which predominantly focus on vegetation composition and habitats. It did include a single common frog.

The habitat is suitable to potentially support a range of other protected and important species that have been recorded on or near the site, including stag beetle, common whitethroat, bullfinch, house sparrow, and hedgehog, although none of these were recorded on site during the survey and none have been recorded on site in the last 5 years.

Area Z appears to support a typical range of species within the mosaic of habitats found throughout the Cemetery.

Any assessment of the survey of this part of the site needs to be put into context with the current biodiversity interest of the whole Cemetery which would have been surveyed in the Southwark SINC Review in 2014.

Area Z's biodiversity interest appears to be consistent with the Cemetery's designation as a Site of Borough Grade I Importance for Nature Conservation. However, this is predominantly

the older wooded areas and glades within the boundary of area Z, rather than the younger woodland habitats, ruderal scrub, tall herb and grassland habitats within the mounded ground of the stockpile. It can be concluded that the woodland habitat within the boundary of area Z area can be considered to have a moderate biodiversity value, whilst other habitats are typically of low value.

Area Z is proposed to be subject to remediation of earthworks with a proposal to revert usage back to burial space of approximately 700 new burial plots. Most of the area to receive works is within the stockpile area but some small areas within the boundary of area Z are subject to remediation to create and reinstate paths

A total of 19 trees, a small amount of woodland habitat and all the vegetation within the stockpile area (mostly scrub with some young trees, grassland and tall herbs) are proposed to be lost but the biodiversity impacts are principally of minimal negative impact except that of the woodland habitat within the boundary of area Z, and four trees that may support bat roosts (two medium potential and two high potential).

Current mitigation proposals for these losses include the planting of 65 mixed lime, oak and cherry trees, several native hedgerows and shrubberies and 0.33ha of wildflower rich grasslands. Other wildlife beneficial features proposed include bat and bird boxes, hibernacula, deadwood loggeries and deadwood logs and some further planting of native species in the woodland.

In addition to the current agreed mitigation we propose that:

- there should be no impact on the woodland environment within the boundary of area Z if the path routes were to be amended;
- the two trees of high bat roost potential within the main works area that will be felled will adhere to a series of agreed procedures so as to comply with legislation and best practice guidelines;
- the two trees with moderate bat roost potential that sit outside the main works area but are fringed by it are retained and protected from accidental damage during any works (in line with BS5837:2012) so that they remain as potential colonisation sites for bats in the future. Legislation must be followed if they are currently being used as roosts;
- the soil removal activities would need to be carefully undertaken to avoid damage to the trees that are located on the edge of the stockpile.

Should the mitigation proposals identified be followed, then it is highly likely that post development there would be a net biodiversity gain. This is dependent on an effective programme of mitigation works, and future management.

Should any of the current proposals be changed significantly then this report will be inaccurate and further survey and impact assessment will be required.

1 Introduction

The Camberwell Old Cemetery, Area Z Extended Phase I survey is a brief assessment of the habitats and other ecological features found at the time of the survey within the surveyed compartment known as area Z (hereafter referred to as area Z or 'the site'; see appendices). Area Z is further sub-divided into a mounded central area where unauthorised soil dumping occurred in 2003 (hereafter referred to as the stockpile as named by London Borough of Southwark) and the boundary area (hereafter known as the boundary of area Z). The survey provides the basis of an evaluation of the biodiversity interest of the site, and the impacts of the proposals to re-use much of the site for burials. References to the cemetery refer to the whole of Camberwell Old Cemetery.

This survey is by no means a comprehensive study of the habitats, species and their respective ecology or ecological requirements of the site; this would require significant time and resources to undertake. It provides a snapshot of the habitats and their respective biodiversity values within a local, borough-wide and London context, and within the survey constraints to provide a reasonably accurate assessment of their interest.

The Cemetery is operational, owned by Southwark Council and managed by the Council's Public Realm department. The first interment at the cemetery took place in 1856, and by 1984 300,000 interments had been carried out. The Camberwell Old Cemetery Conservation Management Plan (hereafter referred to as the CMP) (Southwark Council, 2015a), along with the Southwark Cemetery Strategy (Southwark Council, 2012), are set out to enable the best and most valuable features and attributes of the Cemetery to be protected and restored so as to benefit the local community.

Camberwell Old Cemetery is also designated as a Site of Borough Importance (Grade I) for Nature Conservation, and listed as such in the Southwark Local Plan (London Borough of Southwark, 2007]. It also identified as an area of Metropolitan Open Land, and a Green Chain Park. It lies to the western edge – albeit severed by roads - of a larger mosaic of open green space of nature conservation importance, including Brenchley Gardens, One Tree Hill, Aquarius Golf Course, and Camberwell New Cemetery.

The report in sections 1 to 3 summarise the habitat types and significant vascular plant species found at area Z and evaluates them. Sections 4 through to 6 detail the site proposals and impacts, the mitigation requirements and any recommendations on biodiversity enhancements and future wildlife beneficial management. The appendices comprise all the species and map data plus the capability statement.

1.1 Site details

1.1.1 Location

Camberwell Old Cemetery is located in Honor Oak, London, SE22, in the London Borough of Southwark, (Appendix, Map 1) and has its main entrance located on Forest Hill Road. A small pedestrian entrance is also located at the junction of Langton Rise and Wood Vale at the western corner. The cemetery is approximately 11.6 ha in area, while area Z is 1.25ha. The Stockpile is approximately 0.6ha in area. The surveyed site is predominantly composed of broad-leaved woodland, scrub and semi-improved grassland.

The Cemetery stands within a suburban neighbourhood of late 19th century origin, of predominantly residential usage with some mixed commercial and retail usage. Area Z is located in the extreme north-west of the cemetery.

1.1.2 Topography

The Cemetery sits on the northern ridge of a hill facing towards Peckham and East Dulwich to the northwest. Area Z itself sits on the north-western section of that ridge and has a mostly gentle sloping topography with a flatter area towards the south closer to the top of the hill. One small area of the slope is steeper than the rest of the area. This steeper slope forms part of the Stockpile and has been formed by the unauthorised tipping of soils.

1.1.3 Hydrology and soils

No hydrology or soil surveys undertaken on the site have been made available for this report. Most areas of the site are presumed to have very good drainage due to the sloping nature and its usage as a cemetery. However, a small depression to the north of the site collects water and has created a seasonal 'puddle' pond. The Stockpile area is known to consist of unauthorised tipping of soils.

1.1.4 Access and usage

The site currently has no public access due to be cordoned off with Heras fencing but otherwise typically has full public access. A *de facto* path runs through the centre of the site in a roughly north-south direction but ends abruptly in the north of the site. The eastern and southern boundaries of the site are delineated with a heras temporary fence. The northern and western boundaries are delineated by a wall and in places, a wooden fence. This wall and fence form the cemetery boundaries. The ground surface of the cemetery adjoining the wall, is higher than the land on the opposite side of the wall giving a stepped landscape.

Area Z is little used and has been fenced off recently so currently has no public access. Formerly it has been used for general public enjoyment or as a *de facto* entrance/exit to the cemetery from/to neighbouring land despite the wall. Some littering and a large amount of unauthorised tipped waste materials, including soil waste, has occurred here in the past.

1.1.5 Designations

Camberwell Old Cemetery has been designated as a Site of Importance for Nature Conservation (SINC) at a Borough Grade I level.

The site was first identified as such in the 1984/85 London wide surveys undertaken by London Wildlife Trust on behalf of the then Greater London Council (GLC). The London Ecology Unit (LEU) - continuing the work of designating Sites of Importance for Nature Conservation – followed up this survey in 1987-8, the results of which informed the then Southwark Unitary Development Plan. They were also published in *Nature Conservation in Southwark* (LEU, 1989), which described, under the citation for the Cemetery, the northern part in which Area Z resides: “[it] consists of tall, uncut grassland among the graves and memorials with some scrub, the whole having quite a wild feel to it; all the more valuable in a built-up area.” In addition it refers to woodland habitats having developed in the north-west of the Cemetery.

The borough's SINC's were re-surveyed in 1994 from which the Cemetery maintained its status. These three surveys predate the changes to area Z which have resulted in the scrub,

tall herb and grassland habitats on the mound. In 2014 Southwark Council commissioned a further SINC review but as of yet no results have been published.

In addition to its nature conservation designation the Cemetery is designated as Metropolitan Open Land and part of the South East London Green Chain.

2 Extended Phase I survey

2.1 Desktop survey

A data search of species was requested from Greenspace Information for Greater London (GiGL, 2015) to provide information on previous records for the whole cemetery and its surroundings up to 200 metres. The notable findings of this search are as follows:

2.1.1 Records within Camberwell Old Cemetery

2.1.1.1 Flora

- black poplar *Populus nigra betulifolia* – a London notable¹ and priority plant species (1 record, 1994)
- common broomrape *Orobanche minor* – a London notable species (1 record, 2005)
- wild onion *Allium vineale* – a London notable species (1 record, 1994)

2.1.1.2 Fauna

- bullfinch – a national red listed² species (1 record, 1994)
- common frog – a Southwark ecological species of importance³ (1 record, 1999)
- common whitethroat – a national red listed species (1 record, 1994)
- house sparrow – a national red listed species (1 record, 1994)
- stag beetle – European protected species⁴ (2 records, 1997)

2.1.2 Additional records relating to the wider area (200 metre buffer)

2.1.2.1 Fauna

- bat (unidentified) species – European protected species (1 record, 2001)
- pipistrelle bat species – European protected species (2 records, 1994)
- soprano pipistrelle – European protected species (2 records, 2012)
- goldcrest – a national amber listed⁵ species (1 record, 2006)
- hedgehog – a national priority species (6 records, 1998 (4), 2001 and 2006)
- dunnock – a national amber listed species (1 record, 2006)
- house sparrow – a national red listed species (9 records, 2000, 2001, 2002 (6) and 2006)
- kestrel – a national amber listed species (1 record, 2011)
- swift – a national amber listed species (3 records, 2010)

¹ A plant species that occurs in 14% or less of the 340 10km tetrad squares that make up the London recording area as surveyed in the Flora of the London Area (Burton, 1983).

² A species considered to have had a severe (at least 50%) UK contraction of breeding range and/or decline in UK breeding population over last 25 years.

³ A species listed within the Southwark Biodiversity Action Plan (BAP) as one with Borough importance

⁴ A species that is protected by European law namely under the Habitats Directive and/or the Birds Directive; These are principally covered in the UK under the Wildlife and Countryside Act 1981 (as amended), the Countryside Rights of Access Act (2000) and/or The Conservation of Habitats and Species Regulations 2010.

⁵ A species considered to have had a moderate (25-49%) UK contraction of breeding range and/or decline in UK breeding population over last 25 years

- common frog – a Southwark ecological species of importance (12 records, 1998(6), 1999 (3), 2000, 2006 and 2011)
- stag beetle – European protected species (16 records, 1997(3), 1998(5), 2000 (2), 2001, 2005 (3) and 2009 (2))

2.2 Survey methodology

A Habitat Survey (Phase I extended) of Camberwell Old Cemetery, Area Z was carried out on 30th April 2015 by Tony Wileman. The survey followed standard Phase I habitat survey methodology (JNCC, 1993), as modified for Greater London by the former London Ecology Unit (LEU, 1994), and adopted by the Greater London Authority (2002).

Characteristic, rare and interesting species and plant assemblages were evaluated for conservation designations and assessed as to whether they were notable for the Greater London area. Notable is defined as species which were recorded from 15% or fewer of the 400 two-kilometre recording squares (tetrads) in Greater London in the *Flora of the London Area* (Burton 1983).

Complex taxa, such as *Taraxacum* (dandelions) and *Rubus* (brambles) are treated as aggregates as there is little value in distinguishing these for determining habitat types, especially in London.

Casual recording of fauna was attempted throughout the duration of the Habitat Survey and can be found in the appendices.

A map of the habitats can be found in the Appendix as Map 2.

2.3 Aims of the survey

The aims are to:

- Identify dominant, characteristic and otherwise unusual vascular plant species and the chief habitats present using the DAFOR scale⁶ for each habitat;
- Determine the importance of these features in a local, regional (London) and national context as noted in Biodiversity Action Plans;
- Determine whether or not the site supports notable, rare and/or protected species;
- Make incidental recording of other fauna sightings;
- Provide an assessment of the biodiversity value of the surveyed site in a local, Borough and London-wide context;
- Provide an impact assessment on the proposed development proposals and detail any mitigation requirements necessary;
- Provide further biodiversity enhancement and management recommendations.

Survey objectives did not include surveying non-vascular plant species (e.g. mosses, algae). Given the broad characteristics of the cemetery's habitats this is unlikely to be a determinant factor.

⁶ A standard format for recording relative abundance (Dominant, Abundant, Frequent, Occasional, Rare).

2.4 Survey limitations

2.4.1 Seasonal plants and animals

The timing of the survey visit was considered good to characterise the species and habitats likely to be found present on site. Some plant species may have been overlooked especially late summer and autumn flowering plants. The timing of the survey is considered adequate for recording invertebrates and adequate for recording vertebrate fauna. It is considered good for recording breeding bird species and bird species overall.

Most species found on site were identifiable to species although some were identifiable to Genus only. Several ornamental shrubs which have been clumped together as ornamentals for purposes of the species lists were not identified.

In general the timing of the survey is considered good to provide an impact assessment of the proposed development

2.4.2 Access

Full access was obtained to all of Area Z.

2.5 Plant nomenclature and rarity

The *New Flora of the British Isles (third edition)* (Stace, 2010), the standard text, was consulted for plant nomenclature. English names have been used in preference to Latin (only quoted in the first instance) in order to facilitate readability of the report.

Any uncommon vascular plant species were identified in the London context using the *Flora of the London Area* (Burton, 1983) and are known as London notable species. For national rarity *The New Atlas of the British & Irish Flora* (Preston, Pearman & Dines, 2002) was referred to (where a taxon appearing in 150 or less 10 x 10km squares was considered rare).

2.6 Habitat and species rarity

The Southwark and London Biodiversity Action Plans were consulted on local and regional habitat and species importance and rarity, while the UK Biodiversity Action Plan was consulted on national habitat and species importance and rarity.

Parks and Urban Greenspace, including Churchyards and Cemeteries, are stated as a 'key habitat of ecological importance' within the Southwark Biodiversity Action Plan but this statement is not further defined. It can be assumed that these habitats are those that best helps Southwark Council deliver on its 5 core BAP broad themes which are detailed in the appendices along with species of important within the Borough.

2.7 Site habitats and evaluation

Each of the habitats are described and assessed for their biodiversity value below. It should be noted that the habitat descriptions within the text are indicative of the actual habitat as a whole but there will be variation across any given part of that habitat. Where this is significant in terms of biodiversity value, then certain areas may be described and assessed separately.

Sites are evaluated using Table 1 Site Evaluation Criteria below to generate a value for their biodiversity. This is based on ecological standards set out by the Chartered Institute of Ecology & Environmental Management (CIEEM).

Table 1. Habitat Evaluation Criteria

Habitat Evaluation Criteria	Biodiversity Value
Habitat is known to support nationally or regionally (county) significant populations of important species and is managed in a wildlife sensitive way.	Very High
Habitat is known to support regionally or locally important species and is managed in a wildlife sensitive way.	High
Habitat has a generally typical assemblage of species but is not necessarily managed in a wildlife sensitive way and/or has habitat that would normally be considered high but is isolated from other habitats depriving it of its biodiversity.	Moderate
Habitat is limited in its biodiversity usage because of some inhibiting factor or is managed in such a way that inhibits its biodiversity value. (e.g. amenity grassland, ornamental gardens with limited 'wild' space)	Low
Habitat has very limited value for wildlife due to lack of vegetation features that may support biodiversity (hard surfaces such as paths, buildings and roads)	Negligible

2.7.1 Broad-leaved secondary woodland

2.7.1.1 Description

The broad-leaved secondary woodland is located along the east, west and north boundaries of Area Z and is predominantly located within the the boundary of area Z area with only small amounts located within the Stockpile. The woodland habitat within the the boundary of area Z area has developed through a combination of late 19th century planted boundary trees and natural succession. The woodland habitat within the stockpile are no older than 12 years old and consist of younger trees. This woodland habitat is composed of a mix of tree species; mostly Norway maple and sycamore *Acer platanoides* and *A. pseudoplatanus*, horse-chestnut *Aesculus hippocastanum*, ash *Fraxinus excelsior*, and cherry species *Prunus sp.*, with shrubs of butterfly-bush *Buddleja davidii*, and young English elm *Ulmus procera*. Several Mexican-orange *Choisya sp.* shrubs have been planted along the western boundary.

Ground flora is dominated by bramble *Rubus fruticosus agg.* and ivy *Hedera helix*, yet cow parsley *Anthriscus sylvestris*, cleavers *Galium aparine* and herb-robert *Geranium robertianum* are frequent throughout. Other species include garlic mustard *Alliaria petiolata*, broad-leaved willowherb *Epilobium montanum*, lesser celandine *Ficaria verna*, wood avens *Geum urbanum*, hogweed *Heracleum sphondylium*, creeping buttercup *Ranunculus repens*, broad-leaved and wood dock *Rumex obtusifolius* and *R. sanguineus*, groundsel *Senecio vulgaris*, dandelion species *Taraxacum sp.*, common nettle *Urtica dioica* and ivy-leaved speedwell *Veronica hederifolia*.

The invasive Spanish bluebell *Hyacinthoides hispanica* is scattered throughout.

A small population of wild onion *Allium vineale* was located within the woodland habitat within the boundary of area Z.

Blackbird, blue tit, robin, blackcap, wren, ring-necked parakeet and chiffchaff were observed during the survey and ring-necked parakeets were confirmed to be breeding on site. The habitat is suitable for all of the above species to breed on site.

Green-veined white butterfly was also observed as were many other insects including midges, hoverflies, houseflies, sawflies, etc.

2.7.1.2 Assessment

This habitat is typical of urban secondary woodland with a mix of native and garden escape plants and overall has a reasonable diversity and is of good structure with fallen and standing dead wood present in sufficient amounts.

There is some evidence of occasional clearance work and the Mexican-orange shrubs appear to have been pruned. The general lack of disturbance to the habitat make it particularly valuable to the more sensitive breeding bird species such as chiffchaff and blackcap, and both appeared to have at least one male bird on territory during the survey.

Overall the habitat is expected to support a good range of invertebrate species and may support stag beetle, typical common woodland bird species, as well as common mammals including bats. Although it is possible the habitat may support hedgehog, a species in a worryingly steep decline in Britain and now rare in London, this would need to be subject to specific survey to confirm absence or presence.

A small number of wild onion plants were found within the western boundary woodland of Area Z. This is a London notable species (See section 4.2).

Currently, this part of the site is of **moderate** biodiversity value but could be of a higher value if shown to support one or more of the following:

- a significantly large population of stag beetle utilising dead wood as larva;
- a local population of hedgehog;
- at least one bat roost.

This woodland habitat within the boundary of area Z if damaged or lost could be re-created, but would take 30 years and possibly as long as 100 years before conditions were similar to that which are currently present. However, the smaller areas of young woodland within the stockpile area could be re-created to those similar to that which are currently present within 10 years. Both older and younger similar woodland habitats are also located within other areas of the cemetery including areas immediately adjacent to area Z.

2.7.2 Scrub

2.7.2.1 Description

The scrub habitat is a fairly recent type of scrub that is typical of recently disturbed soils and is often known as ruderal scrub. It has developed over the last 12 years. Most of it is located within the stockpile. Its composition is mostly that of either bramble species and/or butterfly-bush. Sycamore, horse chestnut and goat willow *Salix caprea* are scattered throughout with the former two species being mostly young or sapling trees that occur due to natural regeneration. Other shrubs are present but are typically found as single plants.

Underneath and within the scrub the ground flora, where it is present, consists of a scattering of hedge bindweed *Calystegia sepium*, cleavers, ivy and wood dock but is otherwise generally poor in composition.

All the bird species mentioned above were also using the scrub and woodland edge habitat and it is likely that blackcap, wren, blackbird and robin are using these habitats to breed.

Similarly a host of common insects were found within this habitat too.

2.7.2.2 Assessment

The scrub habitat is typical of that found on disturbed soils, having being developed from pioneer species such as butterfly-bush and sycamore that freely colonise such land. Although its composition is typically poor, possibly inhibited by the soil quality, it forms the structure of the habitat and provides breeding habitat for a number of common bird species. It will also act as cover, shelter and foraging habitat for a host of woodland and grassland species. However, the habitat is widespread in the neighbourhood and many of its features are replicated elsewhere in the cemetery, or can be created if needs be.

This habitat is currently of **low** biodiversity value with some areas supporting **moderate** value. That said it is possible that the whole habitat may be of moderate value if shown to support hedgehog.

2.7.3 Semi-improved neutral grassland

2.7.3.1 Description

This forms a narrow strip of 0.16ha on the summit of the mound, running mostly north-south with a few 'side arms' through the scrub, and located entirely within the stockpile. It has developed naturally over the last 12 years and is predominantly composed of a number of common grass species, with false oat-grass *Arrhenatherum elatius* being the most dominant. Creeping bent *Agrostis stolonifera*, cock's-foot *Dactylis glomerata*, common couch *Elytrigia repens* and Yorkshire-fog *Holcus lanatus* occur frequently. In addition the forbs⁷ ribwort plantain *Plantago lanceolata*, creeping buttercup and common vetch *Vicia sativa* also occur frequently. Other grasses and forbs include meadow foxtail *Alopecurus pratensis*, daisy *bellis perennis*, creeping thistle *Cirsium arvense*, herb-robert, perennial rye-grass *Lolium perenne*, meadow *Ranunculus acris* and creeping buttercup, curled *Rumex crispus* and broad-leaved dock, dandelion species, red and white clover *Trifolium pratense* and *T. repens*, and coltsfoot *Tussilago farfara*.

Common carder bee, holly blue butterfly and hoverflies were observed using this habitat along with a host of other mostly flying insects. A single adult common frog was also found.

2.7.3.2 Assessment

This grassland habitat is typical of ruderal urban rough grasslands and supports a typical fauna limited to quickly colonising species well-adapted to conditions of disturbed soils. The vegetation present is typical for such areas which have been left unmanaged for a few years, and not encroached by scrub. They are common throughout London.

⁷ Flowering plants that do not include grasses, sedges and rushes

It maybe of sufficient capacity and condition to support amphibians as shown by the presence of a single common frog and might also support reptiles, with slow-worm being the most likely (although specific surveys would be required to confirm absence or presence). It has enough of a variety of forbs to support a variety of typical invertebrate species including pollinating insects such as bumblebees, moths, butterflies and bees.

This habitat is currently of **low** biodiversity value, widespread throughout London and can be found elsewhere within the cemetery. The habitat is readily re-creatable to a much higher biodiversity value than that present if required.

2.7.4 Tall herbs

2.7.4.1 Description

The tall herbs (0.07ha) are predominantly found as a buffer habitat between the scrub and the semi-improved neutral grassland, but also found as a stand within the scrub in the south of the site. It is almost entirely found within the stockpile area with small amounts within the the boundary of area Z area mostly on the boundary with the stockpile. The habitat is a mix of black horehound *Ballota nigra*, creeping thistle, green alkanet *Pentaglottis sempervirens* and common nettle with lesser amounts of cow parsley, hedge bindweed, teasel *Dipsacus fullonum*, curled and wood dock and the grasses false oat-grass and cock's-foot. All species are very common and widespread across London.

Common carder bees and holly blue butterfly were observed using this habitat as were many other insects.

2.7.4.2 Assessment

These are quickly colonising species well-adapted to conditions of disturbed, nutrient enriched soils which have been left unmanaged for a few years, and not encroached by scrub. Many of the tall herb species – dependent on their location and extent – can support a variety of invertebrates, with common nettle known to be particularly valuable. Several species like the black horehound also provide rich nectar sources for a host of pollinating insects, particularly bees and bumblebees. Like the scrub habitat it acts as good provide cover, shelter and foraging habitat for a host of woodland and grassland species that includes reptiles and hedgehogs should they be present

This habitat is currently of **low** biodiversity value but could be of moderate value if it is known to support hedgehogs. The habitat is abundant throughout London and is readily re-creatable to a much higher biodiversity value than that present if required.

2.7.5 Puddle Pond

2.7.5.1 Description

This small puddle pond was the only free source of water available on site, and was clearly located in a clay based hollow suggesting that it is an ephemeral area for water collection. No associated wetland vegetation was associated with it.

2.7.5.2 Assessment

This small puddle pond did not seem to support any wetland plants or animals but despite this it does provide a free source of drinking water for all animals on site.

This habitat itself is currently of **negligible** biodiversity value because of its tiny size less than 1m².

2.7.6 Target notes

2.7.6.1 Description

In addition to the above main habitats several small features have been target noted on the habitat map (see appendices) as follows:

- T1: small area of the invasive Japanese knotweed *Fallopia japonica*.
- T2: existing stone gravestones and a small population of Japanese knotweed.
- T3: existing stone gravestones and several clumps of the invasive three-corned leek *Allium triquetrum*.
- T4: steep bank with near vertical bare soil bank which could support digger wasps and/or mining bees.
- T5: small area of Japanese knotweed.

2.7.6.2 Assessment

Several plants of Japanese knotweed were found on site and appear to have come from elsewhere as they do not form stands, as is typical from well-established plants. It is a highly invasive plant that requires control, and ideally removal, due to it being listed on Schedule 9, Section 14 of the Wildlife & Countryside Act 1981 (as amended). This means it is an offence to plant or otherwise cause the species to grow in the wild. It should be removed from site as soon as feasibly possible using appropriate treatment. Japanese knotweed is also classed as 'controlled waste' and as such must be disposed of safely at a licensed landfill site according to the Environmental Protection Act (Duty of Care) Regulations 1991.

Three-cornered leek is also listed on Schedule 9, Section 14 of the Wildlife & Countryside Act 1981 (as amended). Ideally this should also be removed as it can quickly spread and potentially reduce space availability for other species.

The steep near vertical bare soil banks are of particular value as these habitats are unusual in London and can often host a number of uncommon and rare species of digger wasps and mining bees which are also important pollinators. However, none were recorded on site.

This bare soil feature can be considered to generally have a **low** biodiversity value but may be moderate or high value if digger wasps and mining bees are present. The habitat is readily re-creatable to be more attractive to these species than that currently present.

3 Evaluation

From the habitat assessments, it can be concluded that the woodland habitat and parts of the other habitats can be considered to have a moderate biodiversity value, whilst other elements are typically of low value. Within the context of the whole cemetery, area Z – particularly the woodland stands – is still consistent with the Site of Borough Importance for Nature Conservation designation.

Most of the species recorded on site are typical of the habitats present given the Camberwell Old Cemetery's location, history and management, and are common and widespread in Southwark and London. The presence of some protected and Biodiversity Action Plan priority species on site is not surprising either, as these don't necessarily relate to the rarity or vulnerability of the habitats in which they may be found. Nevertheless, due consideration needs to be given to them in the future management of the cemetery.

Given the habitat types present, their condition and their location, it is possible that the site could support other rarer species such as hedgehog and rarer bat species. However, specific surveys would be required to establish their presence or absence. If such species were found to be present then the ecological value of the site could be higher, but this needs to be in context of the Cemetery as a whole.

Given minimal management as to that which has occurred over the last decade or so it is likely that the scrub habitats will develop towards woodland as the colonising saplings grow and produce more shade. It is also likely that the grasslands will succeed to scrub and tall herb stands and overall the current mosaic composition of the site could be lost. Some areas may be kept open by the movement of people through the site. It is this combination of the woodland, scrub, tall herb and grassland mosaic that helps to maintain the species diversity on site albeit rather limited due to the size of the area and other environmental factors such as soil condition and disturbance.

Overall all of the habitats on site are readily re-creatable and most, excluding the woodland habitat, can be re-created to a similar value or higher within a couple of years. Given this the woodland habitat present on site is of most value.

3.1 Habitat rarity and importance

No national priority or protected habitats were found within the surveyed area. None of the habitats present are of national conservation value.

The cemetery falls within the Churchyards & Cemeteries priority London BAP habitat and the Parks and Urban Greenspace, including Churchyards and Cemeteries habitat of ecological importance within the Southwark BAP. Most cemeteries are known to provide valuable wildlife habitats in London, partly due to less intensive and positive management regimes – if not benign neglect – that many have been subject to since the 1960s. In our view Camberwell Old Cemetery is typical in this respect.

The entire cemetery can also be considered to be part of a wider green landscape in this part of the borough and thus it falls within the Wildlife Corridors habitat of ecological importance.

3.2 Species rarity and importance

No national priority or rare species were found to be present on site during this survey.

Of the species of ecological importance and birds of conservation concern in Southwark (see section 3.6) only common frog was found on site as a single individual during the survey.

According to GIGL's database; one native black poplar (1994), one bullfinch (1994), one common whitethroat (1994), one house sparrow (1994), one common frog (1999), and two stag beetles (1997) have been recorded within the Cemetery (in addition to survey data that GiGL don't hold). All of these records are over 15 years old so have little value in terms of current species potential although the native black poplar still stands. They can be clarified as follows:

- a single native black poplar stands within the cemetery but not within area Z.
- bullfinch have declined in London and are now very localised. They prefer areas of scrub that have significant soft fruit trees and shrubs such as wild plum, wild cherry and blackthorn.
- common whitethroat are a common summer visitor to Britain from sub-Saharan Africa but have suffered in recent years and undergone significant declines. They require areas of dense bramble and other scrub habitats free from disturbance.
- house sparrow was once a very common urban bird but have now disappeared from many areas, the reasons for which are not fully understood. Although they prefer to nest in buildings they show strong correlations with hedgerows and areas of dense scrub vegetation which they require for cover and finding food.
- stag beetles are known to be fairly widespread across south London (London Wildlife Trust stag beetle survey work since 1997) and it is possible they are present on site.

In terms of the other species recorded within 200m of the Cemetery there is suitable habitat to support goldcrest and hedgehog. Of those species of ecological importance and birds of conservation concern in Southwark the majority of the records are over 15 years old so have little value in terms of current species potential; they may not accurately reflect what is actually present on site due to recording activity.

However, of interest are the 2006 hedgehog record and the 2012 soprano pipistrelle record.

A small number of wild onion plants were found within the western boundary woodland of the boundary of area Z. This is a London notable species and was noted as present on site in 1989. It is the rarest plant found within area Z but nationally the species has undergone little change in distribution since 1962 (Preston et al. 2002) and only just qualifies as a London notable occupying 14% of the London tetrads.⁸ Its presence here is a probably an anomaly and isn't indicative of the value of the woodland.

No other London notable plant species were recorded.

3.3 Assessment of designation

Area Z's biodiversity interest appears to be consistent with the Cemetery's designation as a Site of Borough Grade I Importance for Nature Conservation. However, this is predominantly

⁸ A tetrad is a 2 km x 2 km square; London's flora are surveyed and evaluated on a tetrad basis

the older wooded areas and glades within the area Z boundaries, rather than the scrub, tall herb and grassland habitats within the centre.

4 Development proposals and impacts

4.1 Development proposals

In the CMP, area Z is proposed to be subject to remediation of earthworks with a proposal to revert usage back to new burial space. These proposals are subject to a number of investigations including soil, tree loss, boundary fencing, and an extension to existing paths and access improvements.

A number of evolving development proposals have been put forward in the last six months. Originally area Z was proposed to have some 1000 new burial plots covering mostly the area of the Stockpile. This proposal was to remove soils and the existing vegetation within the Stockpile leaving the majority of the woodland boundary vegetation intact but removing some 18 trees, to create a gravel road access route and provide a variety of shrub, grassland and wildflower planting throughout the area. The layout of the access routes and the overall impact of the development have undergone various changes to reduce the overall impact on the current biodiversity and the current proposals (22nd June 2015, see Appendix Maps 3-5) are as follows.

- Seek to bring a currently fenced 'out of bounds' area of the cemetery back into public use as a burial area, providing approximately 700 burial plots;
- retain 53 significant trees and integrate them into the new layout;
- involve the clearance of existing self-seeded vegetation, and the removal of 19 trees;
- clear poor quality soils and unsuitable materials which have resulted from past unauthorised waste disposal;
- land modelling to the existing ground levels and incorporate additional soils to prepare site for burial, and make it safe for public access;
- retain existing vegetation and significant trees to the Underhill Road and Ryedale boundaries (The boundary of area Z area);
- include biodiversity enhancements through additional native shrub planting, wildflower meadow grassland areas and new burial area tree planting;
- include a new cemetery pathway and refurbishment of an historic pathway.

Post development it is thought that there would be an increase in visitors to the area due to improved access. This is likely to increase disturbance to the species and habitats present. Details of disturbance impacts are covered below.

4.2 Development impacts

The following impacts are based on the current proposals as expressed above. Any further change to these proposals could result in this report being inaccurate. We therefore suggest that if proposals are changed in any significant way that further assessments would be required to determine if there are any changes to the impact on the current biodiversity.

Habitat and species impacts are evaluated using Table 2 Habitat and Species Impact Criteria below to generate an impact value for their loss. This is based on ecological standards set out by the Chartered Institute of Ecology & Environmental Management (CIEEM).

Table 2. Habitat and Species Impact Criteria

Impact Criteria	Impact (negative or positive)
Habitat or species of at least national importance such as UK BAP habitats or protected species will be impacted upon in a way that either causes their loss entirely in the short or long term or are provided benefits that greatly enhance their potential for expansion.	Very high
Habitats or species of national Importance are subject to some loss in the short or long term or are provided some benefits to enhance their potential for expansion or Habitat or species of regional or local importance such as County/Borough BAP habitats or priority species will be impacted up in a way that either causes their loss entirely in the short or long term or are provided benefits that greatly enhance their potential.	High
Habitat or species of regional or local importance are subject to some loss in the short or long term or are provided some benefits to enhance their potential for expansion or the loss/gain of common wildlife beneficial habitat or species at a significant level (this level is based on a variety of factors including location, connectivity etc.)	Moderate
The loss/gain of common wildlife beneficial habitat or species at a non-significant level or insignificant levels of national/regional/local habitats or species.	Minimal
The loss/gain of insignificant levels of common generally considered non-wildlife beneficial habitat or species.	Negligible

4.2.1 Protected species

4.2.1.1 Bats

Full details of the bat survey can be found in the Preliminary bat survey report (Pearce, 2015) but the conclusions from this report show that:

- The landscape works will result in the loss of two trees with high bat roost potential. A further 13 trees with low potential to support a bat roost will also be lost.
- Common pipistrelle, soprano pipistrelle, serotine, Leisler's bat and long-eared bat were recorded during their typical emergence period, but no bats were observed to emerge from any of the trees surveyed. Although no roost sites were identified, it is likely that they occur at or near to the site.
- It is thought that the visitor increases will have a negligible negative impact on bat activity within Area Z.

Current proposals without mitigation will have a **moderate negative impact** upon the bat population and are subject to current bat legislation. However, should a bat roost be discovered on site the potential impacts could be of a **high negative impact**.

4.2.1.2 *Breeding birds*

A full breeding bird survey was not undertaken and is not currently required. However, ring-necked parakeet was confirmed as breeding on site in the the boundary of area Z area but within a tree subject to removal during the extended Phase I survey and other species including blackcap, chiffchaff, robin, blue tit, blackbird and wren were found to possibly be breeding in area Z (the boundary of area Z and stockpile areas) due to the presence of singing birds on territory.

These species are likely to mostly breeding the in scrub and woodland habitats during the months of March to August inclusive. It is also possible that breeding of species like the blackbird and robin may start earlier in February while migrant species like the chiffchaff and the blackcap may breed later into September. The likely low increase in visitors and disturbance is thought to have a low negative impact on breeding birds post development.

Any extensive vegetation removal works during these months that is close too or may disturb breeding birds is highly likely to have a **high negative impact** upon breeding birds without mitigation and is subject to current breeding bird legislation. Outside of these months there will likely be **no impact** on breeding birds.

4.2.1.3 *Reptiles and amphibians*

Only common frog was found to be present on site. It is also possible that common toad may also be present. The presence of no significant water body within the cemetery precludes the potential for any amphibians to be breeding on site.

Most amphibian species are afforded some protection under the Wildlife and Countryside Act 1981 (as amended) as amended, except great crested newt which has full protection.

Whilst the habitat is suitable to support reptile species, such as slow-worm or less likely common lizard, no records exist for the cemetery or the nearby area for either of these or any other reptile species. Furthermore, a Nature Conservation Assessment survey undertaken last year by Catherine Bickmore Associates (Catherine Bickmore Associates, 2014) concluded that no reptiles were present.

Considering the cemetery's isolation from known populations it can be surmised that it is unlikely that slow-worm, common lizard or any other protected reptile species are present within the site.

The likely low increase in visitors and disturbance is thought to have a negligible negative impact on reptiles and amphibians post development.

Overall the current proposals are expected to have **no impact** on protected reptiles and **minimal impact** on amphibians.

4.2.1.4 *Other species*

It is possible that hedgehog may be present on site as the habitat is suitable for them. However, this species has suffered severe declines in the London in recent years and it has disappeared from many locations. Hedgehogs are afforded a level of protection under the

Wildlife & Countryside Act 1981 (as amended). If hedgehogs are present they will also occupy areas outside area Z and so therefore without appropriate mitigation they are only likely to be subject to a **moderate negative impact**.

Stag beetles are likely to be present on site as they are relatively widespread across south London and have been recorded on site and in the neighbourhood. These species are saproxylic⁹ beetles and remain as larva within dead wood for up to seven years. This dead wood is typically near or below ground level but can occasionally be inside large dead tree trunks higher up. They are protected under the Wildlife & Countryside Act 1981 (as amended) from sale only but they are a London priority BAP species. Impacts on trees within the development are minimal but without appropriate mitigation they could be subject to a **minimal negative impact**.

4.2.2 Other non-protected species

Based on the current information the proposed development is likely to have the following impacts on other non-protected species of note:

- Overall loss of vegetation and fungi species is expected to be entirely of species that are common throughout the cemetery and London as a whole. No London notable or rare species are expected to be lost. Although there will be significant loss (at least temporarily) of these species within the stockpile. Within the context of the cemetery they are of **minimal negative impact**.
- No invertebrate survey has been undertaken so details of invertebrate species present are unknown. However, considering the typical habitats it can be expected that invertebrate species typical of these habitats in this part of London will form the bulk if not the entirety of the invertebrate fauna. That said entomological surveys regularly reveal some nationally scarce species at many sites in London mainly because rarities have been defined from relatively few records (invertebrates, apart from butterflies, are highly under-recorded). In a few cases some rare species have become more common in recent decades. The presence of the small bare soil banks may support rarer digger wasps and mining bees. However, most of the invertebrate species found on site are likely to be present elsewhere within the Cemetery. Current proposals are therefore expected to have a **minimal negative impact** on invertebrates.
- Non-breeding birds are typically mobile species and no direct loss is expected to occur. However, some species may lose habitat for non-breeding activities such as cover, roost space, food resources etc., and they may be subject to increases in visitor disturbance. Current proposals are therefore expected to have a **minimal negative impact** on non-breeding birds.
- No mammal survey has been undertaken although excluding hedgehog, only common species are expected to be found on site such as grey squirrel, fox, brown rat, house mouse, etc. All of these species are wide ranging and can certainly be found within the whole cemetery and in the wider area. None are expected to receive direct losses due to the proposed works. Current proposals are therefore expected to have a **minimal negative impact** on mammals.

⁹ Species that feed of dead and decaying wood material

4.2.3 Habitats

The current proposals will impact upon all of the current habitats within area Z and indicate that a significant proportion of the site is to be cleared and re-laid out as a burial site.

Based on the current assessed biodiversity value and in comparison of the Phase I habitat map and the current proposals map the following impacts will occur:

- 19 significant trees and around 0.09ha (18%) of the broad-leaved woodland habitat which is of a **moderate negative impact** within the the boundary of area Z woodland and on four specific bat roost potential trees and a **low negative impact** on the young trees within the stockpile;
- Approximately 0.41ha (87%) of the scrub habitat which has a **minimal negative impact**;
- Approximately 0.06ha (65%) of the tall herb habitat which has a **minimal negative impact**;
- Approximately 0.16ha (100%) of the semi-improved neutral grassland habitat which has a **minimal negative impact**;
- the puddle pond which has **no impact**.

5 Mitigation

The proposed development is going to have a number of negative impacts upon the overall biodiversity value of Area Z as detailed in section 5. Within the proposal there are a number of proposals to mitigate for the negative impacts. This section details those proposals and adds further information and recommendations to ensure that these negative impacts are sufficiently mitigated for. In addition further recommendations are provided to further increase the overall biodiversity value of Area Z and the cemetery as a whole.

5.1 Protected species mitigation

N.B. The following mitigation information is required to ensure compliance with current legislation.

5.1.1 Bats

The following information is adapted from the Preliminary Bat Report undertaken by Huma Pearce for London Wildlife Trust during April and May 2015 (Pearce, 2015).

By undertaking to following procedures the moderate negative impact on bats will be mitigated for.

5.1.1.1 Mitigation strategy for tree removal

Although the bat surveys did not confirm the presence of a roost site, bats are highly mobile animals that use and move between a number of roost sites throughout the year and therefore the possibility of bats being discovered at other times of the year cannot be entirely discounted.

Where possible, the landscaping proposals **should avoid** the loss of mature trees that support features of HIGH (T1 and T10) and MEDIUM (T6 and T8) potential to support a bat roost.

The two trees recognised in the Preliminary Bat Report as high bat roost potential are required to be felled (T147, T177, Harrison Design Development Ltd., 2015e). Therefore the following procedures will need be followed to ensure that the likelihood of adverse impacts are minimised:

- a minimum of one further evening bat emergence and/or dawn re-entry survey will be completed by a suitably qualified bat ecologist prior to their removal. Trees are occupied most often during late August/September, providing mating roosts, and it is therefore recommended that surveys are undertaken at this time to better assess the use of potential roost features by bats.
- If bats are discovered using the trees prior to or during felling works, tree management works would have to halted, and a European Protected Species Licence would need to be obtained from Natural England.
- During tree removal, the following procedures are to be followed to avoid impacts to bats and to ensure compliance with the wildlife legislation:
 - Felling works must be carried out between mid-September and the 1st November to avoid the bat breeding and hibernation seasons. Works should only proceed under dry conditions and when day and night time temperatures are 8°C or above.
 - All felling works must be carried out under the advice of a licensed bat ecologist.

- Tree surgeons must be briefed on bats and their field signs, features that offer possible bat habitat and the bat legislation prior to the commencement of works. The contact details of a licensed bat ecologist will be made available.
- The trees that support loose bark, splits, fissures and cavities associated with stems >10cm diameter should be climbed or reached by a suitable working platform to allow all potential roost features to be inspected by endoscope either by or under the supervision of a Class 2 licensed bat ecologist. Dusk and dawn surveys should be completed where roost sites are confirmed or suspected. Any works to trees that are confirmed to support a bat roost and which are likely to adversely impact bats or their roost sites, can only be legally carried out under licence from Natural England.
- If ivy is present the tree must be inspected using a finger-tip search during climbed inspections to assess the occurrence of crevice/cavity features behind the ivy. If any significant cavity features are discovered (i.e. which are not exposed to rainwater ingress and so offer potential shelter to bats), then they would need to be felled as below.
- Trunks or stems that have cavity features will be sectioned at least 500mm above and below the cavity so that it remains intact. Sections must be lowered to the ground, rather than clear felled, and left on site in an upright position for at least 48 hours with the cavity unobstructed so that any bats can escape at dusk unharmed. Ideally, a tree within the immediate vicinity - that will not be affected by the works - will be selected as a surrogate roost site and the section will be ratchet strapped on to this tree at approximately the same height and altitude to how it was originally found.
- Split limbs that are under tension must be wedged open during works to prevent their closure when pressure is released.

5.1.1.2 Compensatory roost and nest features

Several bat boxes (recommended to be Schwegler 2FN, 2F and 2FS boxes) are to be installed onto mature trees within the application site to compensate for the loss of potential roost habitat. Boxes will be positioned three metres or higher above ground in a place where there is a clear flight path for bats entering and leaving the box. The aspect of the box should capture the sun for part of the day and therefore be south (or southeast/southwest) facing (JNCC 2004; BCT 2003). Bird nest boxes should also be provided and installed on the same tree as the bat boxes to minimise competition of bat boxes by nesting birds (Meddings et al 2011).

5.1.2 Breeding birds

By undertaking the following procedures the high negative impact on breeding birds will be mitigated for.

5.1.2.1 Mitigation strategy for vegetation removal

Should any vegetation or soil clearance works be undertaken during the months of February-September (inclusive) then a breeding bird survey is required no more than three days prior to the proposed removal of vegetation. This is to ensure compliance with bird legislation and avoid impacts to nesting birds.

Although unlikely some bird species may nest outside this core period and therefore due care and attention should be given when undertaking potentially damaging works at any time of

year. If nesting birds are found during any works then that work must be stopped and a suitably qualified ecologist should be informed before any works are resumed. The ecologist should be able to determine what works can be carried out without causing a disturbance or harm to the nesting birds. Otherwise works are to be postponed until the young have fledged and the nest is no longer in use.

5.1.2.2 Compensatory breeding facilities

Several nest boxes suitable for hole/cavity roosting boxes (e.g. 1B nest box, Avianex and/or 'The Bird House' (www.livingbirds.com)) are to be installed on to mature trees to compensate for the loss of potential bird nest sites. Woodcrete bird boxes are recommended as they include a broad range of designs, are long lasting compared to wooden boxes and insulate occupants from extremes of temperature and condensation.

Where possible, it would be beneficial if bat (and bird) boxes could be provided throughout the whole cemetery site (e.g. a total of 40 bat and bird boxes) to enhance the value of the cemetery for bats and birds in the long term. These should be surveyed (and cleaned out) annually by a suitably qualified ecologist and all data sent to the local records centre.

In addition a large number of tree and shrubs are to be planted and these will add benefit to the loss of breeding bird habitat after a few years of growing.

5.1.3 Reptiles and amphibians

The site supports common frog (and may support common toad) but is unlikely to support any reptiles. Therefore a precautionary approach is required during the removal of vegetation on site.

This precautionary approach should entail a walkover search immediately prior to vegetation removal by a qualified ecologist. Any amphibians found should be gently collected from site and placed outside the works area in appropriate habitat. Should any protected species (great-crested newt, common lizard, grass snake, slow-worm) be found then works should be halted and appropriate mitigation procedures undertaken to remove the animals from the works area. This will consist of a licenced ecologist undertaking an initial search and trapping procedure followed up by a destructive search. This procedure is required to comply with legislation.

By undertaking these procedures the minimal negative impact on reptiles and amphibians will be sufficiently mitigated for.

5.1.4 Hedgehogs

The site may support hedgehog. There is no requirement to survey for this species but a precautionary approach is required during the removal of vegetation on site.

This precautionary approach should entail a walkover search prior to vegetation removal by a qualified ecologist. This ideally would be undertaken the night before proposed works using appropriate night working tools.

Should any hedgehog be found then works should be halted and appropriate mitigation procedures undertaken to remove the animals from the works area. This will consist of a licenced ecologist undertaking an initial search and trapping procedure followed up by a destructive search. This procedure is required to comply with legislation.

By undertaking these procedures the potential moderate negative impact on hedgehogs will be sufficiently mitigated for.

5.1.5 Stag beetle

Stag beetle are almost certainly located on site within both standing and fallen dead wood. There is no requirement to survey for this species but a precautionary approach is required during the removal of vegetation on site (Frith, 2000).

This precautionary approach should consist of the following procedures:

- Any removed tree that support significant dead wood in its trunk should be left on site as a trunk of fallen dead wood as a feature in the woodland environment.
- The roots of any removed tree or the presence of any large amount of dead wood found buried during soil re-profiling should be re-buried within the woodland habitat taking care not to disturb large existing tree roots. If they cannot be re-buried then they should be either partly buried as much as possible or piled onto the surface within the woodland habitat as a dead wood feature.
- Any loose stag beetle larva found should be carefully collected and reburied with the dead wood features they were located with.

These processes will be subject to soil removal laws and policies regarding cemeteries.

By undertaking these procedures the minimal negative impact on stag beetles will be sufficiently mitigated for.

5.1.6 Other protected species

No other protected species are expected to be found that require legal mitigation procedures. However, should in the unlikely event any other protected species be found on site then works should be halted and appropriate mitigation procedures undertaken to remove the animals from the works area. These would need to be undertaken by a qualified licensed ecologist.

5.2 Other species mitigation

In addition to the above mitigation procedures several other proposals within the development will mitigate for the impact upon non-protected species.

5.2.1 Vegetation mitigation

Although a significant amount of minimal valued vegetation is to be removed the overall impact is considered to be minimal because the habitats lost are common in London, are easily re-creatable and are also found elsewhere within the cemetery. Current proposals will mitigate this vegetation loss with:

- approximately 0.23ha of conservation grassland consisting of 20:80 ratio of wildflowers and grasses (a typical natural grassland mix) with margins and aisles between burials of hard-wearing fescue grasses;
- approximately 0.1ha of wildflower verges consisting of 50:50 ratio of wildflowers and grasses (a highly varied and rich wildflower mix);
- approximately 0.1ha of wildflower regeneration areas consisting of 20:80 ratio of wildflowers and grasses (a typical grassland/woodland edge mix mix);
- over 300 metres of newly planted mixed native hedgerow;

- approximately 0.1ha of planted shrubs consisting of hawthorn, field maple, hazel, white dogwood, guelder-rose, blackthorn, elder, holly and yew;
- approximately 65 newly planted trees of common lime, pedunculate oak, silver lime, and wild cherry;
- areas of ivy underplanting on embankments within burial areas;
- areas of native wildflower planting of in maintained woodland habitats outside burial areas.

These proposals far exceed the amount of wildlife beneficial vegetation that is to be lost during the development and is considered to be of a **high positive impact** on overall vegetation composition and diversity. However the following changes are recommended to better provide for biodiversity:

- White dogwood is replaced by common dogwood *Cornus sanguinea*;
- Common and silver lime trees are replaced by hornbeam *Carpinus betulus*.

The appropriate and effective management of these habitats and features is important to ensure that they are maintained in a suitable condition in the long-term.

5.2.2 Invertebrate mitigation

Invertebrate mitigation is expected to occur mostly through the changes in vegetation composition above and the current proposals offer a more diverse range of plant species to attract those species that are already on site and in addition, a wide variety of invertebrate species that may currently not be present on site especially pollinating insects like bees, moths, hoverflies, flower beetles and butterflies.

Several deadwood log trunks are proposed to be located around the perimeter of the grassland habitats and within the woodland to benefit saproxylic species

The vegetation proposals are expected to have a **high positive impact** on overall invertebrate diversity.

5.2.3 Non breeding bird mitigation

The loss of non-breeding birds is likely to have a longer term effect than other groups, as the proposed planted shrubs, hedge and trees that will attract birds will require time to grow before they can provide specific value for them. However after approximately five years it is thought that there will be an overall **moderate to high positive impact** on the non-breeding bird populations on site.

5.2.4 Mammal mitigation

Similarly to non-breeding birds the loss of mammals is likely to have a longer term effect than other groups, as the proposed planted shrubs, hedge and trees that will attract these mammals will require time to grow before they can provide specific value for them. However after approximately five years it is thought that there will be an overall **moderate to high positive impact** on the local mammal population on site.

5.3 Habitat loss mitigation

Approximately 0.72 ha of habitat is to be lost as part of the proposed development. However, 0.53ha of habitat is planned to be created within area Z (thus excluding the proposed path networks of 200 m²). This created habitat should mitigate the losses as follows.

The proposed 65 newly planted trees will mitigate over time the losses of 19 significant trees and the small area of woodland habitat proposed to be lost. It is understood that the newly planted trees will take many years to reach the age of some of those trees that are to be lost but the number of replacement trees should help to compensate for this loss. These proposed trees offer a **moderate positive impact**.

0.33ha of created grassland habitats within the stockpile are to compensate for the loss of the 0.22 ha of tall herb and semi-improved neutral grassland. The proposed grassland mixes are much more species diverse than those currently on site and will, in two or three of years, provide for a wider range of invertebrates and birds. These proposed grasslands offer a **high positive impact**.

0.1ha of shrub plantings in clumps and 300 metres of hedgerow will mitigate for the loss of 0.41ha of scrub habitat loss and although this is less area, the composition of these planted shrubs and the hedgerows will be more varied than that currently found and will significantly increase the potential for higher biodiversity value in the long term. These proposed shrub clumps and the hedgerows will offer a **moderate positive impact**.

There are also proposals to create a swale area in the northeast of the site near where the puddle pond was located. The success of the swale will be dependent on the water table, soil type and topography of the proposed development. Should it be designed effectively this swale will significantly increase the amount of surface water available to wildlife that uses the site. **This is a moderate positive impact.**

We recommend that the swales are initially partly planted with a few damp grassland type species such as soft rush *Juncus effusus*, hard rush *Juncus inflexus*, celery-leaved buttercup *Ranunculus scleratus*, silverweed *Potentilla anserina* and ragged-robin *Lychnis flos-cuculi*.

5.4 Other mitigation

In addition to the above mitigation proposals several hibernacula and wood stacks are proposed to be located within the maintained woodland habitat. These will be of benefit to amphibians, reptiles (if they are present) as well as invertebrates and small mammals. These features are a **moderate positive impact**.

We recommend that some of these hibernacula are created as enclosed vertical or near vertical sand banks and are located on the edge of grassland and wildflower areas facing in a southerly direction where they get warm. These features will be valuable to a number of invertebrate species such as mining bees, digger wasps and various other sand/soil burrowing invertebrate species.

5.5 Future management

The most important aspect to ensure these recommendations are successful will be the resources and commitment to manage them.

Below are some brief management guidelines to maintain the wildlife habitats to at least a moderate biodiversity level:

- Woodland and scrub habitat should be managed as wildlife areas. Standing and fallen dead wood should be maintained where possible. Invasive and ornamental species should be removed with the latter being replaced by native species. Woodlands and

scrub are better for wildlife if they have a varied age structure from saplings to mature trees. Woodland/scrub ground flora is best if it is variable and one species does not dominate across the site throughout the summer months. Most secondary woodlands are best to maintain as a mosaic of cow parsley, bramble and ivy as the core species (with no one species covering more than 40%) with other species interspersed including common nettle, lesser burdock, wood avens, etc.

- Grassland habitat should be managed through infrequent mowing with walking areas mown only as a necessity dictates while wildlife beneficial grassland habitats are best cut once (September/October) or twice a year (additional cut in late March) in any given year rather than left entirely uncut. All cuttings should be removed. This is to maximise potential for flowering species to be pollinated and set seed. Sometimes it is beneficial to leave 30-50% of the whole of the grassland areas uncut in one given year so as to provide overwintering locations for hibernating invertebrates. Grasslands can be arranged to be cut on rotations to account for this.

Further information on cemeteries, and how best to manage their heritage and biodiversity value, can be obtained from the guidance *Paradise Preserved* (Bowdler, R. et al, 2007).

6 Conclusion

It can be concluded that should the development proposal go ahead as identified in this report then the overall impact on the biodiversity of area Z, particularly of the stockpile will be minimal. There will be some moderate impact on the small areas of woodland within the boundary of area Z area and the four trees of medium or higher bat roost potential.

We therefore propose that (if possible):

- there should be no impact on the woodland environment within the boundary of area Z if the path routes were to be amended
- the two trees of high bat roost potential within the main works area that will be felled will adhere to a series of agreed procedures so as to comply with bat legislation.
- the two trees with moderate bat roost potential that sit outside the main works area but are fringed by it are retained and protected from accidental damage during any works so that they remain as potential colonisation sites for bats in the future. Legislation must be followed if they are currently being used as roosts;
- the soil removal activities would need to be carefully undertaken to avoid damage to the trees that are located on the edge of the stockpile.

Should the collective mitigation proposals that have been identified in sections 5 above be followed, then it is highly likely that within around two or three years post development there would have been a net biodiversity gain and this could improve further in 15 years as the shrubs and trees mature.

This is dependent on an effectively funded management programme of works to maintain the wildlife valuable features that are implemented.

Should any of the current proposals be changed significantly then this report will be inaccurate and a further survey and impact assessment will be required.

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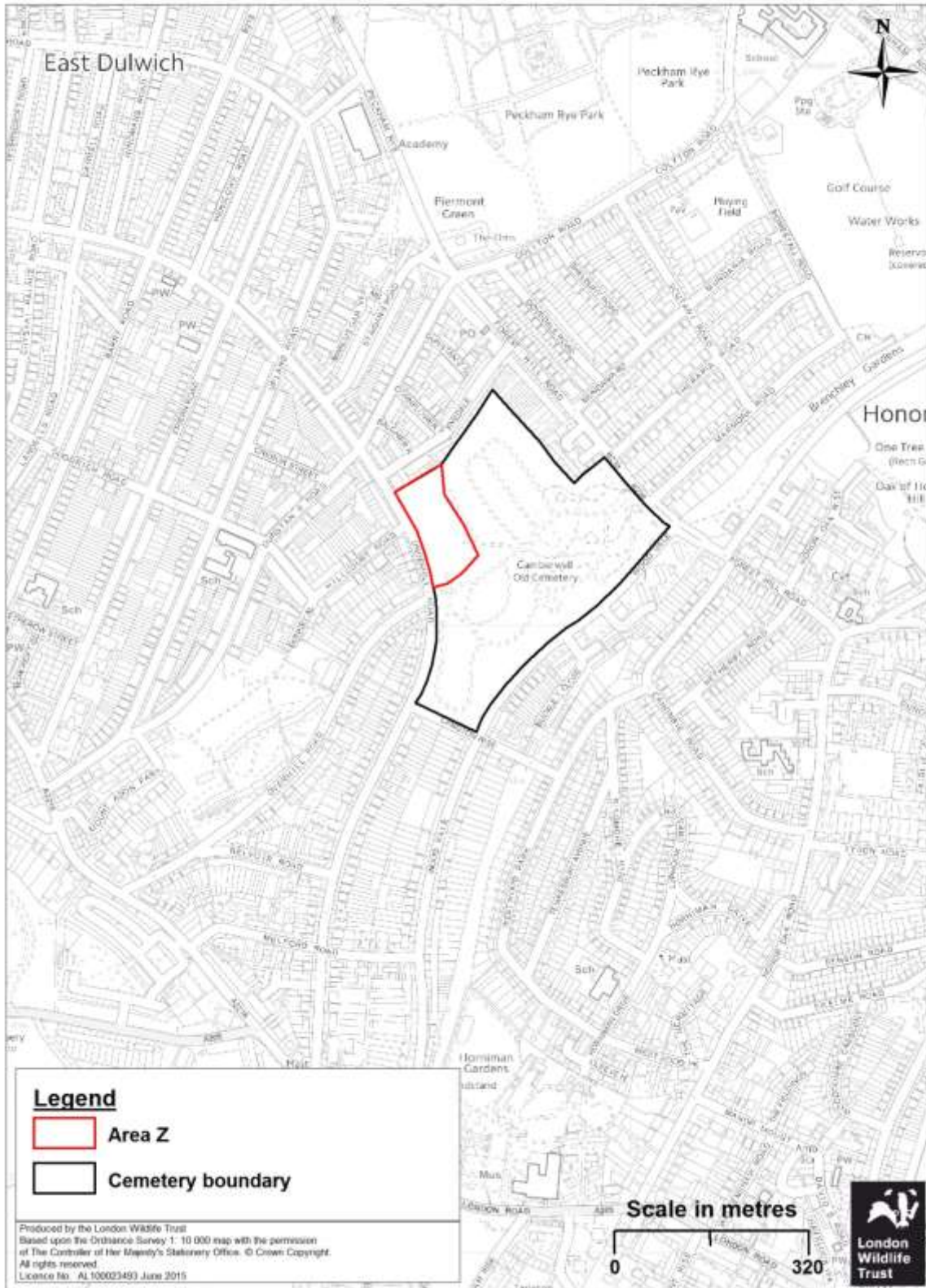
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Appendices

Map 1

Camberwell Old Cemetery Area map



Map 2

Camberwell Old Cemetery, Area Z habitat map



Target Notes for Map 2

- T1: small area of the invasive Japanese knotweed *Fallopia japonica*.
- T2: existing stone gravestones and a small population of Japanese knotweed.
- T3: existing stone gravestones and several clumps of the invasive three-corned leek *Allium triquetrum*.
- T4: steep bank with near vertical bare soil bank which could support digger wasps and/or mining bees.
- T5: small area of Japanese knotweed.

Map 3 Latest proposals: Draft illustrative site layout at 22nd June 2015 (Harrison Design Development Ltd, 2015c)



Vascular plant species lists

Scientific name	Common name	Species abundance in each habitat (DAFOR Scale: D = Dominant; A = Abundant; F = Frequent; O = Occasional; R = Rare)				Notes
		Broad-leaved secondary woodland	Scrub	Semi-improved neutral grassland	Tall herbs	
<i>Acer platanoides</i>	Norway maple	O	R			
<i>Acer pseudoplatanus</i>	sycamore	F	O	R	R	
<i>Aesculus hippocastanum</i>	horse-chestnut	O	O			
<i>Aesculus sp.</i>	horse-chestnut species	R				planted
<i>Agrostis capillaris</i>	common bent			R		
<i>Agrostis stolonifera</i>	creeping bent		R	F		
<i>Alliaria petiolata</i>	garlic mustard	O			R	
<i>Allium vineale</i>	wild onion	R				
<i>Allium triquetrum</i>	three-cornered leek				O	garden escape or planted
<i>Alopecurus pratensis</i>	meadow foxtail	R	R	O	R	
<i>Anthriscus sylvestris</i>	cow parsley	F			O	
<i>Aquilegia sp.</i>	columbine species	R		R		garden escape or planted
<i>Arrhenatherum elatius</i>	false oat-grass	O	R	D	O	
<i>Ballota nigra</i>	black horehound		R	R	F	

Scientific name	Common name	Species abundance in each habitat (DAFOR Scale: D = Dominant; A = Abundant; F = Frequent; O = Occasional; R = Rare)				Notes
		Broad-leaved secondary woodland	Scrub	Semi-improved neutral grassland	Tall herbs	
<i>Bellis perennis</i>	daisy			O		
<i>Buddleja davidii</i>	butterfly-bush	O	F			Invasive garden escape
<i>Calystegia sepium</i>	hedge bindweed	R	O	R	O	
<i>Cardamine flexuosa</i>	wavy bitter-cress	R				
<i>Centaurea nigra</i>	common knapweed			R	R	
<i>Choisya sp.</i>	Mexican orange species	F				planted
<i>Cirsium arvense</i>	creeping thistle			O	F	
<i>Cirsium vulgare</i>	spear thistle	R		R	R	
<i>Cortaderia selloana</i>	pampas-grass			R		garden escape or planted
<i>Crataegus sp.</i>	hawthorn species	R				garden escape or planted
<i>Crepis vesicaria</i>	beaked hawk's-beard			R		
<i>Dactylis glomerata</i>	cock's-foot		R	F	O	
<i>Dipsacus fullonum</i>	teasel			R	O	
<i>Elytrigia repens</i>	common couch			F	R	
<i>Epilobium hirsutum</i>	great willowherb			R		

Scientific name	Common name	Species abundance in each habitat (DAFOR Scale: D = Dominant; A = Abundant; F = Frequent; O = Occasional; R = Rare)				Notes
		Broad-leaved secondary woodland	Scrub	Semi-improved neutral grassland	Tall herbs	
<i>Epilobium montanum</i>	broad-leaved willowherb	O				
<i>Fallopia japonica</i>	Japanese knotweed		R		R	Invasive garden escape
<i>Festuca rubra</i> sp.	red fescue type species	R		R		
<i>Ficaria verna</i>	lesser celandine	O				
<i>Fraxinus excelsior</i>	ash	O	R			
<i>Galium aparine</i>	cleavers	F	O	R	R	
<i>Geranium robertianum</i>	herb-robert	F	R	O		
<i>Geum urbanum</i>	wood avens	O	R			
<i>Glechoma hederacea</i>	ground-ivy	R				
<i>Hedera helix</i>	ivy	A	O			
<i>Heracleum sphondylium</i>	hogweed	O	R			
<i>Holcus lanatus</i>	Yorkshire-fog			F	R	
<i>Hyacinthoides hispanica</i>	Spanish bluebell	O		R		Invasive garden escape or planted
<i>Hypericum perforatum</i>	perforate st john's-wort			R		

Scientific name	Common name	Species abundance in each habitat (DAFOR Scale: D = Dominant; A = Abundant; F = Frequent; O = Occasional; R = Rare)				Notes
		Broad-leaved secondary woodland	Scrub	Semi-improved neutral grassland	Tall herbs	
<i>Ilex aquifolium</i>	holly	R				
<i>Lamium purpureum</i>	red dead-nettle			R		
<i>Lathyrus latifolius</i>	broad-leaved everlasting-pea			R	R	garden escape or planted
<i>Lolium perenne</i>	perennial rye-grass			O	R	
<i>Lotus corniculatus</i>	common bird's-foot- trefoil			R		
<i>Malva sylvestris</i>	common mallow			R		
<i>Medicago lupulina</i>	black medick			R		
<i>Narcissus sp.</i>	daffodil species	O				garden escape or planted
<i>Pentaglottis sempervirens</i>	green alkanet	R		R	F	
<i>Picris echioides</i>	bristly oxtongue	R				
<i>Picris hieracioides</i>	hawkweed oxtongue			R		
<i>Plantago lanceolata</i>	ribwort plantain			F		
<i>Populus tremula</i>	aspen			R		

Scientific name	Common name	Species abundance in each habitat (DAFOR Scale: D = Dominant; A = Abundant; F = Frequent; O = Occasional; R = Rare)				Notes
		Broad-leaved secondary woodland	Scrub	Semi-improved neutral grassland	Tall herbs	
<i>Populus x canadensis</i>	hybrid black polar	R				planted
<i>Prunus avium</i>	wild cherry	R				
<i>Prunus sp.</i>	cherry species	O	R			
<i>Quercus robur</i>	pedunculate oak	R	R	R		
<i>Ranunculus acris</i>	meadow buttercup	R		O	R	
<i>Ranunculus repens</i>	creeping buttercup	O		F		
<i>Rosa sp.</i>	rose species		R			garden escape or planted
<i>Rubus fruticosus agg</i>	bramble species group	D	D	R	R	
<i>Rumex crispus</i>	curled dock			O	O	
<i>Rumex obtusifolius</i>	broad-leaved dock	O	R	O		
<i>Rumex sanguineous</i>	wood dock	O	O	R	O	
<i>Rumex sp.</i>	dock species	R				
<i>Salix caprea</i>	goat willow		O			
<i>Salix fragilis</i>	crack willow		R			
<i>Salix sp.</i>	willow species	R				

Scientific name	Common name	Species abundance in each habitat (DAFOR Scale: D = Dominant; A = Abundant; F = Frequent; O = Occasional; R = Rare)				Notes
		Broad-leaved secondary woodland	Scrub	Semi-improved neutral grassland	Tall herbs	
<i>Sambucus nigra</i>	elder	R	R			
<i>Senecio jacobaea</i>	common ragwort	R		R		
<i>Senecio vulgaris</i>	groundsel	O				
<i>Sisymbrium officinale</i>	hedge mustard			R		
<i>Sonchus asper</i>	prickly sow-thistle	R				
<i>Sonchus oleraceus</i>	smooth sow-thistle	R				
<i>Taraxacum sp.</i>	dandelion species	O	R	O		
<i>Taxus baccata</i>	yew	R				
<i>Tilia x europaea</i>	common lime	R				planted
<i>Trifolium pratense</i>	red clover			O		
<i>Trifolium repens</i>	white clover			O		
<i>Tussilago farfara</i>	coltsfoot			O		
<i>Ulmus procera</i>	English elm	O				
<i>Urtica dioica</i>	common nettle	O	R	R	F	
<i>Veronica hederifolia</i>	ivy-leaved speedwell	O				

Scientific name	Common name	Species abundance in each habitat (DAFOR Scale: D = Dominant; A = Abundant; F = Frequent; O = Occasional; R = Rare)				Notes
		Broad-leaved secondary woodland	Scrub	Semi-improved neutral grassland	Tall herbs	
<i>Veronica persica</i>	common field speedwell			R		
<i>Vicia sativa</i>	common vetch			F	R	
<i>Viola odorata</i>	sweet violet	R				garden escape or planted
Unidentified ornamental shrubs and trees		R	R			garden escape or planted

Southwark Biodiversity Action Plan (BAP)

The Southwark BAP is compiled along five broad themes these are:

- Theme 1: Wildlife and Ecosystem services - identifies actions for the conservation and enhancement of wildlife and the goods and services provided for free by the natural environment
- Theme 2: The Urban Forest - defined as the trees, woodland and hedges in Southwark. The network of these habitats plays an important role in maintaining the ecological network, not only in Southwark but across London. Trees play a vital role in sustainability of the urban environment.
- Theme 3: The Built Environment - Green infrastructure and a green space linked to the built environment offers quality of life, environmental regulation and is a key habitat for many species of conservation concern. In fact some of these animals such as the swift have become specialised to this environment.
- Theme 4: Climate change and sustainability – climate change has been identified as a key challenge to London and Southwark. However there is little clear understanding of the direct impact this may have on the borough. Sustainability comes in many forms from composting garden waste to ensuring buildings meet energy efficiency targets.
- Theme 5: Connecting with nature - is all about community action; Events such as bat walks, planting, clean up days and dawn chorus events well attended in Southwark. Volunteers such as friends of groups, corporate volunteers and individuals play a significant role in managing and enhancing wildlife areas in our open spaces.

In terms of species the Southwark BAP indicates that:

the following Borough relevant species are important national or regional indicator species:

- stag beetle
- white-letter hairstreak
- common frog
- common toad
- smooth newt
- common lizard
- slow-worm
- bats
- hedgehog
- black poplar
- mistletoe
- cornflower

and the following relevant birds are of conservation concern and listed in The Birds of Conservation Concern 3 (BTO et al, 2009).

- bullfinch – red listed
- common whitethroat – red listed
- green woodpecker – red listed
- house sparrow – red listed
- lesser redpoll – red listed
- lesser spotted woodpecker – red listed
- linnet – red listed
- song thrush – red listed
- spotted flycatcher – red listed

- starling – red listed
- stock dove – red listed
- dunnock – amber listed
- goldcrest – amber listed
- kestrel – amber listed
- mistle thrush – amber listed
- redwing – amber listed
- swift – amber listed

Capability statement

Company and report information

The recommendations set out within the report broadly reflect London Wildlife Trust's core principles and objectives.

The information in this document is, to the best knowledge of the author and London Wildlife Trust correct at time of writing.

The ecological recommendations offered in this document are based on known wildlife conservation good practice and where applicable, the current legislation on protected species but should not be treated as legal advice. The report may also contain additional, non-statutory, recommendations with regards to protected species and/or habitats. These are clearly identified as optional where they are offered.

London Wildlife Trust does not take any responsibility for future decisions about the site that is the subject of this assessment.

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Staff capability

All ecologists are members of the Chartered Institute of Ecology & Environmental Management (CIEEM), at the appropriate level, and follow the CIEEM code of professional conduct when undertaking ecological work.

Table 3. Staff details

Name and contact details	Role in team	Relevant experience
<p>Karen Hall Tel: 020 7803 4284 khall@wildlondon.org.uk</p>	<p>Project Manager Client liaison, management, quality control.</p>	<p>26 years' project management experience across a range of sectors including, nature conservation, local authority and private sector.</p>
<p>Tony Wileman BSc (Hons), MCIEEM Tel: 020 7803 4283 Email: twileman@wildlondon.org.uk</p>	<p>Senior ecologist Data collection, Analysis and evaluation, mapping and report delivery.</p>	<p>24 years' experience of land management, site surveys and developing and implementing management plans. Excellent identification skills for relevant taxa. Competent in all MS Office programs, <i>MapInfo</i> and <i>ArcGIS</i></p>
<p>Alister Hayes BA (Hons), PGD</p>	<p>Project advisor Quality control.</p>	<p>Over 27 years' experience in land management and nature conservation planning and policy. Extensive knowledge of wildlife site identification and analysis.</p>
<p>Mathew Frith BSc (Hons), MCIEEM, CEnv Tel: 020 78034292 Email: mfrith@wildlondon.org.uk</p>	<p>Project advisor Quality control.</p>	<p>27 years' experience of urban nature conservation policy and practice, including land management issues of parks and inner urban sites. Phase 1 survey experience and site assessment. Green Flag Award judge.</p>