



Stourhead MIOS Detailed Design - Garden Lake Preliminary Ecological Appraisal and Ecological Impact Assessment

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Abbreviations

BAP	Biodiversity Action Plan
BCT	Bat Conservation Trust
BNG	Biodiversity Net Gain
CIEEM	Chartered Institute of Ecology and Environmental Management
EA	Environment Agency
EclA	Ecological Impact Assessment
EPS	European Protected Species
GCN	Great Crested Newt
GIS	Geographic Information System
INNS	Invasive Non-Native Species
JNCC	Joint Nature Conservation Committee
LNR	Local Nature Reserve
LWS	Local Wildlife Site
MAGIC	Multi-Agency Geographic Information for the Countryside
NNR	National Nature Reserve
PEA	Preliminary Ecological Appraisal
PRF	Potential Roosting Feature
SAC	Special Area of Conservation
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
UKHab	UK Habitat Classification
WCA	Wildlife and Countryside Act
WSBRC	Wiltshire & Swindon Biological Records Centre

1 Introduction

1.1 Project Background

JBA Consulting was commissioned by the National Trust to undertake a Preliminary Ecological Appraisal (PEA) and Ecological Impact Assessment (EclA) in relation to works at Garden Lake, at the National Trust Stourhead Estate. The aim of this report is to provide baseline data and identify any likely ecological constraints to the proposed works followed by an assessment of the likely impacts associated with the scheme, and the mitigation measures required to reduce ecological impacts. Where applicable, recommendations for further surveys, mitigation and ecological enhancements have been provided, in relation to the ecological receptors likely to be impacted upon.

1.2 Site Location

The centre of the site is located at National Grid Reference ST 771 339 and the nearest postcode is BA12 6QB. The site is owned by the National Trust and is home to numerous 18th century landmarks. The site location is presented in

Figure 1-1 and the area surveyed mapped in Figure 1-2. Works are required to a section of embankment along the shallow western arm off of the main lake body and to the east of the Grade II Iron Bridge which is hereafter referred to as 'the site'. The site covers the full width of the embankment and is approximately 60m in length. The topographical survey undertaken by Grantham Coates Surveys Ltd in June 2021 indicates that the embankment varies between 0.6m and 3.0m in height from crest to footpath level. Within the study area the embankment crest is approximately 2m wide.



Figure 1-1. Site location.

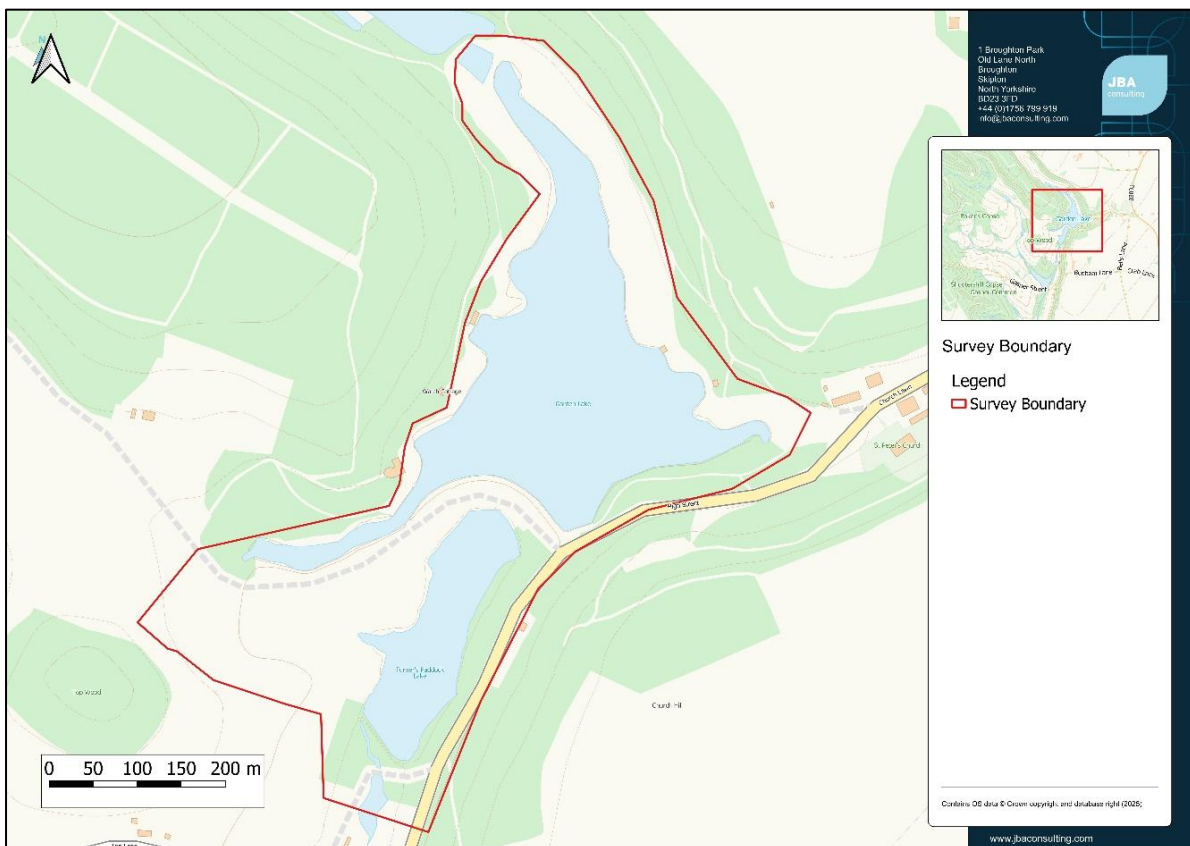


Figure 1-2. Area Surveyed.

1.3 Proposed Works

The embankment dam at Garden Lake is formed of two components, the main dam and the western arm embankment. The western arm embankment has a long history of seepage issues and has undergone several phases of remedial works as noted within the various Section 10 Reservoir reports produced over the years.

Despite these works, ongoing seepage is evident at the site. The western arm embankment lies within the formal gardens. In the Stantec. 2019 S10 report (Ref.: Report of an inspection under Section 10 of the Reservoirs Act 1975, Garden Lake Reservoir) the Inspecting Engineer included a Matter in the Interest of Safety (MIOS) related to seepage observed at the Western Arm Embankment. The MIOS reads:

‘Measures shall be taken to reduce seepage through the western arm embankment between the Main Dam and the Iron Bridge.’

An initial options review was completed by Stantec UK Ltd (Stantec) in October 2019 (ref: Stantec. 2019. Western Arm Seepage Remedial Options Report), the report considered sheet piling and re-puddling of the clay core as options, concluding that the sheet pile cutoff was the preferred option. This option was not implemented.

Mr Martin Airey, in the capacity of Qualified Civil Engineer overseeing the implementation of the MIOS recommendations wrote to the Enforcement Authority on 8th September 2022 advising that, due to uncertainty as to the location of the seepage a two phased approach was being adopted:

Phase 1 comprised installation of a new improved drainage network for the downstream face and downstream toe area of the embankment to capture and measure the seepage in an attempt to define the source of the leak and inform the decision on the remedial works.

Phase 2 comprised the implementation of the remedial works.

The Phase 1 works were completed in July 2022 and a six-month monitoring period was initiated.

A further Section 10 reservoir report was produced following an inspection undertaken in 2023 which had a revised MIOS with a deadline of (July 2026);

‘Re-puddle the clay core over the length of the main embankment between the iron bridge and the location of the outlet chamber of the new toe drain. This should be done within 36 months of the date of this report.’

JBA reviewed the data following the installation of the new drainage network and the older ground investigation report and provided the National Trust with an optioneering report outlining the various solutions considered feasible to remediate the dam and reduce further seepage in May 2024.

The National Trust reviewed the options and confirmed a piled solution along the crestline of the dam as their preferred option.

The works currently proposed include sheet-piling approximately 40 meters along the crest of the western embankment to approximately 3-4 metres above ground level, comprising of AZ12-770 piles in a zig-zag formation, starting at the Grade II Iron Bridge. Sheet piles will be installed using an attachment to an excavator. A temporary gravel working platform with a separator geotextile at the base will be built along the embankment edge to provide access for the excavator.

Water levels of the shallow western arm off of the main lake body will be dropped by approximately 1-2 metres to allow access to the western arm embankment. This will be achieved through the main drainage network and spillway. If the required water level drop cannot be achieved through the main drainage network pumps may be required.

Given the small-scale nature of the works in relation to the size of the main lake body, the proposed water level drop of the western arm is not anticipated to impact the main lake body. Water levels of the Lake regularly fluctuate with the National Trust often engaging the drainage network to reduce water levels of the main lake body.

The works are currently scheduled to take place in January and February 2026.

2 Methods

An ecological assessment of the site has been undertaken in line with current best practice guidance (CIEEM, 2017) and included:

- A desk-based assessment to identify any records of protected and/or priority habitats and species, and designated nature conservation sites in the vicinity of the proposed works.
- A site survey comprising a habitat survey using the UK Habitat Classification (UKHab) and an assessment of the possible presence of protected or priority species, and (where relevant) an assessment of the likely importance of habitat features present for such species.
- An assessment of the potential impacts of the works on the habitats and species present at the site and the surrounding areas.
- Assessing the importance of ecological features affected and assigning these features geographical scales of importance.
- Characterisation of impacts e.g. extent, magnitude, duration, reversibility, timing and frequency.
- Identification of cumulative impacts.
- Identification of significant effects of impacts in the absence of any mitigation.
- The design of suitable avoidance measures and mitigation to ensure ecological impacts are kept to a minimum.
- Proposals for suitable compensation and/or ecological enhancement measures.

2.1 Desk-Based Assessment

Prior to undertaking the site survey, searches of databases containing ecological records, priority habitats, and information on statutory and non-statutory designated sites were made. The following sources were included in these searches:

- MAGIC mapping service (www.magic.gov.uk)
- Natural England GIS data (www.gis.naturalengland.org.uk/pubs/gis/GIS_register.asp)
- Wiltshire & Swindon Biological Records Centre (WSBRC)

Due to the size of the site, it is considered that the zone of influence would be up to 1km from central grid reference ST 77091 33880, and therefore the desk-based assessment was conducted within this search area.

2.2 Site Survey

A site survey was undertaken on the 19th of August 2025 by ecologist Hannah Webster. The survey area included the site boundary as outlined in Figure 1-2 above. The PEA was based upon a UKHab Survey, conducted using the UK Habitat classification (UKHab) system. The method was extended to identify any features suitable for use by legally protected or notable species and locate evidence for their presence or likely absence based on standard techniques.

2.2.1 Habitats

Habitats within and adjacent to the site boundary were surveyed using the UKHab classification system. The survey was undertaken within the boundary shown in Figure 1-2. Habitats were mapped to level 4 of the UK Habitat Classification scheme (UKHab Ltd 2023) and implemented using the field key with reference to the relevant definitions (UKHab Ltd 2023). All habitats within the site were recorded during the site survey and a description of each habitat type collected. Botanical names follow Stace (2019).

2.2.2 Protected and Notable Species

Habitats were also assessed for their potential to support any legally protected species or species of conservation concern and any incidental faunal sightings, or field signs discovered during the survey, were recorded. The following sections provide further details on the assessments undertaken in relation to specific species. Legislative guidance relating to protected species is outlined in Appendix A, along with details of other relevant policy and legislation.

2.2.2.1 Birds

Vegetation and habitats around the site were assessed for their suitability to support nesting birds. Special consideration was given to bird species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). Furthermore, any birds seen or heard on site during the survey were recorded as incidental observations.

2.2.2.2 Badger

The survey area was searched for signs of Badgers *Meles meles*, and where evidence was found details were recorded following Harris et al. (1989). In addition to recording the presence of setts and the level of activity at them, the following signs of activity were also searched for: latrines, footprints, evidence of feeding activity and well-worn paths through vegetation. Badgers will use a number of setts throughout their territory at different times of year; any large holes with the potential to be used by Badgers, but not showing obvious signs of recent activity, were therefore also recorded.

2.2.2.3 Bats

Structures and trees likely to be impacted by the proposed scheme were inspected during a Daytime Bat Walkover (DBW) to observe, assess, and record any habitats suitable for bats to roost, commute and forage both on site and in the surrounding area using the methods specified in the Bat Conservation Trust (BCT) guidelines (Collins, 2023).

Structures, trees, and other features that could be suitable for bats to roost in and any habitats that could be suitable for bats to commute, forage or swarm in/ at were assessed for potential suitability following the below guidance provided by the BCT Guidelines:

Evidence indicating the existence of a bat roost includes bat droppings, urine staining/ dark stains running below holes or cracks, odours, feeding remains, scratch marks, and dead/alive bats. However, roosting bats may still be present without any external evidence being recorded.

Furthermore, the suitability of habitats across the site to support commuting and foraging bats was assessed in terms of habitat type, abundance, connectivity, and distribution. These were categorised as having either 'none', 'negligible', 'low', 'moderate' or 'high' suitability for bats which was determined by applying the categories given within the BCT Guidelines (see Table 2-1).

Table 2-1. Guidelines for assessing the potential suitability of proposed development sites for bats, based on the presence of habitat features within the landscape (Collins, 2023).

Potential Suitability	Description of roosting-habitats in structures	Description of potential flight-paths and foraging habitats
None	No habitat features on site likely to be used by any roosting bats at any time of the year (i.e. a complete absence of crevices/suitable shelter at all ground/underground levels).	No habitat features on site likely to be used by any commuting or foraging bats at any time of the year (i.e. no habitats that provide continuous lines of shade/protection for flight-lines or generate/shelter insect populations available to foraging bats).
Negligible ¹	No obvious habitat features on site likely to be used by roosting bats; however, a small element of uncertainty remains as bats can use small and apparently unsuitable features on occasion.	No obvious habitat features on site likely to be used as flight-paths or by foraging bats; however, a small element of uncertainty remains in order to account for non-standard bat behaviour.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically at any time of the year. However, these	Habitat that could be used by small numbers of bats as flight-paths such as a gappy hedgerow or unvegetated stream, but isolated, i.e. not very well connected to the surrounding

¹ Negligible - 'so small or unimportant as to be not worth considering, insignificant'. This category may be used where there are places that a bat could roost or forage (due to one attribute) but it is unlikely that they actually would (due to another attribute).

Potential Suitability	Description of roosting-habitats in structures	Description of potential flight-paths and foraging habitats
	potential roost sites do not provide enough space, shelter, protection, appropriate conditions 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 and not a classic cool/stable hibernation site, but could be used by individual hibernating bats).	landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.
Moderate	A structure with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only, such as maternity and hibernation – the categorisation described in this table is made irrespective of species conservation status, which is established after presence is confirmed).	Continuous habitat connected to the wider landscape that could be used by bats for flight-paths such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
High	A structure with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions ² and surrounding habitat. These structures have the potential to support high conservation status roosts, e.g. maternity or classic cool/stable hibernation site.	Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by bats for flight-paths such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland. Site is close to and connected to known roosts.

The information displayed in Table 2-1 does not reflect the same classifications for trees, therefore Table 2-2 demonstrates the appropriate classification of PRFs for trees - 'NONE', 'FAR', or 'PRF'. PRFs on trees include cracks/splits, crevices, rot cavities, fluting, loose bark, woodpecker holes and areas of Ivy *Hedera helix*.

² e.g. in terms of temperature, humidity, height above ground level, light levels or levels of disturbance.

Table 2-2. Guidelines for assessing the suitability of trees on proposed development sites for bats (Collins, 2023).

Suitability	Description
NONE	Either no PRFs in the tree or highly unlikely to be any
FAR	Further assessment required to establish if PRFs are present in the tree
PRF	A tree with at least one PRF present

2.2.2.4 Otters

The lake and surrounding areas within the site (as shown in the survey boundary mapped in Figure 1-2) were assessed for their potential to support Otter *Lutra lutra*, based on RSPB (1994) and Chanin (2003). This involved walking the survey section and recording any spraints (droppings), slides, feeding remains and footprints. A search was also made for possible holt and couch (resting) sites. Otters are extremely difficult to observe, and this method provides the most effective and efficient means of investigating presence or absence.

2.2.2.5 Water Voles

The field survey assessed the lake and surrounding areas suitability for Water Vole *Arvicola amphibius*, based on initial habitat assessment criteria outlined in Dean et al. (2016). The assessment of habitat suitability for Water Vole is based on the availability and nature of dry areas above water level for burrowing/nesting (e.g. bank profile, bank substrate), vegetation (i.e. the quantity and cover of herbaceous species) and the presence of water.

Any field signs observed within the survey area (as shown in Figure 1-2), informed by Strachan et al. (2011), were also noted. The most important, diagnostic field sign for Water Vole is the presence of latrine sites. These are locations repeatedly used by Water Vole to deposit their droppings, often in prominent locations along the bank. Other field signs include the presence of burrows, feeding sites and footprints. Although these other signs provide indications of presence and are useful supporting evidence to latrines, they are of limited value on their own.

2.2.2.6 Great Crested Newt

Habitat features with the potential to support Great Crested Newt *Triturus cristatus*, and other amphibians, were recorded. Such features can include: ponds with habitat suitable for breeding newts within 500m of the proposed works; piles of logs, stones or other debris; cracks in the ground; stone or rubble covered ground, and any other features that could support newts.

2.2.2.7 Reptiles

As part of the site survey, an assessment of the habitat suitability for common reptiles was made. This involved inspection of the site for key habitat features/microhabitats which may be favoured by reptiles, such as embankments, log, brash or rock piles, dry stone walls, hedgerows, open sandy areas, woodland edges and rides and interfaces between different habitat types (Sewell et al. 2013).

2.2.2.8 Invertebrates

An assessment of the habitat suitability for invertebrates was made, involving the identification of key habitats and features which may be favoured by invertebrates, such as flower-rich grassland, areas of early successional habitat, wetland, scrub, mature / veteran trees, aquatic vegetation, river margins and habitat mosaics (Natural England 2005; Buglife 2015).

2.2.2.9 Fish

A preliminary assessment of habitat suitability of the lake for fish was made, including assessing flow, depth, and substrate, where possible. Any impediments to fish passage were also noted.

2.2.2.10 Other priority species and environmental constraints

During the site survey, any signs or sightings of other priority species were also recorded. In addition, any environmental features that might constrain the works were also recorded (e.g. access restrictions).

2.2.2.11 Invasive non-native species

Any Invasive Non-native Species (INNS) observed during the survey were recorded. For stand-forming plant species, the extents of such stands were noted.

2.3 Limitations

The habitats and species present in a given area are subject to change over time. A single field visit of this nature captures and reports the situation at the time of survey. As such, the advice contained within this report is considered valid for a period of 18 months before a review or an updated survey/assessment must be made by an ecologist (CIEEM 2019).

Data from biological records centres or online databases is historical information, and datasets might be incomplete, inaccurate, or missing. It is important to note that even where data is held, a lack of records for a defined geographical area does not necessarily mean that the species is absent; the area may simply be under-recorded. As such, records cannot be relied on and serve only as an indication of what might/ might not be found.

3 Results and Evaluation

3.1 Desk-Based Assessment

3.1.1 Statutory Designated Sites

A search via the MAGIC database showed that there are no statutory designated sites within 1 km of the proposed scheme.

3.1.2 Non-Statutory Designated Sites

The data search from Wiltshire & Swindon Biodiversity Records Centre (WSBRC) identified eight Local Wildlife Sites (LWS) within 1km of the proposed scheme. These LWS and site details are listed below in Table 3-1.

Table 3-1. Local wildlife sites within 1km of the proposed scheme.

Code	Site Name	Site Description	Main Habitat
ST73.015	Garden Lake, Stourhead	Large ornamental lake in a landscaped parkland setting	Standing open water
ST73.005	Stourhead Woods	Mainly coniferous woodland managed under a continuous cover system. Areas of interest mainly restricted to streams and flushes where wet alder woodland predominates as corridors.	Conifer Woodland
ST73.009	Bonham Hanging	Broadleaved and coniferous plantation woodland on an ancient site on a steep west-facing slope on the Stourhead estate.	Broadleaved woodland
ST73.007	Top Wood	A small ancient woodland site on a roughly circular hilltop supporting Beech plantation with ornamental plantings.	Broadleaved woodland
ST73.006	Lynch Wood	A small ancient woodland site, formerly coniferised but recently replanted with broadleaves on the Stourhead Western Estate.	Broadleaved woodland
ST73.008	Writh Coppice	A small ancient woodland site with stands of conifer and broadleaved plantation and areas of wet and dry semi-natural woodland.	Conifer woodland/ Broadleaved woodland/Wet woodland

Code	Site Name	Site Description	Main Habitat
ST73.016	Western Estate Fields	A series of damp meadows and assarts on the Stourhead Western estate.	Neutral grassland/Fen, marsh and swamp
ST73.004	Sunny Hanging Wood	Hanging woodland on a steep southwest-facing ancient woodland site on the Stourhead estate.	Broadleaved woodland/Conifer woodland

3.2 UKHab Survey

3.2.1 Habitats

The site is managed by the National Trust and is predominantly made up of Garden Lake, modified grassland, neutral grassland, managed scrub and woodland. The habitats identified on site are listed below and mapped in Figure 3-1, with a description of each habitat type within the following text.

3.2.1.1 r1g46 Other standing water; Ornamental lake

The site is predominantly made up of Garden Lake which is an artificial lake that sits above the source of the River Stour. The banks of the lake are shallow and have been reinforced with block stone and brick that in some areas have been colonised by ephemeral grasses and mosses. Emergent broadleaved leaved aquatic vegetation was recorded at the waters edges and in the shallower sections of the lake Water Lily *Nymphaea alba* beds are present.

3.2.1.2 g4 Modified Grassland

The majority of the grassland on site is made up of a managed lawn that is maintained with a strict mowing regime. The dominant species present was Perennial Rye-grass *Lolium perenne*, with White Clover *Trifolium repens*, Creeping Buttercup *Ranunculus repens* and Dandelion *Taraxacum officinale* also recorded.

3.2.1.3 h3g Rhododendron scrub

Two main areas of scrub were recorded within the site boundary. These areas are heavily managed with species dominated by dense stands of Cherry laurel *Prunus laurocerasus*. Other species recorded included Rhododendron *Rhododendron ponticum* and Holly *Ilex aquifolium*.

3.2.1.4 Individual trees

Within the site boundary there are three individual trees of varying maturity. These included one Common beech *Fagus sylvatica* and two English Yew *Taxus baccata*.

An arboricultural impact assessment has been completed providing a full assessment of trees recorded within the site boundary (PXG-JBA-00-00-RP-EN-4001-Tree_Condition_and_Valuation_Survey).

3.2.1.5 u1b Developed land; sealed surface

A footpath leads through the centre of the site.

3.2.1.6 w1f Lowland mixed deciduous woodland

Mixed deciduous woodland surrounds the site however does not fall within the works boundary. The woodland comprises a mix of mature and semi mature trees with a small number of veteran trees also present. The woodland is made up of the following species Ash *Fraxinus excelsior*, Common beech *Fagus sylvatica*, Oak *Quercus sp.*, Sycamore *Acer pseudoplatanus*, Hazel *Corylus avellana* and Poplar *Populus sp.*.

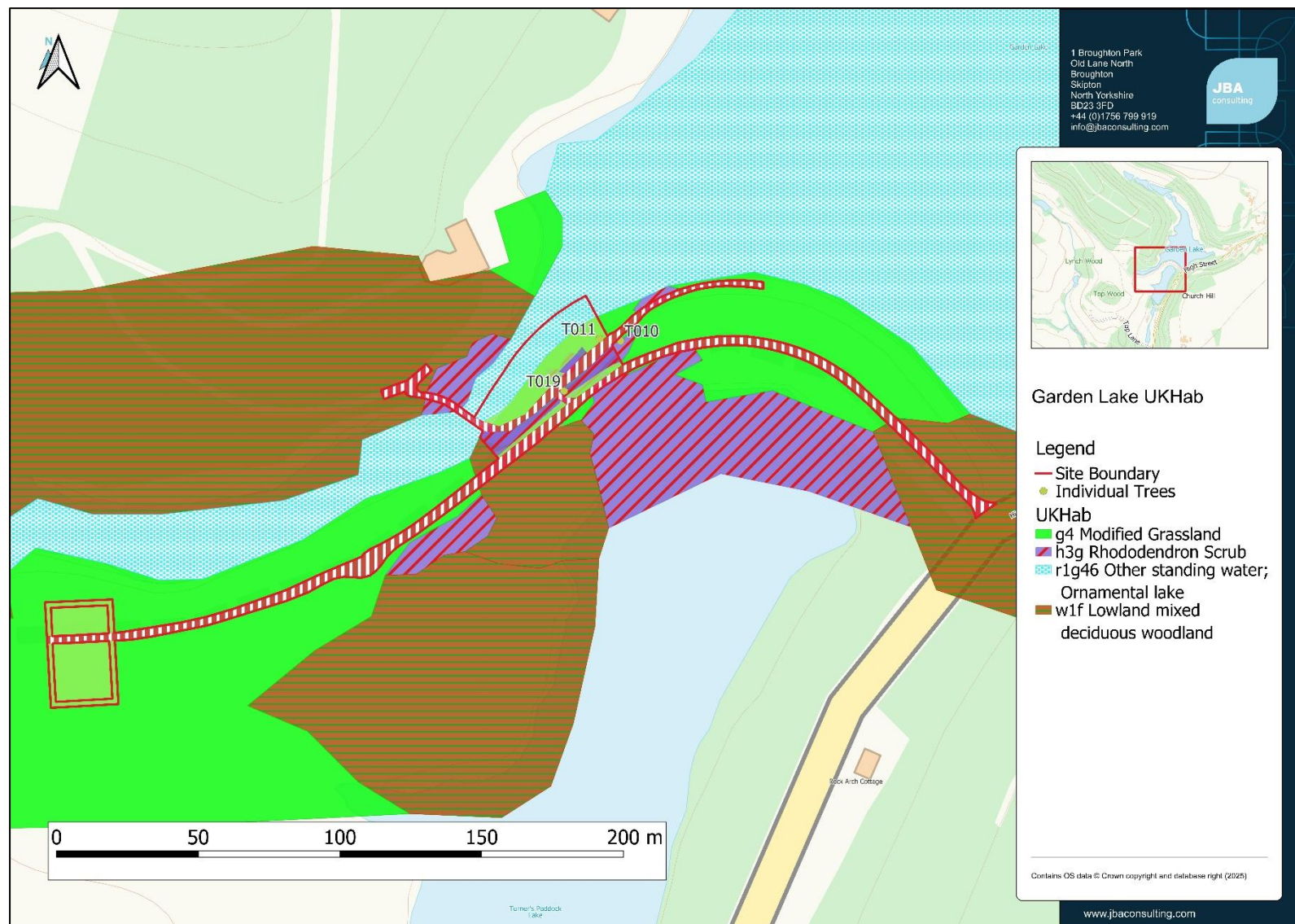


Figure 3-1. UKHab Map

3.2.2 Protected and Notable Species

3.2.2.1 Birds

The data search returned records for a range of bird species, including several Schedule 1 species; Kingfisher *Alcedo atthis*, Hobby *Falco subbuteo* and Peregrine Falcon *Falco peregrinus*. The mature woodland surrounding the site, and scrub and grassland habitats surrounding the lake, provide suitable nesting and foraging habitat for a range of species including raptors, corvids and passerines, the lake itself may provide habitat for foraging aquatic species.

3.2.2.2 Badger

No setts or signs of Badger were identified during the walkover, although a full search was not undertaken. The site is regularly visited by large groups of members of the public and dog walkers therefore the site is heavily disturbed. However, woodland and scrub habitats surrounding the site are likely to provide suitable sett-building habitats, while the grassland may provide foraging opportunities.

3.2.2.3 Bats

A number of bat records were returned in the desk search including species such as Barbastelle *Barbastella barbastellus*, Serotine *Eptesicus serotinus*, Bechstein's Bat *Myotis bechsteinii*, Daubenton's Bat *Myotis daubentonii*, Natterer's Bat *Myotis nattereri*, Common Pipistrelle *Pipistrellus pipistrellus*, Soprano Pipistrelle *Pipistrellus pygmaeus*, Greater Horseshoe Bat *Rhinolophus ferrumequinum* and Lesser Horseshoe Bat *Rhinolophus hipposideros*. The woodland surrounding the site hosts some very mature and veteran trees with features suitable for roosting bats. A number of mature oaks present within the proposed compound area also have potential to support roosting bats. The areas of scrub, grassland and the lake itself likely provide good foraging habitat, with plenty of habitats to support invertebrates on which bats feed. The survey area is well connected to the wider landscape and therefore is likely to be important to the local bat populations.

3.2.2.4 Otter

The data search didn't return any Otter records within 1km of the site. The proposed site does not provide habitat suitable for Otter holts or resting sites and no direct evidence of Otter, such as spraints, holts or resting sites, were observed during the survey. The lake may provide potential foraging and commuting habitat for Otter.

3.2.2.5 Water Vole

There were no records of Water Vole returned in the data search no Water Vole field signs or burrows were observed during the walkover survey. The lake within the survey area is not considered optimal for Water Vole due to the reinforcement of the bank edges with

concrete and brick slabs, limiting the potential for Water Vole to make burrows. The site is also regularly visited by large groups of members of the public and dog walkers therefore the site is heavily disturbed.

3.2.2.6 Great Crested Newt

No records for Great Crested Newt were returned in the data search however a number of records for other amphibian species within proximity to the site including Common Frog *Rana temporaria* and Common Toad *Bufo bufo* were returned. The main body of Garden Lake was deemed to be suboptimal for Great Crested Newt due to its large size and likely presence of fish however the shallow section of the western arm provides potentially suitable breeding habitat for amphibians including Great Crested Newt with a sheltered area with aquatic broadleaved and linear leaved emergent vegetation, with areas of terrestrial habitat including grassland and managed scrub providing habitat suitable for foraging and hibernation. Anecdotal records from a member of the NT suggest that newts have been seen in the western arm of the lake however a positive ID on species was not completed.

3.2.2.7 Reptiles

The data search returned records for Grass Snake *Natrix helvetica*, Adder *Vipera berus* and Common Lizard *Zootoca vivipara* within 1km of the site. The site provides suitable habitat for reptile species with bare ground or short vegetation in sunny, sheltered positions for basking, immediately adjacent to taller dense grassland in which to retreat from predators, and dry protected sites for hibernation. The site however is regularly visited by large groups of members of the public and dog walkers therefore is regularly heavily disturbed.

3.2.2.8 Invertebrates

The habitats within the site are likely to support a range of invertebrate species. Suitable habitats present include grassland, woodland and scrub. Piles of dead wood in the surrounding woodland likely provide good habitat for saprophytic invertebrates. Garden Lake itself is also likely to support an abundance of aquatic invertebrates.

Some of the more sheltered areas of the lake provide potentially suitable White-clawed Crayfish *Austropotamobius pallipes* habitat with refuges present in the form of small rocks and broad and linear leaved aquatic vegetation that could also provide a potential food source. Anecdotal accounts from a member of the NT suggest that White-clawed Crayfish have not been recorded in Garden Lake and there are no historical records in the area.

Sightings of an invasive crayfish species have recently been recorded within the lake. The species is believed to be the Narrow-clawed Crayfish *Astacus leptodactylus*, however the species has not been confirmed.

3.2.2.9 Fish

Garden Lake has the potential to support a range of freshwater fish species however no fish species data was returned within the data search and data from the National Trust was not made available. In the area of the proposed scheme no spawning habitat was recorded.

3.2.2.10 Invasive Non-Native Species

An invasive species of crayfish, the Narrow-clawed Crayfish, is potentially present within Graden Lake and therefore appropriate biosecurity measures should be followed to prevent the spread of the species as well as the spread of any potential disease.

Rhododendron ponticum was also recorded within the site with some stands proposed for removal as part of the proposed works.

4 Ecological Impact Assessment

An Ecological Impact Assessment (EcIA) has been undertaken with reference to the CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland - Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2019).

4.1 Ecological Impact Assessment Methodology

Ecological features include nature conservation sites, habitats, species assemblages / communities or populations or groups of species. The assessment of the significance of predicted impacts on ecological features is based on both the 'importance' of a feature and the nature and magnitude of the impact that the development will have on it. Impacts may be direct (e.g. the loss of species or habitats), or indirect (e.g. effects due to noise, dust or disturbance).

The impact assessment process involves:

- Identifying and characterising impacts;
- Incorporating measures to avoid and mitigate these impacts;
- Assessing the significance of any residual effects after mitigation;
- Identifying appropriate compensation measures to offset residual effects; and
- Identifying opportunities for ecological enhancement.

The assessment includes potential impacts (direct, indirect, secondary and cumulative) on each ecological feature determined as important from all phases of the project and describes in detail the impacts that are likely to be significant, making reference to the following characteristics:

- Positive or negative
- Extent
- Magnitude
- Duration
- Timing
- Frequency
- Reversibility

4.1.1 Important Ecological Features

It is impractical for an assessment of the ecological impacts of a project to consider every ecological feature (species, habitat etc.) that may be affected; instead, it should focus on those that are considered to be important. These are ecological features that are valued in some way and could be affected by the proposed project. Other valued ecological features may occur on or in the vicinity of the proposed works area, but do not need to be considered because there is no potential for them to be affected significantly. Various characteristics contribute towards the importance of ecological features, for example

naturalness, rarity, diversity, and connectivity to other areas. The importance of an ecological feature should be considered within a defined geographical context. For the purposes of this assessment the following frame of reference has been used:

- International and European
- National
- Regional
- County
- Local
- Negligible

Consideration of impacts at all scales is important, and essential if no net loss of biodiversity and maintenance of healthy ecosystems is to be achieved. Ecological features have been valued using the scale set out in Table 4-1 with examples provided of criteria used when defining the level of importance.

Table 4-1. Determining ecologically significant effects.

Level of Importance	Examples of Criteria
International	An internationally important site e.g. SPA, SAC, Ramsar (or a site considered worthy of such designation); A regularly occurring substantial population of an internationally important species (listed on Annex IV of the Habitats Directive)
National	A nationally designated site e.g. SSSI, or a site considered worthy of such designation; A viable area of a habitat type listed in Annex I of the Habitats Directive or of smaller areas of such habitat which are essential to maintain the viability of a larger whole. A regularly occurring substantial population of a nationally important species, e.g. listed on Schedules 5 and 8 of the WCA (as amended).
Regional	Areas of internationally or nationally important habitats which are degraded but are considered readily restored; or a regularly occurring, substantial population of a Regionally scarce species.
County	A site designated as a Site of Importance for Nature Conservation (SINC); or A regularly occurring, substantial population of a species scarce in the County
Local	Areas of internationally or nationally important habitats which are degraded and have little or no potential for restoration; Viable areas of local Biodiversity Action Plan (BAP) Priority Habitat, or small areas of such habitat which are essential to maintain the viability of a larger whole; Species of national or local importance, but which are only present very infrequently or in very low numbers within site area.
Negligible	A habitat which offers little value for nature conservation, e.g. arable field.

The approach of this assessment is to consider the value of the site for the species under consideration, rather than the nature conservation importance of the species itself. While the conservation importance of the species is taken into account, the number of individuals

using the site, and the nature and level of use is also taken into account. An assessment is then made of the value of the site to that particular species.

Legally Protected Species

Notwithstanding what has been said above, there is also a need to identify all legally protected species that could be affected by the proposed works in order that measures can be taken to ensure that contravention of the legislation is avoided. Where a protected species is not considered to be an important ecological feature, for example Badger, which is protected for animal welfare reasons rather than nature conservation value, assessment will focus solely on compliance with legislation.

4.1.2 Residual Impacts

Where impacts are identified, mitigation measures are proposed to avoid, reduce or minimise them. Those impacts remaining after implementation of mitigation are the residual impacts. An assessment of the residual impacts has then been undertaken to determine the significance of their effects on ecological features.

Determining Ecologically Significant Effects

For the purposes of this assessment, a significant effect is an effect that either supports or undermines biodiversity conservation objectives for important ecological features or for biodiversity in general (CIEEM, 2019). Effects can be considered significant at a wide range of scales from international to local. Significant effects encompass impacts on structure and function of defined sites, habitats or ecosystems and the conservation status of habitats and species (including extent, abundance and distribution). Table 4-2 details the factors that have been considered in the determination of significant effects on ecological features.

Table 4-2. Determining ecologically significant effects.

Ecological Feature	Consideration
Designated Sites	Will the project undermine the site's conservation objectives? Will the project positively or negatively impact the conservation status of habitats or species for which the site is designated? Will the project have positive or negative effects on the condition of the site or its interest / qualifying features? Will the project remove or change any key characteristics? Will there be an effect on the nature, extent, structure and function of component habitats? Will there be an effect on the average population size and viability of component species? Will there be an impact on wider ecosystem functions and processes?
Habitats	Will the project positively or negatively impact the conservation status of the habitat? Will it affect its extent, structure and function as well as its distribution and its typical species within a given geographical area?
Species	Will the project positively or negatively impact the conservation status of the species? Will it affect its abundance and distribution within a given geographical area?

4.1.3 Precautionary Principle

The evaluation of significant effects has been based on current scientific evidence and professional judgement. Where sufficient information is not available to allow a robustly justifiable conclusion of no significant effect, a significant effect is assumed, and any uncertainty is acknowledged.

4.2 Summary of Ecological Features

Table 4-3 below summaries the ecological features discussed above in the Preliminary Ecological Appraisal and their geographical importance.

Table 4-3. Summary of ecological features.

Ecological Feature	Evaluation Rationale	Geographical Importance	Considered for Further Assessment?
Designated sites	The site boundary is within the Garden Lake, Stourhead LWS.	Regional/County	Yes
Habitats	Habitats recorded within the scheme area have the potential to be impacted during construction works.	Local	Yes
Birds	Foraging and nesting opportunities for widespread bird species present on site.	Local	Yes
Bats	Commuting and foraging habitat recorded on site.	Local	Yes
Badger	No evidence of Badger on site.	Negligible	No
Otter	No suitable Otter holts or resting sites within the proposed site area however suitable foraging habitat present on site.	Local	Yes

Ecological Feature	Evaluation Rationale	Geographical Importance	Considered for Further Assessment?
Water Vole	The site does not provide suitable habitat for Water Vole.	Negligible	No
Reptiles	Suitable reptile habitat present on site.	Local	Yes
Great Crested Newt and other Amphibians	Suitable Great Crested Newt habitat present on site.	Local	Yes
Fish	Suitable fish habitat present on site.	Local	Yes
Invasive Non-Native Species	An invasive species of crayfish, the Narrow-clawed Crayfish, is potentially present within Graden Lake. Rhododendron <i>Rhododendron ponticum</i> is present within the site with some stands proposed for removal as part of the proposed works.	Local	Yes

5 Assessment of Effects and Mitigation

This assessment of effects includes all designated sites and protected or priority species considered relevant to the site and the proposed works, based on the baseline conditions presented in Section 3.

5.1 Designated Sites

Assessment of Effects

The proposed site sits within the Garden Lake, Stourhead Local Wildlife Site. Given the nature and small footprint of the proposed works it is not considered that there will be any significant impact to the designated sites however, there is the risk of a potential pollution event as a result of the works adversely impacting upon the LWS.

Mitigation

To minimise the risk of a pollution event occurring, mitigation measures will need to be implemented throughout the works. A Construction Environmental Management Plan (CEMP) should be prepared, which sets out the actions that will be implemented to control construction of the proposed scheme so as to avoid adverse impacts on the environment. The CEMP should form part of the construction contract. It should adhere to construction best practice to reduce the risk of environmental contamination during construction and include biosecurity procedures.

Significance of Residual Effects

Provided the mitigation as outlined above is implemented there will be no residual effects on designated sites.

5.2 Habitats

Assessment of Effects

The proposed site area consists of managed grassland and scrub habitat, and standing water in the form of Garden Lake. A number of mature trees are present throughout the site and mature woodland surrounds the site boundary.

As part of the proposed scheme there will likely be some small-scale temporary loss of managed grassland and scrub as part of vegetation clearance to gain access to complete the works.

Mitigation

Any loss of habitats will be small scale and temporary during the construction phase with impacted habitats being reinstated when the works have been completed.

Significance of Residual Effects

Provided the mitigation as outlined above is implemented there will be no residual effects on habitats present within the works area as a result of the proposed works.

5.3 Protected Species

5.3.1 Birds

Assessment of Effects

There is the potential for the site to be used for nesting by raptors, corvids and passerine species, the lake itself also provides nesting opportunities for various species of waterfowl. Clearance of vegetation during the construction phase could damage or destroy bird nests and their young and result in the temporary loss of nesting and foraging habitat. Construction activities such as sheet piling could cause disturbance to nesting birds and waterfowl foraging on the lake.

Mitigation

Vegetation clearance will be undertaken between January and February to safeguard against disturbing nesting birds. Should vegetation clearance be required in the bird nesting season (March-October, inclusive), a nesting bird check must be undertaken immediately prior to works beginning by a suitably qualified Ecological Clerk of Works (ECoW) and active nests protected until fledged. Loss of habitats will be temporary during the construction phase with impacted habitats being reinstated when the works have been completed.

Construction activities will be restricted to the small section of the western arm off of the main lake body and therefore disturbance impacts will be limited to this area. Given the small-scale area of the works boundary in relation to large size of the main body of the lake it is not anticipated that there will be significant disturbance to waterfowl utilising the lake and foraging birds have the ability to move to other areas of the lake that are not impacted by the construction activities.

Significance of Residual Effects

Provided the mitigation as outlined above is implemented there will be no significant residual effects on birds as a result of the proposed works.

5.3.2 Bats

Assessment of Effects

Areas of woodland surrounding the site and a number of mature oaks adjacent to the proposed compound area have the potential to support roosting bats. As the proposed works are currently understood none of these trees will be impacted during the construction work with no tree removal or cutting back proposed. As the proposed works are currently understood access will be gained through existing access tracks. An arboricultural impact assessment has been completed providing a full assessment of trees recorded within the site boundary (PXG-JBA-00-00-RP-EN-4001-S3-P01-

Tree_Condition_and_Valuation_Survey). Areas of scrub, grassland and the lake itself likely provide good foraging habitat.

There will be no loss of roosts or impacts on roosting features as a result of the works and no commuting features will be lost as part of the proposed scheme. During the construction phase there may be the temporary loss of potential foraging habitat and the potential to disturb foraging and commuting bats.

Mitigation

Loss of foraging habitats will be temporary during the construction phase with impacted habitats being reinstated when the works have been completed.

No working after dark should be undertaken during the construction phase, eliminating the need for artificial lighting on the site during this time. Security lighting during construction should be avoided. If deemed essential, it must use Passive Infra-Red (PIR) motion sensors to trigger lighting for no more than two minutes. Lights should be directed downwards and away from features of value to bats. Any floodlights should be fitted with a directional cowl to avoid light-spill onto the Lake or surrounding woodland.

Significance of Residual Effects

Provided the mitigation as outlined above is implemented there will be no significant residual effects on bats as a result of the proposed works.

5.3.3 Otter

Assessment of Effects

The site provides potential foraging habitat for Otter and therefore construction activities including piling could result in the injury or disturbance to Otter utilising the site.

Mitigation

Works near the Lake should not be undertaken at night and the Lake should not be illuminated by lighting, such as security lights, during works. If required, any floodlights should be fitted with a directional cowl to avoid light-spill onto the Lake. Excavations left overnight should either be covered, or an escape ramp installed to prevent the trapping of Otter. Should an Otter be encountered on site during the works, all works should cease immediately, and advice be obtained from an experienced ecologist.

Significance of Residual Effects

Provided the mitigation as outlined above is implemented there will be no significant residual effects on Otter as a result of the proposed works.

5.3.4 Great Crested Newt

Assessment of Effects

Garden Lake provides potentially suitable breeding habitat for Great Crested Newt and other amphibians. Managed grassland and scrub habitat adjacent to the lake also provides

potentially suitable for foraging and hibernation. The proposed works and clearance of vegetation during the construction phase could result in injury or disturbance to great crested newt and other amphibian species utilising the site and result in the temporary loss of suitable habitat.

Mitigation

A Great Crested Newt Precautionary Working Method Statement will be produced to outline specific mitigation measures to reduce the potential impact to any Great Crested Newts within the site area.

Vegetation clearance should be conducted in a sensitive manner to avoid direct harm to Great Crested Newt and other amphibian species. A suitably qualified ECoW should be present on site during the vegetation clearance to complete a search for any resting Great Crested Newt. Should Great Crested Newts be found they will be left undisturbed and their place of shelter returned to its original condition where possible. Works in the area will then be halted, and a low impact licence may be required.

Should any common amphibians be found on site they will be captured and relocated by the acting ECoW to suitable habitat that will be unaffected by the works.

Vegetation in working areas will be maintained short for the duration of the project to reduce the likelihood of disturbing amphibians. Small mammal burrows will be destructively searched under supervision of an Ecologist to search for any amphibians using these as a refuge and move them away from working areas.

Significance of Residual Effects

Provided the mitigation as outlined above is implemented there will be no significant residual effects on Great Crested Newt or other amphibians as a result of the proposed works.

5.3.5 Reptiles

Assessment of Effects

Areas of grassland and managed scrub within the proposed scheme have the potential to support several species of reptiles. Clearance of vegetation during the construction phase could result in injury or disturbance to reptile species utilising the site and result in the temporary loss of suitable reptile habitat.

Mitigation

Loss of reptile habitat will be small in scale and temporary during the construction phase with impacted habitats being reinstated when the works have been completed.

Vegetation clearance should be conducted in a sensitive manner to avoid direct harm to reptiles. A suitably qualified ECoW should be present on site during the vegetation clearance to complete a search for any hibernating reptiles. Should any reptiles be found on site the acting ECoW will capture and relocate the reptile to suitable habitat that will be unaffected by the works. Vegetation in working areas will be maintained short for the

duration of the project to reduce the likelihood of disturbing reptiles. Small mammal burrows will be destructively searched under supervision of an Ecologist to search for any reptiles using these as a refuge and move them away from working areas.

Significance of Residual Effects

Provided the mitigation as outlined above is implemented there will be no significant residual effects on reptiles as a result of the proposed works.

5.3.6 Fish

Assessment of Effects

Garden Lake has the potential to support freshwater fish species and therefore works during the construction phase could have the potential to result in injury or disturbance to fish.

Mitigation

In the absence of survey data, it is recommended that it is assumed fish are present in Garden Lake and appropriate mitigation measures should be undertaken during construction.

Water levels of the shallow western arm off of the main lake body will be dropped by approximately 1-2 metres to allow access to the western arm embankment. This will be achieved through the main drainage network and spillway. **The water levels will be dropped slowly over the duration of approximately one week, giving any fish present ample time to move to other areas of the lake that are not impacted by the construction activities. If the required water level drop cannot be achieved through the main drainage network pumps may be required.**

Given the small-scale nature of the works in relation to the size of the main lake body, the proposed water level drop of the western arm is not anticipated to impact the main lake body. Water levels of the Lake regularly fluctuate with the National Trust often engaging the drainage network to reduce water levels of the main lake body and therefore it is not anticipated that the drop in water level of the western arm will impact fish utilising the main lake. If pumps are required to reduce water levels fish-friendly pumps should be used to dewater, thus ensuring no entrainment of fish.

Construction activities will be restricted to the small section of the western arm off of the main lake body and therefore disturbance impacts will be limited to this area. Given the small-scale area of the works boundary in relation to large size of the main body of the lake it is not anticipated that there will be significant disturbance to fish utilising the lake, with the ability for fish to move to other areas of the lake that are not impacted by the construction activities.

Significance of Residual Effects

Provided the mitigation as outlined above is implemented there will be no significant residual effects on fish as a result of the proposed works.

5.3.7 Invasive Non-Native Species

Assessment of Effects

An invasive species of crayfish, the Narrow-clawed Crayfish, is potentially present within Garden Lake and therefore works during the construction phase could have the potential to spread the invasive or disease carried by the Crayfish.

Rhododendron ponticum is present within the site with some stands proposed for removal as part of the proposed works, therefore works during the construction phase could have the potential to spread the invasive non-native species.

Mitigation

Measures will be put in place to ensure that there is no spread of invasive non-native species or diseases. The Check-Clean-Dry approach will be followed, ensuring that all PPE and equipment is cleaned before leaving site. For more information go to:

www.nonnativespecies.org/checkcleandry. A Construction Environmental Management Plan (CEMP) should be prepared, which sets out the actions that will be implemented to control construction of the proposed works so as to avoid adverse impacts on the environment. The CEMP should form part of the construction contract. It should adhere to construction best practice and include biosecurity procedures as outlined above.

Production of an invasive species management plan will be required for the construction works, to ensure that measures are put in place to ensure INNS are not spread within or beyond the site. The presence of workers and machinery on site could spread and introduce species and therefore industry-standard biosecurity measures should be implemented on site. The Check-Clean-Dry approach should be followed, ensuring that all Personal Protective Equipment (PPE) and equipment is cleaned before leaving site. For more information go to: www.nonnativespecies.org/checkcleandry.

Significance of Residual Effects

Provided the mitigation as outlined above is implemented there will be no significant residual effects in regards to INNS as a result of the proposed works.

5.3.8 General Avoidance Measures

General avoidance measures that should be incorporated within the scheme include:

- Limit the hours of working to daylight hours, to limit disturbance to nocturnal and crepuscular animals;
- Due to the likely presence of Bats and Otter the use of lighting at night should be avoided. If the use of lighting is essential, then a directional cowl should be fitted to all lights to prevent light spill and to be directed away from the lake and surrounding woodland.
- Contractors must ensure that no harm comes to wildlife by maintaining the site efficiently and clearing away materials which are not in use, such as wire or bags in which animals can become entangled; and

- Any pipes should be capped when not in use (especially at night) to prevent animals becoming trapped. Any excavations should be covered overnight to prevent animals from falling and getting trapped. If that is not possible, a strategically placed plank should be placed to allow animals to escape.

5.3.9 Biosecurity

Measures will need to be put in place to ensure that there is no spread of invasive non-native species or diseases. The Check-Clean-Dry approach should be followed, ensuring that all PPE and equipment is cleaned before leaving site. For more information go to: www.nonnativespecies.org/checkcleandry.

5.3.10 Pollution Prevention Measures

Appropriate mitigation measures should be implemented prior to and during the construction phase to ensure that water quality is not adversely affected through pollution incidents and the release of contaminants from the site. This mitigation could include, but is not limited to:

- Following relevant pollution prevention measures e.g. CIRIA Guidance
- Control of water pollution from construction sites. Guidance for consultants and contractors (C532D) (Masters-Williams, 2001). Information useful for Toolbox Talks on working near water and pollution prevention can be found at: https://www.ciria.org/Resources/All_toolbox_talks/Env_toolbox_talks/Working_on_or_near_watercourses.aspx [site accessed 20/02/2025].
- Minimising the impacts of oil and fuel leaks can be achieved by the following actions:
 - Any chemical, fuel and oil stores should be located on impervious bases within a secured bund with a storage capacity 110% of the stored volume.
 - Biodegradable oils and fuels should be used where possible.
 - Drip trays should be placed underneath any standing machinery to prevent pollution by oil/fuel leaks. Where practicable, refuelling of vehicles and machinery should be carried out on an impermeable surface in one designated area well away from any watercourse or drainage (at least 10m).
 - Emergency spill kits should be available on site and staff trained in their use.
 - Operators should check their vehicles on a daily basis before starting work to confirm the absence of leakages. Any leakages should be reported immediately.
 - Daily checks should be carried out and records kept on a weekly basis and any items that have been repaired/replaced/rejected noted and recorded. Any items of plant machinery found to be defective should be removed from site immediately or positioned in a place of safety until such time that it can be removed.

6 Impact Summary

Table 6-1 below summarises any potential impacts to ecological receptors and proposed mitigation to reduce or avoid negative impacts, as described in Section 6.

Table 6-1. Summary of Impacts and Mitigation.

Feature	Unmitigated Impacts	Mitigation	Significant Residual Impact?
Designated sites (including Garden Lake, Stourhead LWS)	There is the potential for indirect temporary impacts via accidental pollution events.	Pollution prevention measures following the latest CIRIA guidance will be implemented through the CEMP.	No
Habitats (including managed grassland, managed scrub and mature trees)	There is the potential for indirect temporary impacts via accidental pollution events.	Pollution prevention measures following the latest CIRIA guidance will be implemented through the CEMP.	No
	Temporary loss of habitats during the construction phase.	Loss of habitats will be temporary during the construction phase with impacted habitats being reinstated when the works have been completed.	No

Feature	Unmitigated Impacts	Mitigation	Significant Residual Impact?
Birds	Potential destruction or disturbance of nests during construction.	Avoidance of main nesting bird season for vegetation clearance or pre-works nesting bird checks if required. All identified nests will be safeguarded until the chicks have fledged.	No
	Temporary loss of nesting habitat during construction phase.	Any loss of habitats will be small scale and temporary during the construction phase with impacted habitats being reinstated when the works have been completed.	No
Bats	Light spill on foraging and commuting habitats during the construction phase causing disturbance.	No working after dark during construction phase. Limits on security lighting, floodlights to be fitted with a directional cowl to avoid light-spill onto the Lake and woodland habitats.	No
	Temporary loss of foraging and commuting habitat during construction phase.	Any loss of habitats will be small scale and temporary during the construction phase with impacted habitats being reinstated when the works have been completed.	No

Feature	Unmitigated Impacts	Mitigation	Significant Residual Impact?
Otter	Light spill on to the Lake during construction activities. Trapping of Otter during construction and operation.	No working after dark during construction phase. Limits on security lighting, if necessary any floodlights to be fitted with a directional cowl to avoid light-spill onto the Lake. Excavations left overnight to be covered, or an escape ramp installed.	No
Reptiles	Killing, injuring or disturbance during construction phase.	A suitably qualified ECoW will be present on site during the vegetation clearance and will identify and move any hibernating reptiles within the construction area.	No
	Temporary loss of reptile habitat during construction phase.	Any loss of habitats will be small scale and temporary during the construction phase with impacted habitats being reinstated when the works have been complete.	No
Great Crested Newt and other Amphibians	Killing, injuring or disturbance during construction phase.	A Great Crested Newt Precautionary Working Method Statement will be produced to outline specific mitigation measures to reduce the potential impact to GCN. Works will be conducted in the winter to reduce impact on breeding GCN. A suitably qualified ECoW will be present on site during the vegetation clearance to conduct a search for GCN. Should Great Crested Newts be found they will be left undisturbed and their place of shelter returned to its original condition where possible. Works in the area will then be halted and a low impact licence may be needed. Should any common amphibians be found on site they will be captured and relocated by the acting ECoW to suitable habitat that will be unaffected by the works.	No

Feature	Unmitigated Impacts	Mitigation	Significant Residual Impact?
	Temporary loss of amphibian habitat during construction phase.	Any loss of habitats will be small scale and temporary during the construction phase with impacted habitats being reinstated when the works have been completed.	No
Fish	There is the potential for indirect temporary impacts via accidental pollution events.	Pollution prevention measures following the latest CIRIA guidance will be implemented through the CEMP.	No
	Killing, injuring or disturbance during construction phase.	Water levels of the Lake regularly fluctuate with the National Trust often engaging the drainage network to reduce water levels of the main lake body and therefore it is not anticipated that the drop in water level of the western arm will impact fish utilising the main lake. If pumps are required to reduce water levels fish-friendly pumps should be used to dewater, thus ensuring no entrainment of fish. Construction activities will be restricted to the small section of the western arm off of the main lake body and therefore disturbance impacts will be limited to this area. Given the small-scale area of the works boundary in relation to large size of the main body of the lake it is not anticipated that there will be significant disturbance to fish utilising the lake, with the ability for fish to move to other areas of the lake that are not impacted by the construction activities. An open channel from the works area in the western arm to the main body of the lake should be maintained at all times to prevent entrapment of fish.	No

Feature	Unmitigated Impacts	Mitigation	Significant Residual Impact?
Invasive Non-Native Species	Spread of invasive species of crayfish, the Narrow-clawed Crayfish or disease	Strict biosecurity measures will be implemented through the CEMP including the Check-Clean-Dry approach.	No
	Spread of invasive Rhododendron	Production of an invasive species management plan will be required for the construction works, and industry-standard biosecurity measures will be implemented on site. The Check-Clean-Dry approach will be followed.	No

6.1 Cumulative Effects

Other plans and projects with potential in-combination impacts were reviewed through the Wiltshire County Council planning portal. No plans were identified that could potentially act in-combination with the proposed works. All of the planning applications within 2km of the site are all small-scale works that have no direct connection to the site. There are no Nationally Significant Infrastructure Projects (NSIP) within 2km of the site.

7 Conclusion and Summary

This PEA and EcIA identifies the potential ecological impacts of the proposed works at Graden Lake, at the National Trust Stourhead Estate in Stourton, Warminster.

The proposed works have the potential to result in temporary impacts to a number of ecological features present within the scheme area. Suitable mitigation and avoidance measures, as outlined in Sections 6 and 7 of this report will ensure that any potential impacts are minimised to an acceptable level, these have been summarised below:

- Precautionary measures to safeguard nesting birds during vegetation clearance as part of the construction phase should be put in place including avoidance of main nesting bird season for vegetation clearance or pre-works nesting bird checks if required.
- Precautionary measures to safeguard bats foraging or commuting in the area or roosting in any of the mature trees adjacent to site. This will include no night working to eliminate the need for artificial lighting. Security lighting during construction should be avoided. If deemed essential, it must use Passive Infra-Red (PIR) motion sensors to trigger lighting for no more than two minutes. Lights should be directed downwards and away from features of value to bats. Any floodlights should be fitted with a directional cowl to avoid light-spill onto the Lake and adjacent woodland.
- Precautionary measures to safeguard any Otter commuting or foraging in the area including no night working. Any floodlights should be fitted with a directional cowl to avoid light-spill onto the Lake. Excavations left overnight should either be covered, or an escape ramp installed to prevent the trapping of animals such as Otter. Should an Otter be encountered on site during the works, all works should cease immediately, and advice be obtained from an experienced ecologist.
- A Great Crested Newt Precautionary Working Method Statement will be produced to outline specific mitigation measures to reduce the potential impact to GCN.
- Precautionary measures to avoid impacts to reptiles and amphibians (including Great Crested Newts) during vegetation clearance as part of the construction phase should be put in place including displacement of reptiles and amphibians away from the construction area. A suitably qualified ECoW should be present on site during the vegetation clearance to conduct searches for GCN. Should Great Crested Newts be found they will be left undisturbed and their place of shelter returned to its original condition where possible. Works in the area will then be halted and a low impact licence may be needed. Should any common amphibians be found on site they will be captured and relocated by the acting ECoW to suitable habitat that will be unaffected by the works.

- In the absence of survey data, it is recommended that it is assumed fish are present in the watercourses and appropriate mitigation measures should be undertaken during construction such as, undertaking construction during months of least sensitivity to fish. If works need to be undertaken in a dry environment, fish-friendly pumps should be used to dewater, thus ensuring no entrainment of fish.
- If pumps are required to reduce water levels fish-friendly pumps should be used to dewater, thus ensuring no entrainment of fish.
- Water levels will be dropped slowly over the duration of approximately one week, giving any fish present ample time to move to other areas of the lake that are not impacted by the construction activities.
- Biosecurity measures will be put in place to prevent the spread of invasive crayfish and/or disease.
- Production of an invasive species management plan will be required for the construction works, and industry-standard biosecurity measures will be implemented on site to prevent the spread of the invasive Rhododendron.

This report describes the mitigation that will be implemented during the construction phase, to ensure that all impacts are avoided or minimised to an acceptable level. These mitigation measures will be included in the project's CEMP and this information will be disseminated appropriately to site staff and implemented by the project's environmental team. No significant in-combination impacts as a result of other proposed projects in the local area have been identified. No significant residual negative effects on habitats and priority or legally protected species are anticipated should the mitigation specified be followed.

Appendix

A Relevant Policy and Legislation

The legislation discussed below is intended as a guide only and does not replace formal legal advice.

A.1 National Planning Policy Framework (NPPF)

The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how these are expected to be applied with a presumption in favour of sustainable development a core element of the framework.

Of relevance to the proposed works in this report, the document states in relation to conserving and enhancing the natural environment, that: "If significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused" Ministry of Housing, Communities and Local Government (2024).

It also states that: "development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest" Ministry of Housing, Communities and Local Government (2024).

Additionally, it states: "promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species" and "minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures" Ministry of Housing, Communities and Local Government (2024).

A.2 Natural Environment and Rural Communities (NERC) Act 2006

Section 40 of the Natural Environment and Rural Communities Act (2006) states that 'Every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity'. Section 40(3) also states that 'conserving biodiversity includes, in relation to a living organism or type of habitat, restoring or enhancing a population or habitat'.

Section 41 of the NERC Act requires the Secretary of State to publish a list of species of flora and fauna and habitats considered to be of principal importance for the purpose of conserving biodiversity. To meet this requirement, the England Biodiversity List (the S41 list) has been developed. Species and habitats listed under Section 41 of the NERC Act

2006, whilst not necessarily being legally protected, can be a material planning consideration.

The S41 list, which replaces the list published under Section 74 of the Countryside and Rights of Way (CROW) Act 2000, should be used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty under section 40 of the NERC Act 2006 'to have regard' to the conservation of biodiversity in England, when carrying out their normal functions.

A.3 Statutory designated nature conservation sites

Sites with statutory designations receive varying degrees of legal protection under UK statute and European Directives. There are several statutory designations used for sites of high nature conservation value in the UK, which are applied depending upon the importance of the site in a local, regional, national or international context. This includes:

- Ramsar Sites (International designation);
- SAC and SPA (European designations);
- National Nature Reserves (NNR) and SSSI (National designations);
- Local Nature Reserves (LNR) (Local designation).

A.4 Non-statutory designated sites

Non-statutory sites are afforded no statutory legal protection, but are normally recognised by local planning authorities and statutory agencies as being of local nature conservation value. The protection afforded to such sites is usually discretionary, through Local Plan policies. Non-statutory sites are designated by the local authority, usually in partnership with the County Wildlife Trust (or equivalent).

A.5 Protected species

Several species are protected under UK and international legislation. In the UK, primary protection is provided under the Wildlife and Countryside Act 1981 (as amended). Species of European importance receive additional protection in England under the Conservation of Habitats and Species Regulations 2017 (as amended); others may receive protection through specific legislation. Further details on specific species and their levels of protection are provided below.

Birds

All wild birds are protected under the Wildlife and Countryside Act 1981 (as amended). This makes it an offence to:

- Intentionally take, damage or destroy the nest of any wild bird whilst it is in use or being built;
- Take, destroy or possess the egg of any wild bird.

Certain species, such as the Barn Owl *Tyto alba*, receive additional protection under Schedule 1, which makes it an offence to intentionally or recklessly disturb birds and also their young at, on or near an active nest.

Badger

Badgers *Meles meles* are protected by the Protection of Badgers Act 1992 and the Wildlife and Countryside Act 1981 (as amended), Schedule 6. Under the Protection of Badgers Act, it is illegal to intentionally kill, capture, injure or ill-treat any Badger. It is also an offence to obstruct, destroy or damage a Badger sett or disturb Badgers within a sett. Disturbance is defined, for development purposes, as any activity that could damage a sett or be greater than what Badgers commonly tolerate.

Bats

All UK bat species are European Protected Species (EPS), protected under Section 9 of the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitat and Species Regulations 2017 (as amended). This makes it an offence to:

- Deliberately capture, injure or kill a bat
- Intentionally or recklessly disturb a bat in its roost or deliberately disturb a group of bats;
- Damage or destroy a bat roosting place (even if bats are not occupying the roost at the time);
- Intentionally or recklessly obstruct access to a bat roost.

Dormouse

The Hazel Dormouse *Muscardinus avellanarius* is legally protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and afforded protection as a European Protected Species (EPS) under the Conservation of Habitats and species Regulations 2017 (as amended). This legislation makes it an offence to:

- Intentionally or deliberately kill, injure or capture dormice;
- Intentionally, deliberately or recklessly disturb dormice in such a way as to be likely to significantly affect the ability of any significant group of dormice to survive, breed, or rear or nurture their young or the local distribution of or abundance of the species;
- Intentionally or recklessly damage, destroy or obstruct access to places used by dormice for shelter or protection (whether occupied or not) or intentionally or recklessly disturb a dormouse whilst it is occupying such a place;
- Damage or destroy a breeding site or resting place of a dormouse;
- Possess or transport a dormouse (or any part thereof) unless under licence; and
- Sell or exchange dormice.

Otter

The European Otter *Lutra lutra* is an EPS protected under the Conservation of Habitats and Species Regulations 2017 (as amended), making it an offence to:

- Deliberately capture, injure or kill an Otter;
- Deliberately disturb an Otter such as to affect local populations or breeding success;
- Damage or destroy an Otter holt, possess or transport an Otter or any part of an Otter;
- Sell or exchange an Otter.

Otters also receive protection under the Wildlife and Countryside Act 1981 (as amended), this makes it an offence to:

- Intentionally or recklessly disturb any Otter whilst within a holt;
- Intentionally or recklessly obstruct access to a holt.

Water Vole

The Water Vole *Arvicola amphibius* is protected under the Wildlife and Countryside Act 1981 (as amended). This makes it an offence to:

- Intentionally kill, injure or capture a Water Vole;
- Possess or control a Water Vole, living or dead, or any part of a Water Vole;
- Intentionally or recklessly damage, destroy or obstruct access to any place of shelter, or disturb a Water Vole within such a place;
- Sell or offer for sale a Water Vole living or dead, or part of a Water Vole.

Great Crested Newt

The Great Crested Newt *Triturus cristatus* is an EPS under the Conservation of Habitats and Species Regulations 2017 (as amended). This makes it an offence to:

- Kill, capture or disturb a Great Crested Newt;
- Take or destroy the eggs of a Great Crested Newt;
- Damage or destroy the breeding or resting places of Great Crested Newt.

It also receives additional protection under the Wildlife and Countryside Act 1981 (as amended) making it illegal to possess or control any Great Crested Newt, living or dead.

Reptiles and other amphibians

Legal protection varies considerably for different species. Smooth Snake *Coronella austriaca*, Sand Lizard *Lacerta agilis* and Natterjack Toad *Epidalea calamita* are EPS, and it is an offence to:

- Deliberately kill, capture or disturb these species;
- Deliberately take or destroy the eggs of these species;
- Damage or destroy the breeding or resting places of these species.

Under the Wildlife and Countryside Act 1981 (as amended) Adder *Viperus berus*, Grass Snake *Natrix natrix*, Common Lizard *Zootoca vivipara* and Slow Worm *Anguis fragilis* are protected from intentional killing or injuring, additionally Common Frog *Rana temporaria*, Common Toad *Bufo bufo* and other newt species are prohibited from sale.

Fish

The Salmon and Freshwater Fisheries Act (1975) affords protection to fish and to the spawning grounds of fish. Section 2(5) makes it an offence to wilfully disturb spawning fish or the spawn of fish. Section 4(1) makes it an offence to knowingly permit the introduction of material to a watercourse such that it becomes injurious to fish, the spawn of fish or the spawning grounds of fish.

Invertebrates

Numerous invertebrate species receive international under the following legislation:

- The Conservation of Habitats and Species Regulations 2017 (as amended); Annex IIa, Annex Iva and Annex Va;
- Council of Europe Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) Appendix II and III;
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES);
- EU CITES Regulations.

Approximately 70 species of invertebrate species receive legal protection through Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). There are various levels of protection according to the rarity of the species. Offences include combinations of the following:

- Sale, or offering / exposing for sale;
 - Possession;
 - Intentional taking, killing or injuring;
 - Intentionally / recklessly damaging or destroying its place of shelter / protection;
 - Intentionally / recklessly disturbing it whilst occupying its place of shelter / protection;
 - Intentionally / recklessly obstructing access to its place of shelter / protection
- Species with full protection under the Act include the Marsh Fritillary *Euphydryas aurinia*, Southern Damselfly *Coenagrion mercuriale* and Violet Click Beetle *Limoniscus violaceus*.

There are also over 400 invertebrate species listed under Section 41 of the Natural Environment and Rural Communities Act for England and under Section 7 of the Environment (Wales) Act 2016.

Invasive non-native species

Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) lists plant species, groups of plants and animal species for which it is illegal to plant, release, allow to escape or cause to spread into the wild. Examples of species listed on Schedule 9, which are most likely to be encountered, include Japanese Knotweed *Fallopia japonica*, Himalayan Balsam *Impatiens glandulifera*, and Giant Hogweed *Heracleum mantegazzanum*.

Some species are also classed as 'controlled waste' under the Environmental Protection Act 1990 and must be disposed of properly (i.e. Japanese Knotweed and Giant Hogweed). These provisions mean that, if these species occur on a site proposed for development or other work which may disturb the ground, control of these species is likely to be required.

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