

EASTLEIGH BOROUGH COUNCIL

One Horton Heath

Ecological Mitigation and Management Strategy (EMMS)

V2

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1 INTRODUCTION

This document has been prepared for the One Horton Heath Secondary Infrastructure Road (SIR) application reference F/23/96631.

The objectives of the EMMS are:

- To provide the basis for more detailed Ecological Mitigation and Management Plans (EMMPs) and for Construction Environmental Management Plans (CEMPs).
- To protect features of ecological importance during site clearance and construction in accordance with the National Planning Policy Framework (NPPF), and Policies DM1 and DM11 of the adopted Local Plan (2022). The EMMS will provide the ecological baseline and the framework for managing impacts to biodiversity throughout the lifetime of the construction. It will form the basis for more detailed Ecological Mitigation and Management Plans to accompany each Reserved Matters application

The management requirements for the habitats lying within the Site boundary including grassland, ponds, woodland, hedgerows and ditches.

This document will set out the layout, habitat preparation specification and recommended maintenance regime for these habitats covering to 30 years post completion.

This document provides the mechanism by which the mitigation measures provided for the following receptors will be delivered and maintained in the long term:

- Great crested newts
- Hazel dormouse
- Reptiles
- Bats
- Nesting birds, including barn owl

- Priority habitats (including hedgerows)
- Relevant SINCs and SACs.

This EMMS should be read with the following supporting documents as a minimum, but also those associated with any stand alone or Reserved Matters applications associated with elements of the Outline Planning Application (OPA):

- OHH Ecology Chapter of ES (Johns 2020)
- Bird Hazard Management Plan (Johns 2020)
- Construction Environmental Management Plan (CEMP) One Horton Heath (June 2022, ref OHHOPACEMP/BJM14062022)
- GCN licences for the development
- Bat licences for the development
- Dormouse licences for the development
- Habitat Regulations Assessment (Appropriate Assessment) for OPA (Johns 2022)
- Bat Mitigation Strategy (Johns Associates, 2019)

2 EMMS AIMS AND OBJECTIVES

One Horton Heath is a residential led development that will also deliver ecological mitigation and enhancement objectives. The EMMS is based on the recommendations in Chapter 10 and Appendix 10.12 of the OPA Environmental Statement and on the revised Green Infrastructure Parameter Plan and based on the most up-to-date ecological survey information and outline the avoidance and mitigation measures to be carried out on-site and off-site, together with a timetable for implementation.

The EMMS covers:

- a) Overall risk assessment of potentially damaging site clearance and construction activities;
- b) The extent and location of important ecological features (habitats, including watercourses, ponds, all hedgerows and trees, and species including great crested newt, bats, dormice, otter, reptiles and barn owl) and ecological networks and related green infrastructure identifying those that are proposed to be retained and those proposed for removal and proposed avoidance and mitigation measures, shown on appropriate scale maps and plans;
- c) Identification of 'biodiversity protection zones' within which no construction related activities will take place (including protection zones for SINCs, woodland, hedgerows, ponds and watercourses);
- d) Details of biosecurity arrangements, invasive non-native species control and methods for preventing the spread of non-native species;
- e) Outline the requirements for updated ecological surveys to inform mitigation measures and the timetable for each survey;
- f) Identify where Protected Species Licences will be required to enable the proposed development to proceed lawfully;
- g) Outline practical measures (both physical measures and sensitive working practises) to avoid or reduce impacts during site clearance and construction including the location and timing of sensitive works to avoid harm to important biodiversity features (may be provided as a set of method statements);
- h) The times during construction when specialist ecologists need to be present on site to oversee works.

The management period required is considered to be 30 years post construction, unless otherwise agreed with Eastleigh Borough Council.

The extents of the habitats listed in this document have been measured and estimated using GIS software based on CAD and topographical base mapping. Despite the high degree of accuracy of this method, it is possible that the areas as constructed are likely to vary from the above but with a margin limited to +/- 5%.

3 SUMMARY OF PROPOSALS

The SIR application comprises:

Construction of an internal distributor road and associated footways, cycleways, lighting, landscaping and SuDS basins, and diversion of Public Rights of Way footpaths FOHHF 701 and 702 as part of the One Horton Heath development (proposal constitutes EIA development)

Figure 1 OHH Site Plan location



Figure 2 Phase 1 Habitat Survey

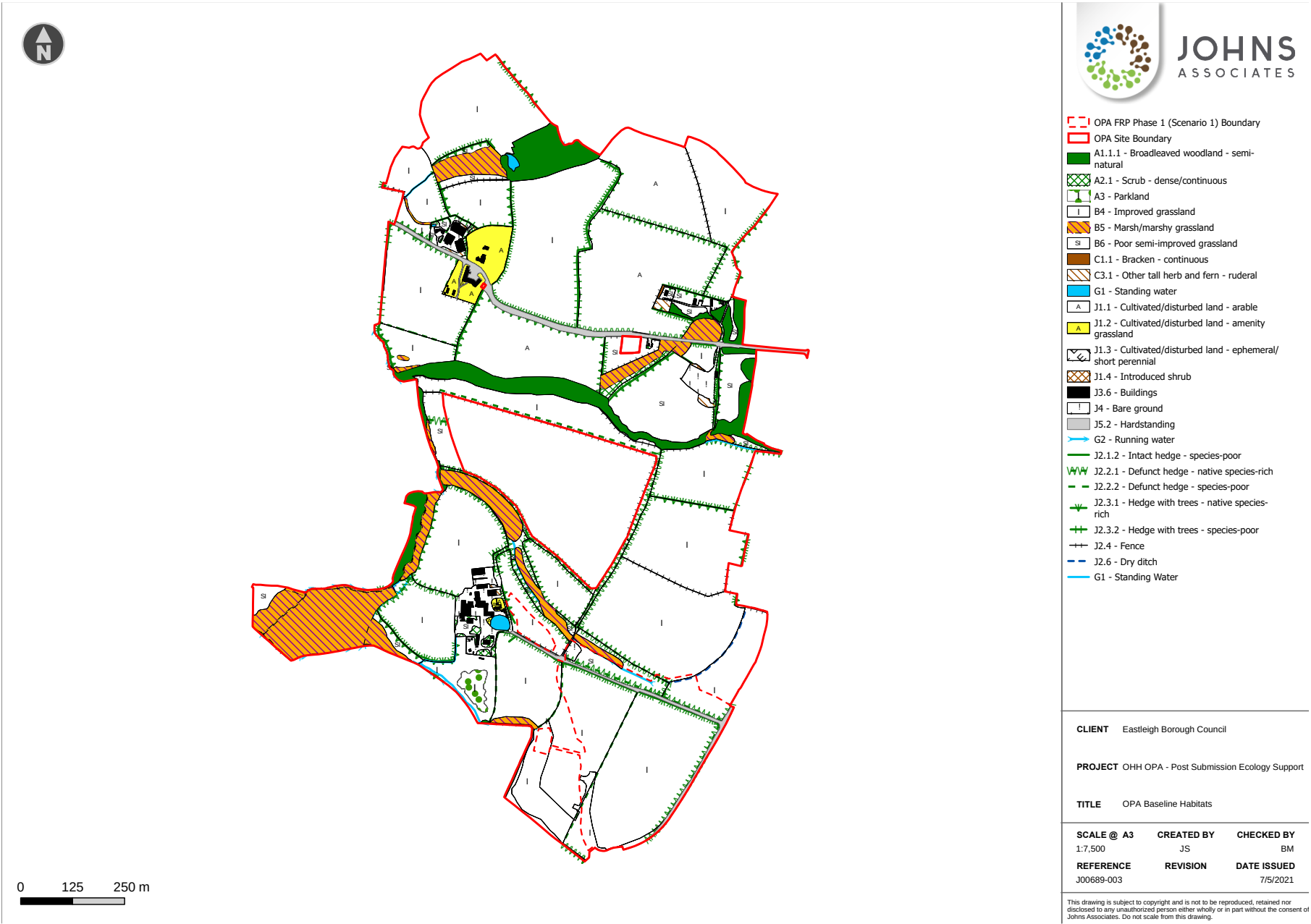
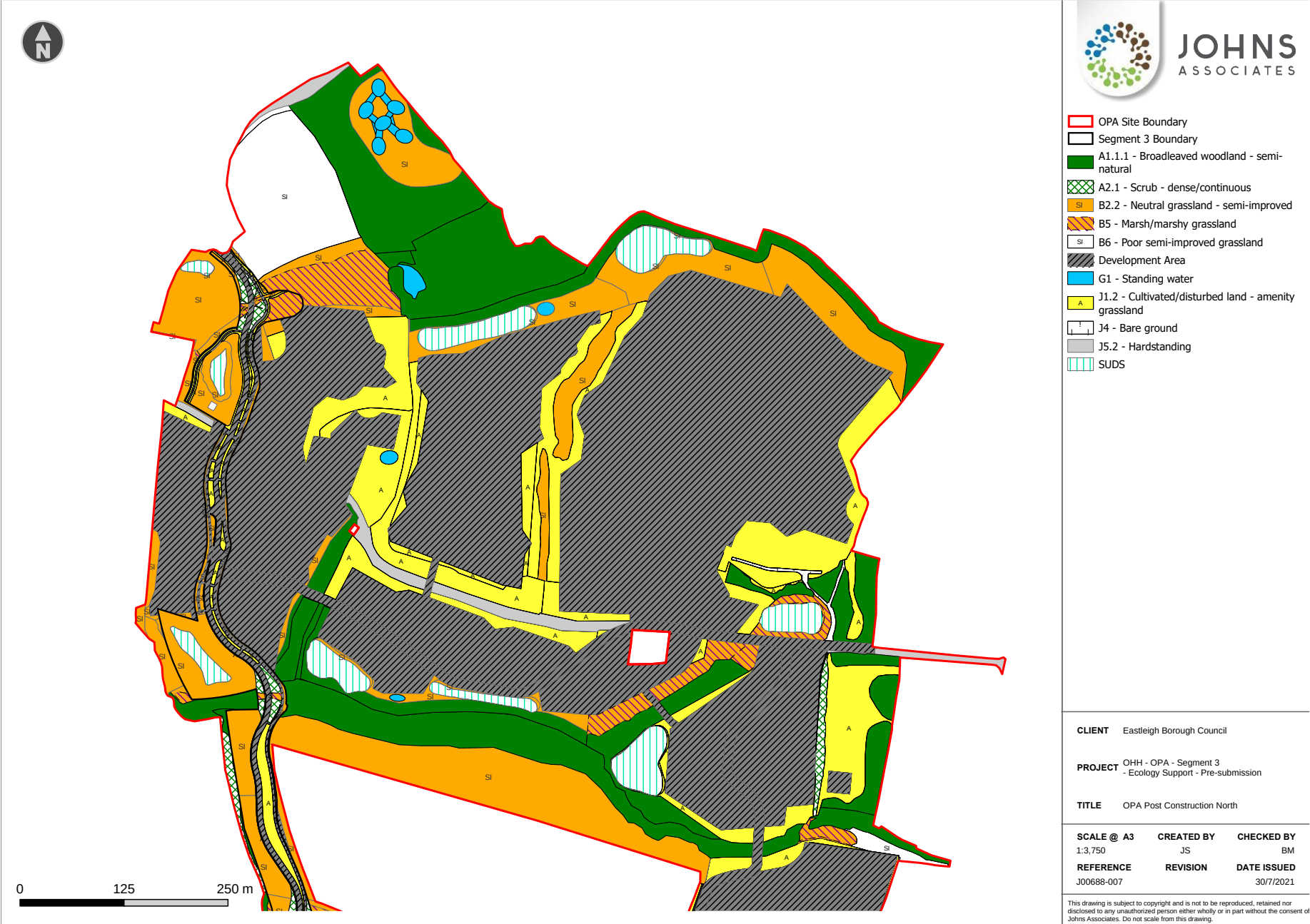
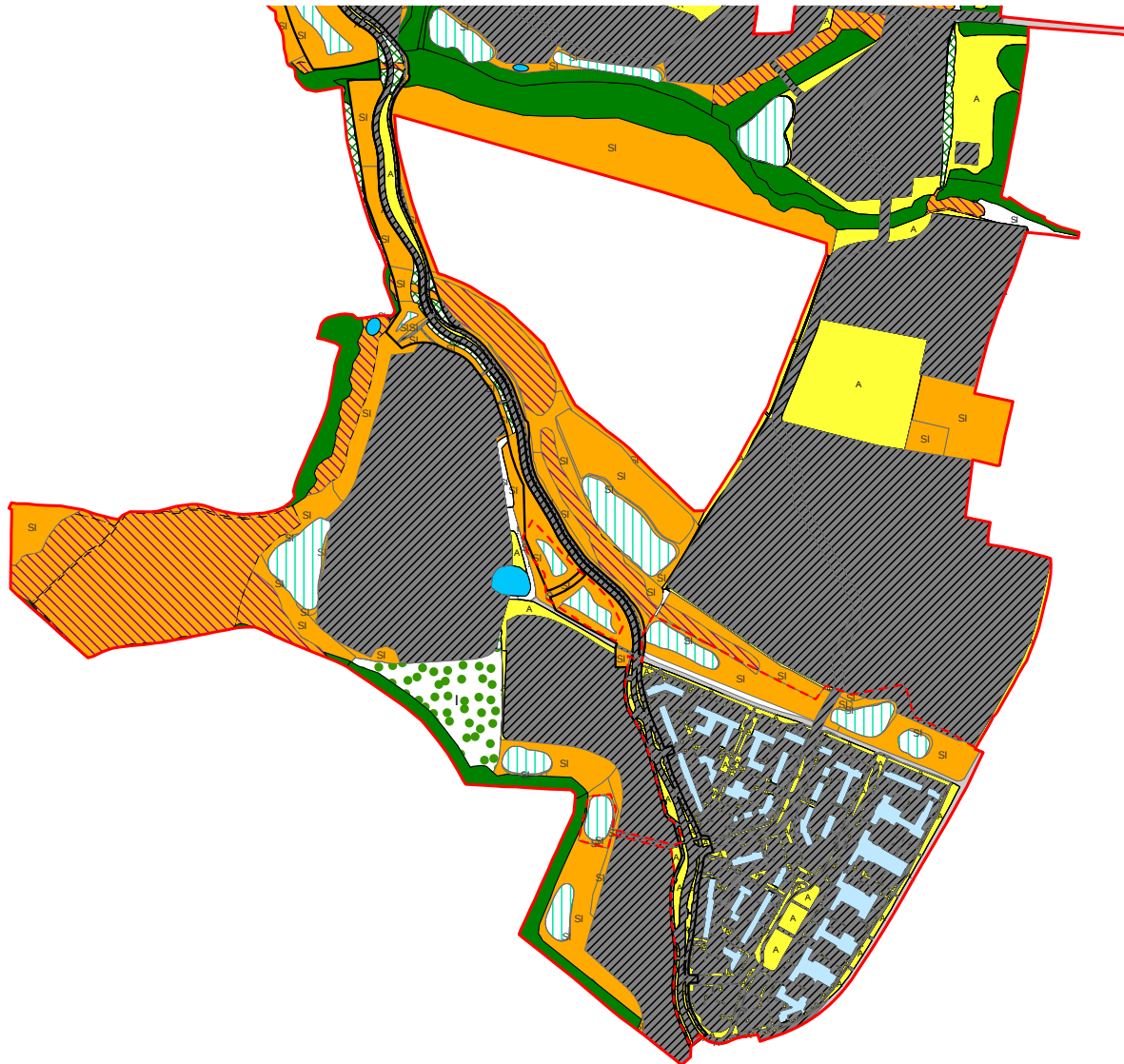


Figure 3 Proposed Site Plan





0 125 250 m



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ASSOCIATES

- OPA FRP Phase 1 (Scenario 1) Boundary
- OPA Site Boundary
- Segment 3 Boundary
- A1.1.1 - Broadleaved woodland - semi-natural
- A2.1 - Scrub - dense/continuous
- A3 - Parkland
- B2.2 - Neutral grassland - semi-improved
- B5 - Marsh/marshy grassland
- B6 - Poor semi-improved grassland
- Development Area
- G1 - Standing water
- J1.2 - Cultivated/disturbed land - amenity grassland
- J4 - Bare ground
- J5 - Other habitat
- J5.2 - Hardstanding
- SUDS

CLIENT Eastleigh Borough Council

PROJECT OHH - OPA - Segment 3
Ecology Support - Pre-submission

TITLE OPA Post Construction South

SCALE @ A3 1:5,000	CREATED BY JS	CHECKED BY BM
REFERENCE J00688-008	REVISION	DATE ISSUED 30/7/2021

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PART 1 – ECOLOGICAL MITIGATION AND MANAGEMENT STRATEGY (EMMS)

4 OVERALL RISK ASSESSMENT OF POTENTIALLY DAMAGING SITE CLEARANCE AND CONSTRUCTION ACTIVITIES

The EMMS is based on the recommendations in Chapter 10 and Appendix 10.12 of the submitted Environmental Statement.

The main risks of clearance and construction activities are summarised in Table 1 below.

Table 1. Site clearance and construction ecological risks

Clearance/ construction Issue	Risk	Mitigation/solution
Protected species - GCN	Contravention of WCA ¹	All clearance/construction activities affecting GCN within 250m of GCN ponds are subject to European Protected Species (EPS) licences and associated mitigation.
Protected species - bats	Contravention of WCA ¹	All demolition of buildings with bat roosts subject to EPS licences and associated mitigation (including bat boxes installed). Any trees with bat roost potential have been subject to bat tree climbing or emergence surveys.
Protected species – hazel dormouse	Contravention of WCA ¹	Construction of Seg 3 Link Road through Foxholes Wood to be subject to EPS licence and mitigation.
Nesting birds	Contravention of WCA ¹	All vegetation clearance to be scheduled to be undertaken outside nesting bird season (taken to be 1 st March – 31 st August): if undertaken during the nesting period, then a nesting bird check will be required immediately prior to work commencing.
Barn owl	Contravention of WCA ¹	Buildings with breeding barn owl potential to be demolished under a Method Statement. Replacement box have been installed.
Reptiles	Contravention of WCA ¹	Habitat with reptile potential to be removed under a Method Statement
Sites of Importance for Nature Conservation	Local Plan policy protection	No clearance or construction activity to impact SINC or buffer zones.
Special Areas of Conservation (SACs)	Habitat Regulations	Construction activity likely to impact SACs, principally release of pollutants and sediments into watercourses that may impact the nearby River Itchen SAC. Measures in the agreed CEMP to be strictly adhered to.

¹ Wildlife and Countryside Act 1981 (as amended)

5 THE EXTENT AND LOCATION OF IMPORTANT ECOLOGICAL FEATURES

Ecological Constraint Plans (North and South) are set out as Appendix A. These show the extent and location of important ecological features.

6 IDENTIFICATION OF 'BIODIVERSITY PROTECTION ZONES'

The following areas (as a minimum) will be protected for wildlife and subject to access restrictions (see Access Plan in Appendix B):

- Northern GCN mitigation zone, containing ponds 91-96 and associated mitigation planting (see Figure F1 and mitigation see Final development layout map J00445-F1 revision J 26.04.22 ('GCN licence plans'));
- The following SINCS: Quobleigh Wood; Hearts Copse, Chalcroft Distribution Park, Round Copse West End, Field North of Hearts Row West End and Treeline Break West End (see Appendix A Ecological Constraint Plans).
- The loss of bat foraging habitat across the site has been minimised through the retention of key high value habitats. These habitats will be protected and enhanced, with connectivity between these habitat areas and potential roost sites maintained both across the site and the wider landscape through the measures to protect these specific habitats (see Mitigation Table from ES, Appendix C, refs G, H, I, O & P)
- A number of watercourses run through the site, including main rivers (Moorgreen Stream, Quobleigh Stream) and ordinary watercourses (brook that runs through Foxholes Wood and along the northern edge of the proposed First Residential Parcel, FRP). These watercourses run eventually into the River Itchen SAC, a European wildlife site for plant communities, fish communities, otter and the southern damselfly. These on site watercourses should be protected from damaging development impacts, including discharge of sediment and pollutants.

7 DETAILS OF BIOSECURITY ARRANGEMENTS, INVASIVE NON-NATIVE SPECIES CONTROL AND METHODS FOR PREVENTING THE SPREAD OF NON-NATIVE SPECIES

Biosecurity

The OHH Project maintains a robust approach to biosecurity, focusing on avoiding factors and situations that increase the risks of spreading diseases, parasites and invasive non-native plants and animals (INNS).

The approach to biosecurity is summarized here.

Field equipment and materials should be stored and maintained in a separate location, split into lockable clean/dry and dirty/wet containers, with an outside yard and washdown area available for disinfection. The three key steps associated with Check - Clean – Dry and the guidance for Biosecurity in the Field (both on site and at our field depot) forms the cornerstone of the Biosecurity approach:

- Check - Check plant, equipment and clothing for living organisms. Pay particular attention to areas that are damp or hard to inspect.
- Clean - Clean and wash all plant, equipment, footwear and clothes thoroughly, preferably with hot water. If you do come across any organisms, leave them at the location where you found them.
- Dry - dry all plant, equipment and clothing - some species can live for many days in moist conditions. Make sure you don't transfer them elsewhere.

Prior to any site work, a biodiversity risk assessment should be completed, which includes consideration of background information (including client knowledge, GIS data, site records) to identify potential hazards, risk ratings and mitigation measures. Where specialist advice is required, this should be sought from professional external advisors and/or from other sources such as best practice guidance documents, the Defra and Non Native Species Secretariat website, other EU/UK advisory websites and from our clients where appropriate (e.g. Environment Agency).

The outcome of the biodiversity risk assessment feeds into a project task method statement that will be used to deliver a project/site induction with the use of tool box talks and registers of attendance. Any new members of the team (including sub-consultants and contractors) joining a project will have to complete the induction. Guidance and identification materials (e.g. of INNS) are made available as part of this induction. A biosecurity response plan is developed and procedures and any required equipment is always available on site as well as being prepared for the office/field depot.

Site work adopts a risk avoidance strategy where possible including:

- use of advanced knowledge or walkover surveys to ground truth biodiversity risks identified as being potentially present
- avoiding driving vehicles off road wherever possible to minimise transfer of soils/spores/seeds
- avoiding sensitive times of the year
- provision of the right equipment that is easy to manage
- following defined paths
- use of signage and barrier tapes, checklists, personal cleaning and disinfection, equipment isolation/ washing and disinfection facilities where possible, or isolation and handling at our field depot
- confirmation of safe and appropriate disposal pathways for potentially contaminated materials, cleaning and drying (48hrs) of personal protective equipment and sampling equipment.

Invasive species control and prevention of spread

Section 14(2) of the Wildlife and Countryside Act 1981 (as amended) states that “...if any person plants or otherwise causes to grow in the wild any plant which is included in Part II of Schedule 9, he shall be guilty of an offence”.

Working Method and Control Measures

Small numbers of Japanese rose, Himalayan balsam (Quobleigh Stream and Woods), rhododendron and laurel (Quobleigh Woods) and Japanese knotweed (Chalcroft Farm) occur on Site. Construction activity should not cause such species to spread and specialist contractor's may be required to control/remove such species.

All the above species are invasive non-native species listed under Schedule 9 of the Wildlife and Countryside Act (as amended). Where present within and immediately adjacent to the working area, the contractor will remove the plants to ensure there is no risk of spread within the site prior to works commencing and dispose of it under an agreed procedure in accordance with relevant guidance from the Environment Agency (www.gov.uk). This needs to also be addressed through the contractors' RAMS.

Specialist contractor's may be required e.g. to control or remove Japanese knotweed.

Should other (or previously undetected) injurious and invasive plants or animals become suspected during works (mink have been recorded in the past), cease work and contact the environmental manager immediately. The significance of these invasive species will be highlighted in the induction and tool box talks.

Preventing the spread of Himalayan balsam

- **Mechanical/physical control.** Mechanical control, by repeated cutting or mowing, is effective for large stands, but plants can regrow if the lower parts are left intact. The plant must be cut below the lowest node to stop regeneration. Access to the sides of riverbanks can be difficult and inaccessible stands can quickly recolonise accessible cleared areas, so vigilance is needed if an area is to be effectively cleared. Regular grazing also suppresses this species. Small infestations (most common in gardens) can easily be controlled by hand-pulling as the species is shallow rooted. Padded gloves should be worn to avoid risk of injury to hands. Seeds are not very robust and only survive for up to 18 months so a two year control programmes can be successful in eradicating this plant if there is not further infestation from upstream or adjacent sites. To avoid additional spread do not disturb plants if seeds pods are visible (usually sometime after May). Programmes should be undertaken in April or early May. If hand pulling after this time, bag plant tops to prevent seed spread.
- **Chemical control.** Himalayan balsam can be controlled by spraying the foliage with glyphosate. The plants should be sprayed in the spring before flowering but late enough to ensure that germinating seedlings have grown up sufficiently to be adequately covered by the spray. Glyphosate is sold under a number of brand names. Small infestations and

individual plants can be controlled by using glyphosate in a weed wiper. This has the advantage of preserving native plants and grasses which would otherwise be killed by the glyphosate. The herbicide 2,4-D amine controls many broadleaved annual weeds and may also be used to control this species but is not recommended for use near waterbodies. This selective herbicide will not kill grasses. It may be preferable to glyphosate in situations where the weed has not reduced complete cover of the grasses. A long-lance sprayer may assist in the spraying of less accessible areas out of the reach of conventional knapsack sprayers. Always follow health and safety procedures outlined by the herbicide manufacturer and take appropriate precautions when working near water.

Controlling rhododendron

Current methods of management and disposal for *R.ponticum* include the following:

- Mechanical control: heavy machinery with long hydraulic arms are best for digging up the root material and crushing branches. Operator knowledge of the machinery and habitat is key to ensure the heavy machinery does not compact valuable forest flora and fauna. Mechanical clearance must be followed by repeated herbicide applications for at least two years to prevent re-sprouting and recolonisation (forestry.gov.uk, 2017). Chemical control: spray cut stems with chemicals, although surrounding vegetation may be affected by this. Bury the contaminated material deep within a landfill site.
- Disposal through production of biochar. This could be achieved by on-site charcoal production using modern portable reactors to reach optimum conditions. This can lead to a yield of 25-33% of the original material (forestry.gov.uk, 2017).
- Biological control: There are few natural enemies associated with *R. ponticum* even in its native range (cabi.org, 2017). Cabi is currently researching biological control, including the proposed use of a rust fungus from Portugal. This is currently being evaluated in other countries and is a possible cheaper, simpler alternative approach to chemical and mechanical control.
- Once *R.ponticum* has been removed from an area, a study by Maclean et al (2017) has shown that understorey plant community composition does not return to the state pre-invasion, even decades after the removal of *R.ponticum*. The overall conclusion from the study states that native plant communities showed no signs of returning to pre-invasion conditions up to thirty years after the removal of *R.ponticum*. It is suggested that restoration should focus on aiding the arrival of forbs and grasses under these circumstances, rather than altering the condition of the soil.

Japanese knotweed

A specialist Japanese knotweed contractor should be used to deal with this species.

Disposing of invasive species plant waste

A significant fine can be levied or individuals sent to prison if contaminated soil or plant material from any waste being transferred is allowed to spread into the wild.

A specialist contractor will be appointed to undertake the works. The contractor will review and update this approach and provide all other supporting information, RAMS and certificates required to implement the INNS MS process. This may include the disposal of Japanese knotweed, Himalayan balsam, rhododendron and associated soil/sediment.

When invasive plants and soil contaminated with invasive plants is transported, the operator must make sure that the vehicle is covered or sheeted so that seeds and plant material cannot blow away. If contaminated soil or plant material is allowed to escape, you could be prosecuted and fined.

The operator must have waste transfer notes (WTNs) for any material leaving your site. It must list any material that contains invasive plants or their seeds on the WTN. The waste carrier can only take the waste containing invasive weeds to sites authorised to accept it. Plant material, or soil containing invasive plant material or seeds, is likely to be classed as non-hazardous but controlled waste - this is a different category from inert waste.

There is a duty of care for waste that affects all businesses. You must make sure that:

- waste is stored, handled, recycled or disposed of safely and legally by licensed individuals or businesses
- record all transfers of waste between your business and another business - using a WTN
- keep all WTNs, signed by both businesses, for at least two years

- record any transfer of special waste between your business and another business using a consignment note
- keep all consignment notes, signed by both businesses, for at least three years.

You must take waste plant material or contaminated soil to a site that has a relevant Environmental Permit or Waste Licence.

The conditions of the permit or licence must allow the disposal of invasive plants at the site. You should check with the waste site in advance to make sure they can accept material containing invasive plants.

The waste site may need notice so that an area can be prepared. For example, a landfill site will need an area away from the landfill liner for material containing invasive plants.

The contractor will:

- Follow the guidance set out in this INNS MS
- operate within the conditions in 'treatment and disposal of invasive non-native plants: RPS 178'
- have the relevant environmental permit

The following will not occur:

- dispose of Japanese knotweed, Himalayan balsam, rhododendron with other surplus soil
- sell soil contaminated with giant hogweed, Himalayan balsam, rhododendron as topsoil

Before the appointed contractor transfers contaminated waste it will:

- When the appointed contractor transfers the contaminated waste it will cover or enclose it in the vehicle so that no waste can escape.
- Should the appointed contractor transfer contaminated waste to a disposal site it will:
- brush vehicles down vigorously or jet-wash them to clear them of any giant hogweed, Himalayan balsam, rhododendron and associated soil/sediment before leaving site;
- inspect its vehicles to check there's no trapped pieces of plant or rhizome.

8 OUTLINE THE REQUIREMENTS FOR UPDATED ECOLOGICAL SURVEYS TO INFORM MITIGATION MEASURES AND THE TIMETABLE FOR EACH SURVEY

Guidance on the lifespan of ecology reports can be found in the CIEEM Advice Note². This recommends the following:

- Less than 12 months – likely to be valid in most cases
- 12-18 months - likely to be valid in most cases with the following exceptions:
 - Where a site may offer existing or new features which could be utilised by a mobile species within a short timeframe (see scenario 1 example);
 - Where a mobile species is present on site or in the wider area, and can create new features of relevance to the assessment (see scenario 2 example);
 - Where country-specific or species-specific guidance dictates otherwise.
 - Report authors should highlight where they consider it likely to be necessary to update surveys within a timeframe of less than 18 months.
- 18 months to 3 years - A professional ecologist will need to undertake a site visit and may also need to update desk study information (effectively updating the Preliminary Ecological Appraisal) and then review the validity of the report,

² Advice Note on the Lifespan of Ecological Reports and Surveys, CIEEM April 2019.

based on the factors listed below. Some or all of the other ecological surveys may need to be updated. The professional ecologist will need to issue a clear statement, with appropriate justification, on:

- The validity of the report;
- Which, if any, of the surveys need to be updated; and
- The appropriate scope, timing and methods for the update survey(s).

The likelihood of surveys needing to be updated increases with time, and is greater for mobile species or in circumstances where the habitat or its management has changed significantly since the surveys were undertaken. Factors to be considered include (but are not limited to):

- Whether the site supports, or may support, a mobile species which could have moved on to site, or changed its distribution within a site;
 - Whether there have been significant changes to the habitats present (and/or the ecological conditions/functions/ecosystem functioning upon which they are dependent) since the surveys were undertaken, including through changes to site management;
 - Whether the local distribution of a species in the wider area around a site has changed (or knowledge of it increased), increasing the likelihood of its presence.
- More than 3 years - The report is unlikely to still be valid and most, if not all, of the surveys are likely to need to be updated (subject to an assessment by a professional ecologist, as described above).

Table 2 below sets out when each survey was last undertaken and recommends further action if required.

Table 2 OHH Ecology Survey Review

Species/ group/ survey type	Dates of previous surveys	Date when repeat surveys needed	Update surveys required? Date	Rationale
1.Extended Phase 1 Habitat Survey – now superceded by UKHAB Survey method	July/ August 2018; August 2019; July/ August 2020 October 2020 (part) Sept, 2022	April to August 2025	No	An update walkover survey has been conducted of the wider OHH site, including the Link Road, in Sept 2022 and again in Spring 2024. This has established whether there are any significant differences in baseline habitats since previous surveys and provide comments on current land management practices. It has also provided updated information on fields signs or potential for protected species such as badgers and otters.
2.River habitats and fish habitats – now superceded by River Condition Assessment (Morph)	July 2020	July 2023	Yes – spring 2024	No changes to site layout or management. Updated survey 1 and 2 has assessed any changes and concluded that previous results remain valid for 2024.
3.Bat activity surveys (transects and automated detector surveys, radio tracking, trapping)	July to October 2018, April to June 2019, May 2020 Radio tracking summer 2020 Trapping Aug 2018, Aug 2020	2025 April to October	No	No changes to site layout or management and incremental delivery of replacement habitat/mitigation/compensation/ enhancement. Updated survey 1 has assessed any changes and concluded that previous results remain valid for 2024.
4.Bat crossing point surveys	June to September 2019 and June to September 2020	Summer 2025	No	No changes to site layout or management. Updated survey 1 has assessed any changes and concluded that previous results remain valid for 2024.

5. Roosting bat surveys: buildings	Northern licence buildings: inspections 2018 and May 2020; emergence surveys Aug/Sept 2018 and July/Aug 2020 Southern licence buildings: inspections Aug 2018 and Feb 2021; emergence surveys 2018 and June 2021. Updates on Chalcroft Farm July-Aug 2022 Detailed inspections/surveys	Buildings have been demolished under licence. Monitoring required under bat licences is in place and ongoing, with annual maintainance also in place.	No	All buildings have been demolished under licence and all mitigation/compensation/enhancement measures have been delivered.
6. Roosting bat surveys: trees	Tree emergence surveys August/ September 2020 Tree climbing inspections of moderate or high potential trees Oct 2020 Ground based assessment updated Dec 2021 Quobleigh crossing alders inspected and resurveyed spring 2022.	Emergence 2023 most Ground level tree assessment 2025 Quobleigh crossing 2025	No	No changes to site layout or management. Updated survey 1 has assessed any changes and concluded that previous results remain valid for 2024.
7. Great crested newt surveys	May 2019 (pond HSI); May/ June 2019 (presence/ absence and population class) May-June 2021 presence absence surveys May-June 2022 presence absence surveys May-June 2024 presence absence surveys	2026	No	Surveys updated in 2024.
8. Otter and water vole surveys	September/ October 2018; July 2020	July 2023	No	No changes to site layout or management. Updated survey 1 has assessed any changes and concluded that previous results remain valid for 2024.
9. Dormouse surveys	July to November 2018; August to November 2020 and 2022	2024 (Secondary Infrastructure Road) and 2025 (generally)	No	A dormouse licence is in place for the Link Road severance of Foxholes Wood. Dormouse monitoring to support EPS licence to commence in Sept 2022 and extend throughout construction and beyond in accordance with the licence requirements.

10. Bird surveys	April to June 2020 (breeding bird surveys); April to July 2020 (barn owl surveys)	Spring/summer 2025	No	No changes to site layout or management. Updated survey 1 has assessed any changes and concluded that previous results remain valid for 2024.
11. Badger surveys	November 2018; September 2019; September 2020	2025	No	Badgers are notorious for moving into areas relatively quickly. Whilst there was no activity up to 2020, there has been badger sett activity in the extreme SE noted subsequently, on the site on the new road embankments. The site walkover update (see 1 above), has surveyed for any new badger activity across the site and concluded that previous results remain valid for 2024.
12. Reptile surveys	September 2018; September 2020	2025	No	No changes to site layout or management. Updated survey 1 has assessed any changes and concluded that previous results remain valid for 2024.

9 IDENTIFY WHERE PROTECTED SPECIES LICENCES WILL BE REQUIRED TO ENABLE THE PROPOSED DEVELOPMENT TO PROCEED LAWFULLY

The following protected species licences are in place for in preparation for the wider OPA:

- GCN licence for northern road from Allington Way to Quobleigh Stream, and separate licences for the Secondary Infrastructure Road and associated drainage, within 250m of breeding pond at Chalcroft Farm and south of watercourse.
- Hazel dormouse licence for Foxholes Wood (Secondary Road Infrastructure road).
- Bat licence OHH Northern Building Cluster, brown long-eared (satellite roost), whiskered, Soprano pipistrelle, common pipistrelle (all day roosts).
- Bat licence Southern Building Cluster Demolition, brown long-eared, Soprano pipistrelle, common pipistrelle (day roosts);
- Remaining Chalcroft Farm building demolition; includes provision of new replacement bat house for maternity colony of brown long eared bats in Pond Cottages.
- Demolition of Victoria House (brown long-eared bat satellite roost, and also pipistrelle species) and provision of replacement roost building at Fir Tree Farm House and also crevice features via bat boxes.

10 MITIGATION

The practical measures (both physical measures and sensitive working practices) needed to avoid or reduce impacts during site clearance and construction including the location and timing of sensitive works to avoid harm to important biodiversity features (including relevant method statements) are set out below.

10.1 MITIGATION RATIONALE

Johns Associates Ltd has undertaken a range of protected species surveys within the local area to inform the outline planning application and the baseline is reported in full within Chapter 10 (Biodiversity) of the EIA.

All landscape and ecological maintenance work will be carried out in a manner that will avoid potential legal offences and harm to ecological receptors that may be present on site. Any potentially harmful maintenance operations are to be performed with awareness of, or take place outside, the most ecologically sensitive periods, while providing the management necessary to maintain and increase the biodiversity value of the site.

All construction and maintenance operators and contractors shall make themselves aware of all ecological constraints, drainage runs and services etc prior to commencing maintenance operations. They shall maintain access to all/any manholes/drainage hatches, soakaways, etc.

The principal seasonal ecological constraints of protected species are provided in Table 3 below.

10.1.1 Great Crested Newt

Great crested newt (*Triturus cristatus*) surveys were completed in 2019, 2021, 2022 and 2024 by Johns Associates. Evidence suggests that high quality terrestrial habitat up to 100m from a breeding pond comprises the locations where great crested newt is most likely to be found, although the species can be found at locations further away from a pond than this.

A medium population of GCN are found in the Northern sector centered around Wyvern Pond (off site to NE). The Ecological Constraints Map North shows a 250 GCN licence area centered on ponds associated with the neighbouring residential development off Allington Lane (these ponds have since dried up or become too vegetated for survey). Six new compensation ponds have been created on site just south of Allington Lane as part of the GCN licence. A modification to the original licence was obtained in 2022 to cover the extension of the link road access down to Quobleigh Stream (see mitigation plan at Appendix D). No further measures will be required in this area in relation to site clearance works.

In the southern sector, presence of GCN was confirmed in the Chalcroft Farm Pond in 2019 with a peak count of 5 adults. Breeding in this pond was confirmed during egg searches conducted in 2019. Whilst there was no evidence of breeding in 2021, GCN were again present as a low population from 2022. Mitigation measures are required in relation to both the demolition of Chalcroft farm buildings (and the clearance of surrounding vegetation that may harbour GCN), the construction of the Link Road within the 250 GCN zone and subsequent development within 250m south of the nearby watercourse.

10.1.2 Bats

Johns associates have carried out a series of bat surveys across the OPA Horton Heath Site in 2018, 2019, 2020, 2021 and 2022. Ten species have been confirmed to be present on Site through various surveys carried out:

- Barbastelle: A very low levels of activity was recorded through static detector surveys however; this species was recorded at all detector locations and in all months with the exception of May.
- Serotine: No roosts identified on site. Low activity levels observed.
- Brown long-eared: Two maternity roosts present on site (Fir Tree Farmhouse and Chalcroft Farm). Fir Tree Farmhouse (Northern Colony) – static data indicates that these bats are using the two main connective habitats leading both north and south across Fir Tree Lane from the Farmhouse, presumably to the highly suitable foraging habitats in Quobleigh Wood and the central/western stream corridor respectively (ST11 and ST12). Two Post lactating female BLE and one adult male were caught in Quobleigh Wood in August 2020. Chalcroft Farm (Southern Colony) – Maternity roost present in Pond Cottages to the north of Chalcroft pond. Additional satellite roosts identified in tree in Hearts Copse and within the stables building (A6). Key supporting habitats are considered to be Hearts Copse (offsite) with the marshy grassland and riparian corridor of the southwest and western areas of the site. Key connective corridors are the hedgerows to the south and the riparian corridor to the north and west of Chalcroft Farm.
- Natterer's: One roost record on site in Building B18 in 2018. This building has subsequently been demolished under licence. This genus is represented at all locations sampled.
- Daubenton's: No known roosts present on site. Anecdotal observation of two Daubenton's bats entering oak tree in parkland south of Chalcroft during trapping surveys.
- Nathusius pipistrelle: mostly recorded in October.
- Noctule: Tree 19 (an Ash next to the pond at Chalcroft Farm) has been confirmed as a mating roost.
- Common pipistrelle: Day roosts present in Northern and Southern Building clusters. Common pipistrelle were recorded at high levels at all static locations.
- Soprano pipistrelle: Day roosts present in Northern and Southern Building clusters. The median bat passes per hour per month found April recorded the highest level of recordings with the lowest number of recordings in May and then a similarly low level of recordings for the remaining months. They were caught in all years and at all locations during trapping.
- Whiskered. Roost in Northern building cluster.

Demolition of buildings containing bat roosts has been undertaken under EPS licences, with replacement bat roosts being erected in trees to be retained.

An enhanced bat house (for brown long eared bats from Pond Cottage) has been created within Pond Cottage. A new replacement roost building has been constructed at Fir Tree Farmhouse to compensate for the demolition of Victoria House.

An updated ground based tree assessment for bat potential was undertaken in December 2021 (see Appendix F). No trees with roosting bat potential should be felled or impacted unless prior approval is obtained from an ecologist.

Whilst bats are not at specific direct risk during these works, they are sensitive to light and lighting of the site during construction has the potential to temporarily affect the behaviour and availability of foraging and commuting habitats for bats.

There are several hedgerows and woodland edge habitat that will be used by foraging and commuting bats. The addition of the new species rich hedgerows will ensure further landscape connectivity and provide foraging habitat for these species.

Specific mitigation measures have been included for the three locations where the Link Road passes over watercourses as follows:

- Quobleigh Stream crossing. A 20m zone where road lighting will be reduced. Structured vegetation planting to maintain bat foraging and commuting route along Quobleigh Stream. Road bridge design to maintain connectivity under bridge for Daubenton's bats.
- Foxholes Wood stream crossing. A darker area of less than 1.0lux for 10m stretch centred on middle point of bridge, i.e. 5m in both directions north and south. Plus a wider area of less than 5.0lux for 30m to keep the general woodland link of Foxholes Wood dark, i.e. 15m either side of central point of bridge, north and south. This woodland connectivity is especially important for brown long eared bats which have satellite roost in the area.
- Southern bridge. A darker area centred on middle point of bridge, i.e. 5m in both directions north and south. Plus a wider area of less than 5.0lux for a 35m width to keep the wetland link and in particular the northern hedgerow dark, this would stretch from the bridge northwards to include the northern hedgerow that comes in from the east, running along the southern edge of the solar park. This corridor is important for brown long eared bats which have satellite roost in the area, serotines and noctules.

Road crossing bat surveys were undertaken to determine whether bats are using regular flightpaths to cross current habitat that will be severed by the Link Road construction and therefore to enable prediction of the impacts of the proposed road across the site from north to south. Results are set out in the Bat Appendix to the ES

10.1.3 Reptiles

Johns Associates Ltd have carried out reptile surveys in areas of suitable habitat across the One Horton Heath site in September 2018 and an update survey was completed in September 2020 that focussed on areas of suitable reptile habitat that are most likely to be affected by the development proposals (see Appendix G for results of 2018 and 2020 surveys). The 2018 survey results recorded a total of 15 slow worms and a single juvenile grass snake. A peak count of six slow worms was recorded in area J on 20th September 2018 which represents a good population size within this area. The 2020 update surveys recorded one common lizard and one adult grass snake within the Site on the 9th September and 18th September, recorded in areas C & D respectively. This represents a low population of both species within these areas.

The habitat suitability for reptiles across the Horton Heath Site remains similar to that of the 2018 surveys. Therefore, it should be assumed that low populations of reptiles (common lizard, grass snake and slow-worm) remain present in all areas where previously recorded. The suitability of habitats across the site is locally restricted and patchy with reptile presence largely restricted to the boundaries of the site, particularly in areas adjacent to woodland or domestic gardens.

A precautionary Reptile Method Statement has been issued for works that may affect suitable reptile habitat (see Appendix H).

10.1.4 Hazel dormouse

Historic survey results from Ecologica in 2014 and Johns Associates in 2018 found no evidence of dormouse across the Site. The results of an updated survey conducted in 2020 confirmed the presence of one live dormouse and three dormice nests within Foxholes Wood, the central woodland belt on site during the November 2020 survey visit. This was repeated in 2022 and newly installed boxes inspected in 2024, confirming the results.

Woodland habitat potentially suitable for hazel dormouse at the OPA are the ancient woodland blocks to the north and south of the site and potentially the network of hedgerows that border and traverse the Site.

The remaining woodlands have been dissected into smaller copses and left as fragmented blocks of suitable habitat with connectivity being restricted by the railway to the south and urban development to the north. The network of hedgerows across the site have undergone regular management resulting in species poor hedges that provide little in the way of important food or dispersal corridors between these woodlands.

Habitat suitability would indicate potential dormouse presence within the woodlands but likely to be only a small population due to the habitat isolation and the limited connectivity for the exchange of animals between local populations.

10.1.5 Otter

No otter have been recorded on Site, however the River Itchen SAC to the west is designated partly due to otter presence. Measures to reduce impact on otter should they colonise the site in future are set out in the Table below.

10.1.6 Badger

No records of badger were recorded in badger surveys on site 2018-21, although an outlier sett on the site margin was recorded in 2022. No further activity was recorded in the more recent walkover surveys. This more recent evidence of badger activity has been recorded on the southern access embankments. Measure to minimise impact on badgers is set out in the table below.

10.1.7 Nesting Birds

A range of typical woodland, hedgerow and farmland birds are associated with the OPA site, typically breeding between 1st March and 31st August, inclusive. All active birds’ nests are protected under the Wildlife and Countryside Act (WCA, 1981, as amended). One specially protected bird (Schedule 1 WCA), barn owl, has been recorded on site: these species have additional protection from disturbance whilst at the nest.

Hedgerow removal is of particular relevance to potential effects on nesting birds, with the sensitive timing of works vital to avoiding impacts to nesting birds.

A Method Statement has been produced for the demolition of buildings with barn owl nesting potential. Replacement barn owl boxes have been provided on site (see Appendix I).

10.1.8 Invasive species

Small numbers of Japanese rose, Himalayan balsam (Quobleigh Stream and Woods), rhododendron and laurel (Quobleigh Woods) and Japanese knotweed (Chalcroft Farm) occur on Site. Mink have been recorded in the past. Construction activity should not cause such species to spread and specialist contractor’s may be required to control/remove such species.

10.1.9 Watercourses including River Itchen SAC

The main and ordinary watercourses that flow through the site (Moorgreen Stream, Quobleigh Stream etc) all feed eventually into the River Itchen which is a protected Special Area of Conservation (SAC) for its vegetation, fish, invertebrate and otter populations.

It is imperative that any construction activity strictly follows the Construction Environment Management Plan (CEMP) and prevents sediment loss (and the discharge of other pollutants) into the on site watercourses.

10.1.10 SINC’s and Habitats

Various SINC’s occur on or adjacent to the site, plus there are various habitats that are subject to buffer zones. These are all shown on the Ecological Constraints Maps (see Appendix A).

10.2 MITIGATION MEASURES

The following mitigation measures are required (see Table 3 below) and relate to the mitigation map in Appendix C.

Table 3 Ecological Measures Summary

Receptor	Constraint	Sensitive Period	Action
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Great crested newt	Suitable refugia present	Hibernation period: November–February inclusive	Measures to prevent entrapment in drainage systems and connectivity across roads Habitat connectivity will be maintained through the designation, enhancement and long-term management of ecological connective corridors to maintain the landscape permeability both on and across the site for amphibians/reptiles. Measures will also be incorporated in road designs at key severance locations to facilitate safe passage to avoid collision mortality and entrapment risk. An amphibian tunnel is proposed north of Chalcroft Farm to maintain current and future connectivity to the relict Chalcroft Farm breeding pond with the healthier northern breeding pond network. Key amphibian habitats have been avoided and will be protected and enhanced. Where valuable amphibian habitats must be affected, appropriate measures will be implemented to ensure that animals are protected during construction and that there is no detrimental effect on the favourable conservation status of the populations present on site. These measures include: • Implementation of a series of linked Natural England EPS licences coordinated through the implementation of a great crested newt masterplan • Avoidance measures to minimise areas of habitat loss and to maintain habitat connectivity • Sensitive approach to vegetation clearance including consideration of timing, duration and methodology. This will employ measures of phased vegetation removal in accordance with best practice under a detailed method statement. • Exclusion from working areas until works have ceased and habitat reinstated • Capture from exclusion areas and translocation to retained receptor habitat • Conservation of the southern low size class Chalcroft population within the single poor quality pond (to be enhanced) and associated poor quality and disturbed terrestrial habitat to newly created ponds with high quality terrestrial habitat. Chalcroft pond will be retained and restored, including connectivity for great crested newt to return to the southern habitat. • Measures to prevent entrapment in drainage systems and connectivity across roads • Provision of enhanced terrestrial habitat and a network of created and restored ponds and wetlands, together with resting and overwintering habitats • Habitat compensation and enhancement measures will be delivered in accordance with industry best practise ensuring compliance with policy and legislation. • Key elements of GCN mitigation will be delivered under EPS mitigation licences, as appropriate, with additional elements of the development delivered under a non-licensable method statement where the likelihood of an offence is negligible. Measures have been incorporated into the masterplan to minimise risk and disturbance to the populations present and to facilitate the recolonisation and natural dispersal/recolonisation of the population across the site post construction to new wildlife ponds constructed to
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			appeal to breeding GCN via a comprehensive network of suitable connective habitats linking existing populations to these new features. All habitats managed for amphibians/reptiles will be subject to a detailed long-term management plan. <u>Areas within GCN 250m zones to be cleared:</u> Vegetation will continue to be managed short by grazing or cutting until works commence. No introduction of material that could form potential resting/overwintering habitat will be permitted. Above ground hedgerow material will be removed to a height of 300mm before weather conditions typical of hibernation to avoid potential disturbance to amphibians resting or overwintering in features associated with the hedgerow base. The timing of works will be subject to agreement with the Project Ecologist. An SQE will conduct a detailed inspection of any hedgerows to be removed prior to works, identifying areas of suitable features and assigning a risk category. Where works are considered highly sensitive, an experienced and licenced Ecological Clerk of Works will supervise the works. Arisings will be chipped and removed from site with larger logs used to create refugia. These will be placed directly into the refugia locations and not stockpiled elsewhere. The stumps will be directly treated with a suitable herbicide to prevent re-growth with care taken to avoid non target drift onto retained vegetation. Construction work within GCN 250m zones will proceed under EPS licence measures (check licences for details).
Reptiles	Suitable habitat and refugia present	Hibernation period: November–February inclusive	Timing of works: Vegetation clearance works should be carried out within the active season for reptiles (March–October inclusive) to avoid the disturbance of hibernating animals which are unable to move away from the development area. No removal of suitable refuge habitat will be undertaken when overnight temperatures are consistently (for five consecutive nights) below 5oC, to remove the risk of disturbing hibernating reptiles. Pre-works phase. An ecological toolbox talk will be delivered prior to any works. Prior to the commencement of works the working footprint will be agreed and demarcated on site to include vehicle access areas, material storage, skip and materials handling areas associated with the demolition works. This working footprint will be minimised and designed with the contractor to avoid any unnecessary impacts on suitable reptile habitats. Where suitable habitats are present within the agreed works area, a two phased cut of any habitat considered it be suitable for reptiles, such as tussocky grass, will be conducted to prepare the working area. The first cut will be to approximately 30cm in order to encourage any reptiles present to move out of the area. The area will then be left to settle and a subsequent cut to 15cm will follow. A suitably qualified ecologist will lift and remove any potential reptile refugia from within the working area. The vegetation will be maintained in an unsuitable condition for the duration of works. Works phase. Prior to the movement of any machinery into the working area, a check by a suitably qualified ecologist will be carried out to ensure no animals are likely to be harmed. Wherever possible demolition machinery will work from areas of hard standing adjacent to the buildings and then move onto the building base as the demolition progresses.

			Response: If reptiles are found at any stage of the vegetation clearance works, they will be encouraged to move off of their own accord into the surrounding retained habitat.
Nesting birds	Potential nesting habitat present throughout site.	Nesting period: 1 st March -31 st August (inclusive)	No vegetation clearance/ building demolition within bird nesting season. Habitats requiring works during the nesting season (1st March-31st August inclusive) will be subject to a pre-works nesting bird check with measures implemented to protect any active nests likely to be affected by the works. Where areas of suitable nesting habitat for valued bird species is lost (including house sparrow, starling, swallow and swift), suitable alternative nesting habitat will be provided on site through a network of bird boxes features incorporated to buildings, new tree and shrub planting and enhanced grassland, woodland, wetlands Barn owl. Any demolition of buildings with identified barn owl nesting potential to be undertaken under Method Statement (see Appendix I). A replacement barn owl box has been erected in the vicinity of Hearts Copse (>600m from link road) to reduce road collision risk associated with the link road. Sections where the road is situated on an embankment present the highest risk followed by sections at existing ground levels. In these areas, the creation of vegetation planting (trees and shrubs) which force birds to fly higher across roads will be incorporated into the scheme. Verges south of the link road will be maintained in a short, thatchless condition to reduce the potential for field vole. Enhancement of grassland habitats and hedgerow buffers for small mammals will provide additional foraging resource for barn owl to compensate for the loss of low value foraging habitats
Bats - roost loss	Construction phase –	Spring-Autumn	A number of low status roosts for common bats species were present within the buildings on site, the majority of which have been or are to be demolished. These will be compensated for through the provision of roost type/species appropriate bat boxes and “natural” roost features created on retained trees in appropriate locations (i.e. in close proximity to existing flight lines, adjacent to high value habitat, relatively undisturbed and unlit areas). A maternity roost for brown long-eared bats in Pond Cottage will be directly affected by the demolition. Pond Cottage has been retained and enhanced following the criteria for this roost type as described in the bat mitigation guidelines and been delivered under licence. Substantial tree and shrub planting will reinforce the connection this location to existing flight lines and other roost locations. The removal of mature trees has been minimised through careful masterplan layout. Where trees containing potential roost features are retained, these will be protected by the buffer specifications as described for hedgerows (O & P) and woodland (G). Where trees with potential roost features are required to be removed, a precautionary principle will be applied that assume the presence of the most likely roost type for the feature. This is considered appropriate as tree roosts are dynamic and can be readily occupied/abandoned by a variety of species at any given time, making firm assessment of the roost types present particularly challenging. Mitigation and licensing requirements will therefore be informed by subsequent inspections prior to any impacts on these features. A comprehensive suite of in built bat roost features has been included within structures in appropriate locations.

			Should task specific lighting be required, this should be limited to within the hours of 0700-1800 spring-autumn.
Bats - Bat Habitat Severance/Road - Collision Mitigation	CONSTRUCTION AND OPERATION – ALL PHASES	Spring-autumn	Three locations where the link road severs high value foraging and connective habitat have been identified on site that present a traffic collision risk to bats. • Minimising habitat loss in these areas by designing the road approach to the habitat in a perpendicular orientation • Minimising the width of the road crossing • Clear span design • Incorporation of suitable measures to ensure safe crossing following the most recent research into the efficacy of such measures to minimise road collision mortality. • A minimum height of 1.5m under bridge crossings. • Sensitive design of any lighting that may be required in these areas (less than 1 lux where possible from a highway safety perspective) • Additional compensatory habitat may be required. Significant vegetation will be retained either side of the construction areas in these locations to encourage the use of underpasses.
Bats - Bat Loss/degradation of foraging habitat Mitigation	CONSTRUCTION AND OPERATION – ALL PHASES		The loss of foraging habitat across the site has been minimised through the retention of key high value habitats. These habitats will be protected and enhanced, with connectivity between these habitat areas and potential roost sites maintained both across the site and the wider landscape through the measures to protect these specific habitats (see G, H, I, O & P).
Hazel dormouse	CONSTRUCTION		Link road works passing through Foxholes Wood to be subject to EPS licence and agreed mitigation. Above ground vegetation clearance in this area can be undertaken in winter; works to remove tree roots and ground vegetation can only be undertaken between May and October, under the EPS licence, i.e. when the dormice are active. Design of road bridge over stream in Foxholes Wood to include mammal tunnel and ledge. Provision of replacement woodland adjacent to key retained woodland corridor to ensure no net loss of habitat and to maximise availability of food plants throughout the active part of the year.
Otter	CONSTRUCTION AND OPERATION – ALL PHASES		Watercourse road crossing points locations to be designed as single span to facilitate continuation of hydrological regime and landscape permeability for terrestrial mammals including otter. Mammal crossings will be included where provision for mammal access cannot be incorporated along the stream at water level. 10m minimum construction buffer to all watercourses elsewhere. Use of well serviced plant and adoption of best practice standards for noise/vibration. No illumination of watercourse corridors from construction and minimal operational lighting. Ongoing monitoring for otter during the construction period to enable methods to be adapted if detected.

			Watercourse restoration using best practice measures (e.g. as defined by the UK River Restoration Centre) to increase physical habitat diversity, reconnect to the floodplain, increase light levels to the channel and riparian corridor and maximise species diversity, controlling non-native species.
Badger	CONSTRUCTION – ALL PHASES		Precautionary surveys will continue to ensure any new setts or re-activated setts are taken into account in the construction programme. Should it be necessary Natural England badger licences will be sought to ensure legal compliance in terms of disturbance of any setts and any requirements for exclusions/sett closure/provision of artificial setts. Deep excavations will be covered at night or suitable mammal ladders/earth maps will be provided to allow large mammals including badger to exit excavations. See 'Otter' above in relation to mammal tunnel and ledges under new bridges.
Fish (including Atlantic salmon)	CONSTRUCTION – ALL PHASES		The development will not result in a net increase in fine sediments ('fines') reaching the River Itchen SAC resulting in adverse effects on Atlantic salmon. Construction phase mitigation: Sediment run-off can be particularly severe during the land clearance, surface contouring and groundworks construction phases, where soils are exposed. It is a particular risk during storms/times of high rainfall. Measure to address sediments are set out in the Construction Environmental Management Plan (CEMP). These include: • Phasing and timings: no works should occur during periods of heavy rainfall events. Consideration should be given to timings of ground works close to watercourses to avoid sensitive spawning periods for Atlantic salmon (avoid key spawning period of November- December) • Installation of temporary SuDS where strategic SuDS features cannot be implemented or not yet effective (e.g. before vegetation establishment which can typically take up to 3 years) • Plans to deal with erosion from flow 'escapes' during heavy and extreme rainfall events – e.g. biodegradable netting (erosion 'blankets') along ditch/swale/wetland edges before vegetation has established" • the measures to be used during the development in order to minimise environmental impacts of the works (considering impacts such as potential disturbance, noise and vibration, lighting, pollution, water quality impacts, storage of fuels and chemicals, sediment and silt control, hydrological regime changes.)
Invasive species	CONSTRUCTION – ALL PHASES		An invasive species management plan will be implemented to control the existing populations of Japanese knotweed, Japanese rose, Himalayan balsam, variegated yellow archangel, rhododendron, mink and other non-native species present on site. Construction activity should not cause the spread of any invasive species and specialist contractors should be employed to control and deal with invasive species, where required.

Watercourses including River Itchen SAC	CONSTRUCTION AND OPERATION – ALL PHASES Prevention of sediment discharge into streams and SAC: maintenance of water quality	All times	Full details of construction measures set out in relevant CEMP. See also measures for fish (Atlantic salmon) above. The Environmental Permitting (England and Wales) Regulations 2016 require a permit or exemption to be obtained for any construction activities which will take place on or within 8 metres of a non tidal main river. This would therefore mean that Link Road bridge crossings of any main river watercourse would need to be considered under these Regulations. Works in such close proximity to watercourses present a particularly high risk of water pollution, especially through the mobilisation of sediments. Retention, protection and restoration of watercourses and associated riparian corridors including bankside and in channel enhancement measures, promoting reconnection with the floodplain and Stage 0 features, delivered in accordance with a detailed long-term water features management plan. All watercourses will be protected by a 10m ecological buffer (excluding SUDS connections and ecological improvements) with an associated 10-50m green infrastructure corridor (measured from the bank edge of water limit when watercourse is full i.e. bankfull). This buffer will be enhanced with appropriate habitat management and habitat creation measures that complement and enhance the watercourses. Early inclusion of SuDS to promote on-site attenuation of surface waters emerging from the OHH area to enable long-term high quality wetland/watercourse habitats, promoting physical habitat diversity, reconnection to the floodplain and Stage 0 headwater processes, to ensure no further downstream mobilisation of soil/riverine sediment and nutrients and to provide ecologically valuable natural filtration features within the development such as wetland areas reed beds etc that is above and beyond the net zero nutrient and sediment emission measures described in above. A robust water quality monitoring regime of all SUDS basins and flows into/out of the One Horton Heath Site (including sediments, turbidity, conductivity, pH, nitrates and phosphates) will be implemented to provide feedback on the efficacy of net zero nutrient/sediment (including SuDS) treatment measures and to inform a responsive system of remedial management works to ensure that the long-term function of these features is maintained. Please refer to Chapter 11 of this ES for full details. Phased delivery of development and associated reduction in nutrient inputs as agricultural activities cease and zero/low nutrient/sediment input/output activities start. This will include interim land use change to reduce existing nutrient levels from the soil to reduce duration of legacy release from soils to water once agricultural activities cease. Please refer to Chapter 11 of this ES for full details. CEMP measures: Sediment control: Control of sediment and runoff will be managed in accordance with the principles set out in the CIRIA SuDs Manual. Installation temporary sediment basins/traps/settlement ponds and/or early construction of the permeant SuDs features will be undertaken before any earthworks begin.
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			Haul roads will be designed to minimise and control run-off including temporary surfacing and temporary drainage to intercept sediment laden run-off and wetting of surfaces during periods of dry weather. Run-off control measures to divert run-off around areas being excavated will be installed in conjunction with sediment basins/silt traps. The contractor will minimise the amount of land disturbed at any time to reduce the potential for run-off to enter water courses (phasing). The use of methods including, retaining grass and vegetation for as long as possible, in disturbed areas, controlling erosion via the use of straw bale barriers, geotextile silt fences and sediment basins (with regular clearing out of excess sediment off-site) and ensuring that the runoff from the disturbed area passes through sediment control systems before discharge will be required. De-watering operations – water pumped out of excavations generally carries a heavy sediment load and should never be discharged direct into watercourses. It should be routed first through features that will allow sediment to be filtered out and settle out. Working in or on the banks of watercourses presents a high risk of significant sediment mobilisation and challenges in intercepting it and capturing it once mobilised. The Contractor must consider the temporarily diversion of watercourses around work sites. Worked areas should be finished and vegetation established as soon as works are complete and the area/time ground is left bare and disturbed should be minimised. All discharge of water into local watercourses will be in line with relevant Environment agency licenses and permits. All sediment controls will be set out in the Contractors Construction phase plan and will be subject to weekly checks. Dealing with silty or contaminated water: Silt, including fine silt or other contaminated water must not be allowed to enter watercourses and ditches. The water courses in this area feed into the River Itchen, a European Special Area of Conservation for wildlife. Pollution of the watercourses could have significant environmental and ecological impact. There is a potential for significant silt and run-off from the construction works and storage areas, (which slope down towards the drainage ditches) to enter watercourses and ditches. The Principal Contractors plan their work to contain any contamination, for example, bunding, the use silt barriers/geotextile fencing or alternative effective measures to prevent this occurring. Contaminated water can arise from excavations, exposed ground, stockpiles, plant and wheel washing, concrete mixing, or other construction activities. Catch-pits or silt traps on drains will be used to remove suspended solids such as mud and silt to prevent contaminated water entering surface water drains, surface waters or ground waters, or draining onto the land.
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		Wheel washing locations need to be identified away from watercourses and ditches. Before wheel washing takes place, checks will be carried out to ensure that sediment traps and measures to prevent run-off and the transmission of hydrocarbons/salt/invasive plant seeds are in place during cleaning. These must be checked and emptied and at regular intervals. Adequate provision for dealing with silty water is to be agreed in advance. Any planned discharges off the site will require prior approval with the appropriate authorities. All washings from cement and other cleaning processes must be contained within the site and removed via tanker or other appropriate means to prevent discharge into the local environment. All contaminated water must be removed from site and adequately treated prior to discharge under the appropriate permits and licenses. Stream/watercourse diversions: Temporary damming/dewatering or rerouting of watercourses will be required for the installation of bridge and walkway. All works which will impact the immediate environment and any European Protected Species (EPS) will be undertaken in accordance with the method statement reviewed and agreed with the OHH Ecologist and all relevant license conditions. Installation of drainage and SuDS features: Temporary SuDs and/or early installation of the permanent SuDs features will be implemented to prevent silt contamination of high-risk watercourses. During construction of the sewers and infrastructure the likelihood of any contamination being caused is slim, however all machines are well serviced and will be fuelled via diesel station located within the compound facilities that will have the appropriate raised blockwork surround with plastic lining to help prevent spillages. If there are spillages whilst a machine is onsite, then this can be addressed using the locally located spill kits to prevent any further contamination within the soil. There will also be the appropriate skips for waste materials etc. that will be delivered on a call-off basis to prevent over filling.
SINC's and habitats	CONSTRUCTION ALL PHASES	1.5m buffer to areas of ancient woodland in which the following specifications apply: - No excavation (except SuDS, respecting RPAs) - No construction related activities or activities likely to have negative effect on habitat - Biodiversity Enhancement permitted - No additional lighting >0.5lux The 1.5m ecological buffer will be demarcated with a significant species rich hedgerow, fence earth bank and ditch features to prevent public access into these areas. The ecological buffer will be designed to effectively extend the existing habitats within the SINC woodland and to provide a transitional habitat and structure, replicating natural woodland

			expansion/succession to increase diversity and to protect and enhance the existing habitat. The zone between 15-50m from the habitat boundary will be subject to the following restricted uses and constraints: Footpaths Cycleways SuDS Biodiversity enhancement permitted Minimal additional lighting where this does not compromise ecological function, ideally >0.5lux. SINC woodland (Treeline Break): A 15m ecological buffer subject to the specifications as described above will be implemented between the link road and the woodland to protect the habitat and to ensure that root protection areas are respected. Where the removal or severance of woodland is unavoidable, compensatory native species rich planting will occur in accordance with the prescriptions agreed with Eastleigh Borough Council. New areas of woodland and woodland extension are also included in the proposals. Woodland management and monitoring will be implemented from the start of the project delivery process if not before to maximise habitat value, structure and longevity, including the control of non-native invasive species. A woodland management plan will be prepared and implemented for all woodlands. Hedgerows with mature trees at regular intervals (SINC or non SINC) will have a 15m buffer (measured from tree stems) Hedgerows without mature trees or only occasional trees (SINC or non SINC) will have a minimum 5m ecological buffer (plus RPA around any mature trees to be retained) measured from the centre line of the hedgerow. These buffers will be subject to the following constraints: No excavation (except SuDS, respecting RPAs) No construction related activities or activities likely to have negative effect on habitat Biodiversity Enhancement permitted No additional lighting >0.5lux All hedgerows will be managed for biodiversity in accordance with a long-term management plan, including new planting to infill gaps in hedgerows and ongoing high quality management.
Bird Hazard Management Plan	CONSTRUCTION	All times	Control of construction drainage and earth works during the construction phase should ensure that wide areas of permanent open water do not develop which can attract geese, gulls and wading species. If necessary, bare lose soil should be compacted to reduce its suitability for bird species. The timing of all significant earthworks, particularly topsoil spreading and grading, shall be notified to the airport (Airfield Operations) in advance and scheduled, where possible, at times of lower flying activity. Grass seeding should be done in phased sections if the area to be seeded is larger than 150m² rather than all at once. Intervals between discrete blocks should ideally be in the order of 3 days. This will produce staggered germination, reducing the amount of

			seed available to pigeons, reducing the area affected at any one time and allowing better deployment of passive deterrent measures. Blocks of ground where construction work has been completed shall be reinstated or covered and re-seeded (where applicable) at the earliest opportunity. Waste control and disposal for the Site, including food waste, should be controlled to avoid the build-up of scavenging bird species such as gulls and corvids. Waste should be placed in covered skips and bins to reduce risk."
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11 THE TIMES DURING CONSTRUCTION WHEN SPECIALIST ECOLOGISTS NEED TO BE PRESENT ON SITE TO OVERSEE WORKS

Ecological supervision will be required for the following construction activity/operations. Specific requirements are set out in both the CEMP and the relevant EPS licences. The Project Ecologists will be on site to provide Ecological Tool Box Talks to The Principal Contractor and its sub-contractors to ensure that this EMMS (and associated EMMPs, and LEMPs) and relevant parts of the CEMP are fully understood and will be adhered to.

In addition, the Project Ecologists will be undertaking ongoing monitoring and reporting back to the Principal Contractor, the OHH Management Team and EBC/NE/EA during the duration of the works.

The Project Ecologists will be 'on standby' to respond to any unforeseen ecological issue that may arise during the proposed construction works.

- Works affecting vegetation clearance within GCN 250m zones during March-October;
- Demolition works to buildings with known bat roosts (anytime);
- Soft felling of trees with low bat roost potential (anytime);
- Vegetation clearance (habitat manipulation – 2 stage cutting down) of habitat with known reptile potential during active reptile period (March- October);
- Vegetation clearance of habitat with dormouse potential during active dormouse period (removal of tree/hedge roots/ stumps, May to October);
- Clearance of vegetation with nesting bird potential during the nesting bird season (1st March to 31st August) – pre-works nesting bird check required rather than supervision.

PART 2 - LEMP

HABITAT MANAGEMENT

11.1 LEMP OBJECTIVES

The requirements of the available green space areas are to fulfil multiple functions as required by the development including recreation, landscape, sustainable drainage and ecological mitigation and enhancement objectives. This document refers in detail to the ecological requirements and specifications for the existing habitats and those to be created on site.

Specifically:

- Mitigate for severance, habitat loss and habitat degradation effects associated with suitable roosting, foraging and connective habitat for bats as identified in the Bat Mitigation Strategy (Johns Associates, 2019);
- Mitigate for the loss of sub-optimal foraging habitat associated with the great crested newt (GCN) population to provide significant habitat enhancements aimed at increasing the population size of the Quobleigh metapopulation as identified in the Great Crested Newt Mitigation Strategy (Johns Associates, 2019). These measures have also been committed as mitigation and enhancement measures supporting the Natural England Great Crested Newt Mitigation Licence application for this Site. Specific areas have been identified that are to be managed with the express purpose of delivering optimum GCN habitats;
- Compensate for the loss of species rich hedgerow removed during construction works;
- Compensate for the loss of trees associated with this development;
- Provide significant habitat enhancement in order to achieve an overall biodiversity net gain for the wider development;
- Ensure successful establishment of new planting and long-term health of existing and new planting for the benefit of the land users and wildlife; and
- To comply with wildlife legislation and policy and in particular that relating to protected species.

It also allows for the provision of multi-functional open spaces where the potential conflict between the requirements of these areas can be suitably reconciled (e.g. recreation and ecological sensitivity). As such, this plan also includes elements that will provide additional open space in addition to their provision of ecological mitigation and enhancement measures, where appropriate.

The management period required is considered to be 30 years post construction, unless otherwise agreed with Eastleigh Borough Council.

11.2 GENERAL SPECIFICATION

The contractors shall make themselves aware of all service locations prior to commencing on site. All planting works to be carried out in accordance with BS4428 1989 'Code of Practice for General Landscape Operations. Recommended timing of works is detailed in the Table 9.

All trees and hedgerows which are shown for retention should be inspected for safety by a suitably qualified member of the Arboricultural Association and subject to BS5837 2012 – Trees in relation to design, demolition and construction - recommendations. They should be protected during all stages of construction with temporary fencing in accordance with BS5837 2012 and must comply with all applicable planning conditions. Any tree surgery required shall also be in accordance with BS3998 2010 'Tree work. Recommendations'.

The landscape contractor shall make the project coordinator aware of any injurious weeds (classified under the Weeds Act 1959) and invasive weeds (as noted in section 14(2) of the Wildlife and Countryside Act 1981, Schedule 9 Part II) that may be present on site at the earliest opportunity.

The landscape contractor shall satisfy himself as to the suitability and availability of materials/topsoil on site, and if necessary, topsoil shall be imported from an approved site. All topsoil to be in accordance with BS3882 2015 – Specification for topsoil

and requirements for use. Soil ameliorant to be agreed with project manager/SQE and were approved for use to be applied to new planting as per manufacturers recommendations, unless otherwise directed.

All plant material to be in accordance with relevant British Standard, and available for inspection prior to planting. Any plant stock to be planted outside the planting season (November to March unless otherwise stated) to be containerised. All containerised stock to have healthy, well-developed root system within the specified pot size.

No fertiliser is to be applied within ecological mitigation areas unless otherwise agreed with SQE.

11.3 REPORTING AND REVIEW PROCESSES

A Management Team shall be established to ensure that the management plan is implemented and oversee its ongoing use and development through a process of monitoring and review. The Management Team shall comprise representatives from the development company, the Landscape Contractor, the project ecologist (suitably Qualified Ecologist, SQE) and any specialist consultants as appropriate.

In order to monitor standards and make amendments where required, the Management Team will need to review the management work (with reference to this document) with the Main Contractor and the Landscape Contractor prior to handover and at least quarterly for the first year after practical completion of the development. Post-handover, review annually with the Landscape Contractor unless agreed otherwise.

All plant failures should be logged and reported to the Management Team at the first opportunity. It is anticipated that, where approved, replacement planting should be carried out in the next planting season, with replacement plants to match size and species of adjacent plants. If the originally specified species is found to be unsuitable for the current situation (during the design stages species were chosen carefully so as to avoid this issue), then the Landscape Contractor should propose an appropriate alternative.

The Landscape Contractor will contribute to an annual review of the use of the site carried out by the management team, looking at the following (as appropriate):

- Pedestrian routes and desire lines
- Litter
- Wildlife impact
- H&S management and duty of care

It is anticipated that following the review of the use, any issues or changes that are impacting on the landscape will be either accommodated through design proposals by the Landscape Contractor or approach to the appropriate body by the Management Team.

It is suggested that the Management Team discuss any significant changes to the site layout and management regime, where appropriate, with the Local Authority.

An operations checklist will be signed by the Landscape Contractor when actions are completed during each maintenance site visit. The checklist will be submitted to the Main Contractor or the Management Team for approval following each site visit.

11.4 PROCEDURES FOR CONTRACTORS

The following should be discussed and confirmed at initial meetings with the Contractor:

- Storage of materials and parking.
- Location of underground services.
- First aid arrangements; and
- Emergency procedures.

In the event of an incident occurring during the implementation of the landscape management works this would be required to be reported to the Management Team. Any incident shall be reported immediately, and emergency services contacted if necessary.

11.4.1 Chemical Use

It is the responsibility of the Landscape Contractor to ensure they are aware of, familiar with and abide by all current legislation pertaining to pesticides (insecticides, herbicides, fungicides) and their use.

A full Risk Assessment shall be undertaken and documented for each planned chemical application.

Chemicals are only to be used for weed control and pests/diseases where specified and approved. All work and workmanship shall comply with latest COSHH regulations. Where work is near to drainage ditches or land drains it must comply with Environment Agency guidelines for use of chemicals. Where scheduled or instructed the Landscape Contractor shall apply a suitable foliar acting herbicide to kill regrowth and allow the recommended period before clearing arisings.

11.5 HABITAT MANAGEMENT

Post development, the OPA will contain the following habitats: subsequent sections detail the management prescriptions for such habitats and their Biodiversity Net Gain condition target status:

- Hedgerows
- Broad-leaved woodland, and wood pasture
- Scrub
- Other Neutral Grassland (Semi-improved neutral grassland)
- Marshy grassland
- Poor semi-improved grassland (not addressed here)
- Water bodies
- Urban hard surfaces (not addressed here)
- Bare ground (not addressed here)
- Amenity grassland (not addressed here)

11.6 HEDGEROWS

The site contains of a number of mature field boundaries consisting of existing, native hedgerows with hedgerow trees. Existing hedgerow species include blackthorn (*Prunus spinosa*), ash (*Fraxinus excelsior*), bramble (*Rubus fruticosus*), dog rose (*Rosa canina*), field maple (*Acer campestre*), hawthorn (*Crataegus monogyna*), field rose (*Rosa arvensis*), elm (*Ulmus procera*), dogwood (*Cornus sanguinea*), grey willow (*Salix cinerea*), holly (*Ilex aquifolium*), and polpar (*Populus cinerea*).

Key Habitat Objectives

Table 4 Hedgerow Habitat Objectives			
Target Criteria	Measure	Tolerances	Management and Monitoring Actions
A. To provide a species rich linear habitat that supports wildlife including nesting birds, amphibians, reptiles, invertebrates, and small mammal species.	The value of a hedgerow is a function of its structure, diversity, and context. Hedgerows should be well sited and maintained as a substantial feature both in terms of height and width (Table 1). The grassland areas at the base of hedgerows are important breeding, resting and nesting habitats for a variety of species. These must be species rich, dense, and allowed to outgrow to provide suitable shelter.	The establishment of animal species in any given habitat, particularly those that are new or establishing. Whilst the ultimate target condition should be achieved, that key tolerance is in terms of the period post construction at which this target is met. Time to target condition is estimated at 5-10 years.	See 11.6.1.1 and 11.6.1.2
B. To achieve a target condition of Good according to the DEFRA 2.0 metric criteria	See Table 2	The target condition should be achievable within 5-10 years post construction. Moderate condition is considered acceptable only if good condition proves to be unachievable as moderate condition has formed the basis of the BNG calculations for the wider site.	See 11.6.1.1 and 11.6.1.2 Botanical monitoring should be conducted in years 1, 3, 5, 10 and then every 5 years to inform remedial management required to retain target condition.
C. To provide habitat connectivity across the landscape	Hedgerows and adjacent grassland vegetation should be managed to create a substantial natural feature in the landscape, providing a landmark for navigation and suitable habitat for small animals to disperse across the site and into the landscape beyond. Hedgerows will be sited so that they form a well-connected network.	N/A	See 11.6.1.1 and 11.6.1.2

Table 1 Hedgerow - Favourable Habitat Condition Criteria			
Attributes and functional groupings (A, B, C & D)	Criteria (the minimum requirements for 'favourable condition')		Description
A1.	Height	>1.5 m average along length	The average height of woody growth estimated from base of stem to the top of shoots, excluding any bank beneath the hedgerow, any gaps or isolated trees. Newly laid or coppiced hedgerows are indicative of good management and pass this criterion for up to a maximum of four years (if undertaken according to good practice) A newly planted hedgerow does not pass this criterion (unless it is > 1.5 m height)
A2.	Width	>1.5 m average along length	The average width of woody growth estimated at the widest point of the canopy, excluding gaps and isolated trees. Outgrowths (e.g. blackthorn suckers) are only included in the width estimate when they >0.5 m in height. Laid, coppiced, cut and newly planted hedgerows are indicative of good management and pass this criterion for up to a maximum of four years (if undertaken according to good practice⁴)
B1.	Gap – hedge base	Gap between ground and base of canopy <0.5 m for >90% of length (unless 'line of trees')	This is the vertical gappiness of the woody component of the hedgerow, and its distance from the ground to the lowest leafy growth. Certain exceptions to this criterion are acceptable (see page 65 of
B2.	Gap - hedge canopy continuity	Gaps make up <10% of total length and No canopy gaps >5 m	This is the horizontal gappiness of the woody component of the hedgerow. Gaps are complete breaks in the woody canopy (no matter how small). Access points and gates contribute to the overall gappiness, but are not subject to the >5 m criterion (as this is the typical size of a gate)

C1.	Undisturbed ground and perennial vegetation	>1 m width of undisturbed ground with perennial herbaceous vegetation for >90% of length measured from outer edge of hedgerow, and is present on one side of the hedge (at least)	This is the horizontal gappiness of the woody component of the hedgerow. Gaps are complete breaks in the woody canopy (no matter how small). Access points and gates contribute to the overall gappiness, but are not subject to the >5 m criterion (as this is the typical size of a gate)
C2.	Undesirable perennial vegetation	Plant species indicative of nutrient enrichment of soils dominate <20% cover of the area of undisturbed ground	The indicator species used are nettles (<i>Urtica</i> spp.), cleavers (<i>Galium aparine</i>) and docks (<i>Rumex</i> spp.). Their presence, either singly or together, should not exceed the 20% cover threshold.
D1.	Invasive and neophyte species	>90% of the hedgerow and undisturbed ground is free of invasive non-native and neophyte species	Neophytes are plants that have naturalised in the UK since AD 1500. For information on neophytes see the JNCC website and for information on invasive non-native species see the GB Non-Native Secretariat website.
D2.	Current damage	>90% of the hedgerow or undisturbed ground is free of damage caused by human activities	This criterion addresses damaging activities that may have led to or lead to deterioration in other attributes. This could include evidence of pollution, piles of manure or rubble, or inappropriate management practices (

Table 2 Condition Categories for Hedgerows	
Category	Maximum number of attributes that can fail to meet 'favourable condition' criteria in Table TS1-.2
Good	No more than 2 failures in total and no more than 1 in any functional group.
Moderate	No more than 4 failures in total and fails both attributes in a maximum of one functional group e.g. fails attribute 1 & 2, 5 & 7 = Moderate condition.
Poor	Fails a total of more than 4 attributes or both attributes

11.6.1 Removal of Hedgerows

11.6.1.1 Preparation

If hedgerow is within a GCN 250 zone: where removal of sections of existing hedgerow is required, this must be subject to agreement with the SQE and in compliance with the GCN method statement for this site:

- Check for below and above ground services in the vicinity. Inform project supervisor if they may be affected

and obtain instructions before proceeding. Comply with BS 3998:210, Appendix A and Forestry and Arboriculture Training and Safety Council Safety Guides.

- Clearly mark plants/sections to be removed. Avoid damage to adjacent vegetation or structures to be retained. Protect with protective fencing (to comply with BS 5837:2012) until the end of the works/construction period where necessary.
- Obtain the project manager/SQE approval before removing stumps that may require winching and do not use other trees as supports or anchors. Fill holes and grade to marry in with surrounding ground level, using as-dug material and/or imported soil as required.
- Recommended mix for new hedgerows is described in Table 3. Species should be of native origin.

Where gapping up of existing hedgerows is required:

- Any dead or dying plants are to be replaced during the winter season (November/February) and newly planted areas are to be maintained in a healthy and weed free condition. Plants loosened by frost heave or wind rock shall be re-firmed. Following approval from the project manager/SQE any section of an existing hedge which is in poor health with low vigour and would not respond to trimming is to be cut out, roots removed and gapped up with a mix comprising a diverse range of locally native species.
- Hedges to be gapped up with locally prevalent native mix. Plant mix to be planted at 450 mm centres in double staggered rows, 450 mm apart.
- Transplants to be protected with spiral rabbit guards Tubex shrubshelter or similar– specification to be agreed.
- Suggested gapping up mix is described in Table 3, or similar approved:

Table 3 Hedgerow Species Mix

% Mix	Species	Age/Form	Height cms	Breaks	Roots
30	<i>Crataegus monogyna</i>	1+1	40-60	3	Br
20	<i>Prunus spinosa</i>	1+1	60-90	2	Br
15	<i>Corylus avellana</i>	1+1	40-60	3	Br
10	<i>Ilex aquifolium</i>	2L pot	40-60	1	Cg
5	<i>Cornus sanguinea</i>	1+1	40-60	3	Br
8	<i>Acer campestre</i>	1+1	40-60	3	Br
2	<i>Rosa canina</i>	1+0	40-60	Branched	Br
2	<i>Rosa arvensis</i>	1+0	40-60	Branched	Br
2	<i>Euonymus europaeus</i>	1+0	40-60	Branched	Br
2	<i>Viburnum lantana</i>	1+0	40-60	Branched	Br
2	<i>Rhamnus catharticus</i>	1+0	40-60	Branched	Br
2	Ulmus spp. (to be confirmed with supplier as to suitability. Substitution options include <i>Carpinus betulus</i> .)	1+0	40-60	Branched	Br

11.6.1.2 Maintenance - Establishment

Established hedges/sections of hedges can be trimmed annually each winter (November - February) using suitable mechanical cutters. Cut to an 'A' shaped profile with the more shaded northern face to be cut to a shallower angle than the un-shaded face. No hedge trimming to be carried out during the nesting season (1st March – 31st August inclusive). Final trimmed size to be agreed, 3 m high and 3 m wide at base where appropriate unless specified on site. Individual hedgerow trees to be left untrimmed unless required by CA. All clippings to be cleared away and removed from site to recycling/composting facility.

11.6.1.3 Maintenance - Long Term (30 years) Monitoring & Management

Newly planted species to be frequently trimmed in the first five years to ensure a denser structure. The hedgerow shrub layer will then be cut every three years to keep it thick and to gradually increase in width and height. Where the hedge starts to get sparse at the base either implement gapping up, laying or coppicing to rejuvenate the hedgerow. The cutting height will be raised by 10-15 cm every three years to increase the berry crop and improve the shrub health. One third of the hedgerows will be trimmed each year on rotation.

Patchy outgrowths will be encouraged between 1 m and 2 m wide to create a scalloped and soft edge. Approximately 1 m of ground vegetation will be retained each side of the hedgerows to create thick basal cover. The base will be cut after flowering every five years also on rotation (1/3 of the bases cut every five years) to control scrub encroachment.

11.6.2 New Species Rich Hedgerows

11.6.2.1 Preparation

- Planting to take place between November-March unless otherwise agreed.
- Prepare planting trench or planting pits as agreed. The existing grassland may require to be sprayed off prior to planting. Additionally, the area may require to be rotovated to provide optimum conditions for hedgerow growth. The habitats present are improved grassland with no suitable resting features for reptiles or amphibians so neither of these preparations will affect hibernating animals in either case. The preparation is to be subject of discussions with appointed contractor and the Project Ecologist based on site conditions at the time of works.
- Planting area to be weed free and thoroughly forked over before planting.
- Where shrubs are to be planted in pits they are to be 150mm wider and deeper than their root spread. Pits to be backfilled with a mixture of topsoil/soil ameliorate. Where necessary plants to be a minimum of 300mm from and adjacent hard surface. Once planted all stock to be well watered when planted with approx. 20L of water per m².
- Following planting and watering operations, plants to be mulched with 75mm of approved mulch unless otherwise instructed.
- Hedgerows to be planted in double staggered row at a density of not less than 5 per m, with approximately 450mm between plants in the same row, and 450mm between rows. The plants should be planted within this pattern in groups of 2-3.
- For hedgerow mix see Native Hedgerow gapping up mix (Table 3)

11.6.2.2 Maintenance Year 1

Newly planted hedges/sections of will require a period of formative pruning before they reach their final dimensions. Within this period the minimum of pruning is required to maintain a neat and tidy hedge. Formative pruning work will be undertaken annually, each winter (November/February) in accordance with sound horticultural practice and with consideration to the genus and species of plant involved. Pulverized bark mulch shall be maintained as a 75mm layer. As soon as ground layer plants have formed a close-knit ground cover the topping up of bark mulch will not be required. No hedge trimming to be carried out during the bird nesting period (Mid Feb – August). Remove any redundant shrub guards (unless biodegradable) and stakes / canes once plants have become sufficiently established.

11.6.2.3 Long Term (30 years) Monitoring & Management

The hedgerow shrub layer will be cut every three years to keep it thick and to gradually increase in width and height. Where the hedge starts to get gappy at the base either implement gapping up, laying or coppicing to rejuvenate the hedgerow. The cutting height will be raised by 10-15 cm every three years to increase the berry crop and improve the shrub health. One third of the hedgerows will be trimmed each year on rotation.

Patchy outgrowths will be encouraged between 1.5 m and 2 m wide to create a scalloped and soft edge. A minimum of 1 m of ground vegetation will be retained each side of the hedgerows to create thick basal cover. The base will be cut after flowering every five years also on rotation (1/3 of the bases cut every five years) to control scrub encroachment. Ensure that tools used are sharp and cut hedge so that top is narrower than the base to ensure base will remain clothed in leaves.

Subject to approval, replace any dead or damaged plants with matching species and size. Allow for re-firming soil around roots to ensure plants are securely planted and upright especially following periods of high winds. When agreed with the management team, shrubs are to be selectively thinned to allow room for growth and avoid 'overcrowding'. Care is to be taken to avoid overthinning, so creating obvious 'gaps'. Shelter/guards are to be removed and recycled at between years 3-5,

dependent on growth and condition. At approximately 5 yearly intervals the planting should be reviewed in terms of thinning and trimming for the benefit of long-term good health and diversity.

11.7 BROAD-LEAVED WOODLAND AND WOOD PASTURE

The site comprises retained areas of broad-leaved woodland - Quobleigh Wood, Foxholes Wood, proposed planted areas of woodland and also adjacent areas of SINC woodland. The Wildlife and Countryside Act 1981 should be adhered to and any specialist licences obtained before commencement of work e.g for bat roosts. If problems are identified in trees off site, the Landscape Contractor shall notify the Management Team, who should contact and notify the appropriate land owner.

Existing Woodland

Preparation

Quobleigh Wood and Foxholes Wood are to be retained. No prior preparation works are required with the exception of ongoing woodland management. Creation of log piles and retention of fallen wood within the woodland will create valuable additional habitat.

Maintenance Year 1

Existing trees on site to be regularly inspected by a member of the Arboricultural Association or a specialist approved by the project manager to BS 3998:2010 and approved by the Management Team (NB. Any trees subject to a Tree Preservation Order will require permission from the Local Authority for any arboricultural work to be carried out). Before any works to existing trees and woodland can be carried out all necessary permissions must be sought from the local authority. All tree works to be carried out in accordance with good arboricultural practice, and under the direction of the project manager/SQE. It is not envisaged that the existing woodlands will require significant woodland maintenance during the period covered by this document, other than the removal of a stand of Himalayan balsam present in Quobleigh Wood.

Long Term (30 years) Monitoring & Management

Manage to retain a mixture of dead wood, healthy trees, young saplings and glades. Woodland to be coppiced on rotation every 5 years in a chequerboard effect to ensure minimal disturbance. Approximately 0.5 – 1 ha will be coppiced leaving slow growing species such as oak and beech to be left standing. The boundary of the woodland, tracks and paths will be cleared and scalloped to increase woodland edge habitats and create a higher diversity of sunlight, shelter and woodland diversity. Scalloped tracks and paths also reduce the effects of wind tunnels through the woodland. Areas where trees are creating dense shading will be thinned with poor, weak, diseased or overcrowded trees being preferentially removed.

Coppicing/thinning to be conducted in late autumn/winter (November to February) and will seek advice from the SQE regarding removal of trees to ensure those with potential to be used by roosting bats are not affected by the works. Brushwood and timber from coppicing/thinning to be left in piles or turned into dead hedgerows. Vegetation arisings to be located in a location within the woodland following advice from the SQE.

Proposed Woodland

Preparation

- Woodland mix to be planted at 3 m centres in naturalistic species groups of 5, 7 or 9;
- *Quercus robur* to be evenly distributed throughout the mix avoiding obvious straight lines;
- Setting out and planting methods to be agreed prior to the works commencing;
- Deep mulch proposed woodland - Apply sanitised and stabilised compost PAS 100 or similar approved (100 mm depth), to be free of pests, disease, fungus and weeds. Clear all weeds and water soil thoroughly in a circular area of 500 mm radius measured from the tree stem.

Suggested planting mix for proposed woodland is described in Table 4.

Table 4 Woodland Planting Mix

% mix	Species	Height cms	Specification	Roots
15	<i>Acer campestre</i>	125-150	Feathered	Br
5	<i>Ilex aquifolium</i>	80-100	Leader with laterals	Rb
5	<i>Corylus avellana</i>	125-150	Feathered	Br
10	<i>Malus sylvestris</i>	80-100	1+2 transplant	Br
10	<i>Prunus avium</i>	80-100	1+1 feathered	Br
55	<i>Quercus robur</i>	175-200	2x; feathered; 5 breaks	Rb

Maintenance Year 1

Regular maintenance visit (minimum 8) within the first year of planting to include watering as necessary to ensure plants thrive and to prevent plants wilting. Re-firm all loose plants and firm surrounding soil without compacting. Cut down and remove all weeds prior to setting seed in a 1 m diameter area around each tree. Cut all weed/vegetation within the plantation area to a maximum height of 75 mm. Leave arisings between rows.

Long Term (30 years) Monitoring and Management

Inspect woodland during the winter on years 3, 6 and 10 for condition, litter and invasive species. Remove tree guards that have spilt and before they start to disintegrate. Stakes and ties shall be regularly checked for firmness, tightness and support and adjusted as necessary. Tree stakes shall be checked regularly for breaks and decay, replaced as necessary to original specification. All should be checked after strong winds for stability. Soil shall be firmed around the roots to ensure that trees are securely planted in the ground and upright. All trees shall be re-firmed in the spring period following planting. Any trees loosened due to late frosts, strong winds or surface water movement shall be refirmed as required. 'Collars' at the base of tree stems created by tree movement to be broken up by fork, avoiding damage to roots and stem, backfilled with topsoil as necessary, and refirmed.

Adjust, refix or replace loose or defective ties as necessary, allowing for growth and some movement to encourage development of a stable root system whilst preventing chafing, excessive windrock, and to compensate for settlement. Where chafing has occurred, reposition or replace ties or guying cords to prevent further chafing. Ties shall at no point be over-tight on the tree and shall be checked and loosened regularly, especially at the start of the growing season to allow room for growth. Remove redundant tapes, tags, ties, labels and other encumbrances to prevent damage to bark.

Where stakes are longer than the height of the lowest branch of the tree, cut the stake to this height in spring and retie to tree firmly but not tightly with a single tie.

If a tree with a defective stake has grown sufficiently to become self-supporting, the Landscape Contractor shall inform the Management Team and, if instructed, remove stakes and fill the holes with lightly compacted soil. These trees should be continued to be monitored in cases of a deterioration in stability.

After any period of four weeks without significant rainfall (less than 5mm) during the summer months (May to August); water trees at minimum fortnightly intervals. Heavy watering will be required in dry periods. Should the Statutory Undertakers impose restrictions on the use of water for watering any plants, the Landscape Contractor shall be responsible for making any special arrangements which may be necessary to ensure regular and adequate watering of plant material to ensure successful establishment.

It is also important to ensure that the trees are not over-watered. All drainage points shall be regularly checked. Any plants lost due to water-logging or drought shall be replaced with matching species and size as appropriate. Size shall match that of

the surrounding plants, rather than the originally specified size, unless agreed otherwise with the Main Contractor or the Management Team.

Woodland to be coppiced on rotation every 5 years, as required, in a non-sequential manner to ensure minimal disturbance. Approximately 0.5 – 1 ha will be coppiced leaving slow growing species such as oak and beech to be left standing. Areas where trees are creating dense shading will be thinned with poor, weak, diseased or overcrowded trees being preferentially removed. Thinning of approximately 1 in 5 trees will reduce competition for light, water and nutrients.

Coppicing/thinning to be conducted in late autumn/winter (November to February) and will seek advice from the SQE regarding removal of trees to ensure those with potential to be used by roosting bats are not affected by the works.

Brushwood and timber from coppicing/thinning to be left in piles or turned into dead hedgerows. Vegetation arisings to be located in a location within the woodland following advice from the SQE.

Scattered Trees

Preparation

- Tree pit size – 1.5 x diameter of root ball, no deeper than root ball. Break up bottom of tree pit to a depth of approximately 150 mm. Backfill with excavated material and ameliorants (organic fertiliser where agreed). Firm, water to achieve field capacity and stake appropriate to tree specification.
- Mulch - Apply sanitised and stabilised compost PAS 100 or similar approved (75mm depth), to be free of pests, disease, fungus and weeds. Clear all weeds and water soil thoroughly in a circular area of 500 mm radius measured from the tree stem. Where appropriate apply finished level of mulch 50 mm below adjacent grassed areas.
- Construct and install timber stock proof tree guard to protect trees from deer/stock. Specification to be agreed.
- Suggested trees are *Quercus robur* (18-20 girth; 450-550 height; roots Rb; specification 3x extra heavy standard, clear stem min 200cm).

Maintenance Year 1

- Regular watering/monitoring to ensure that the root-ball does not dry out.
Re-firm where necessary.
Ensure 500 mm radius from stem remains weed free and top up mulch regularly to 75 mm.

Long Term (30 years) Monitoring & Management

- Monitor trees every five years for general condition, compaction of soil from congregating grazing stock (if grazed). Install additional fencing around trees if required. Retain deadwood within the tree and fallen limbs on the ground below tree wherever possible. Monitor health of trees and replace where required and feasible.

Lowland Mixed Deciduous Woodland & Parkland

The criteria for the delivery of this habitat type have been reproduced from the DEFRA Metric 2.0 Technical Supplement³ in **Error! Reference source not found.** and Table 0.5. The following principles will guide the delivery of this habitat on site:

- This habitat will be delivered through the planting of new woodland designed to extend the existing woodland habitats providing multi species benefits.

³ Biodiversity Metric 2.0 Technical Supplement – Beta Test Final (DEFRA JP029, 29.07.20)

- This woodland planting will retain the existing grassland habitats where the grassland is of value or, in areas where the grassland has been removed, a diverse species mix will be sown.
- A specific native woodland species mix will be developed using the existing high value woodland community as a basis.
- These areas of woodland will be segregated from the main green infrastructure (GI) corridors by a species rich hedgerow, ditch and/or bank and fence to restrict public access.
- The associated GI corridors will act as a further complimentary habitat and buffer between the developed areas and the new woodland habitats.
- A detailed management and monitoring plan will be implemented to ensure target condition and structure are achieved.

Table 0.4 Woodland Broad Habitat Type Condition Table

Condition Table	Woodland Broad Habitat Type
Habitat Description Woodland is defined as vegetation dominated by trees more than 5 m high when mature, which forms a distinct, although sometimes open, canopy [areas of trees with a canopy greater than 20%]. This includes felled, young or newly planted woodland. There is no minimum size for areas of trees that have the definite characteristics and feel of a woodland and are managed as woodland. Two broad woodland types are considered here: Broadleaved, mixed and yew woodland. Coniferous woodland. It does not include scrub (see separate scrub condition assessment). In England, native woodland is defined as woodland that is composed of at least 80% native tree species including 'naturalised species'. It is based on the England Woodland Biodiversity Group condition assessment for none SSSI woodlands. See https://woodlandwildlifetoolkit.sylva.org.uk/assess for more background and detailed information. Wood Pasture and Parkland (see notes below on how to record) Wood pasture is a vegetation structure rather than a particular plant community. Typically, this structure consists of large, open-grown or high forest trees (often pollards) at various densities, in a matrix of grazed grassland, heathland and/or woodland floras. This feature includes: Wood pasture and parkland derived from medieval forests and embankments, wooded commons, parks and pastures with trees; and where the land use has been converted to arable, forestry or amenity, but where ancient trees are still present. For wood pasture and parkland assessment established by PTES see https://ptes.org/campaigns/wood-pasture-parkland/wood-pasture-parkland-survey/ .	
Condition Assessment Criteria 1. This should be an area of trees with complete canopy cover. 2. Native species are dominant. Non-native and invasive species account for less than 10% of the vegetation cover. 3. A diverse age and height structure of the trees. 4. Free from damage [Bark stripping; Browse line; Damage shoot tips] (in the last five years) from stock or wild mammals with less than 20% of vegetation being browsed. 5. There should be evidence of successful (i.e. not browsed off before it gets well established) tree regeneration such as seedlings, saplings and young trees. 6. Standing and fallen dead wood of over 20 cm diameter are present including fallen large dead branches/stems and stumps. 7. Wetland habitat if they exist within the wood has little sign of drainage or channel straightening. 8. The area is protected from damage by agricultural and other adjacent operations. 9. There should be no evidence of inappropriate management (e.g. deep ruts, animal poaching or compaction). 10. Invasive non-native plants are below 5% (see list below). 11. No signs of significant nutrient enrichment present. 12. More than 3 different native trees and 3 shrub species in an average 10 m radius.	

Table 0.5 Woodland - Key Habitat Criteria

Condition	Assessment Criteria	Score
Good	Meets at least 10 of the criteria with only minor variation No more than 1 of the indicators of poor condition are present Stands of native trees that do not obviously originate from planting should be classified as native semi-natural woodland. Stands of native trees that do not obviously originate from planting should be classified as native semi-natural woodland.	3
Moderate	Clearly fails at least 2 of the above criteria OR invasive non-native plants are 5-20%. OR where non-native species comprise more than 20% of the canopy, the woodland should be recorded as either non-native plantation or mixed woodland. A mixed woodland is woodland with native and non-native species. (This includes woodlands established by planting and by natural regeneration.) Trees of similar age and height structure throughout the woodland. Little or no standing deadwood is present.	2
Poor	The following characteristics can help to identify plantations: (note: BAP woodlands can be plantation woodlands) Non-native trees often of a single species or the same age are the dominant component; OR invasive non-native plants are greater than 20%. Mixed species show a consistent planting pattern across the site. Original planting lines or remains of planting lines can be seen Drainage features and channel straightening of watercourses	1
Undesirable species: - American skunk cabbage <i>Lysichiton americanus</i> - Himalayan balsam <i>Impatiens glandulifera</i> - Japanese knotweed <i>Fallopia japonica</i> - Cherry Laurel <i>Prunus laurocerasus</i> - Shallon <i>Gaultheria shallon</i> - Snowberry <i>Symphoricarpos albus</i> - Variegated yellow archangel <i>Lamiastrum galeobdolon</i> subsp. <i>argentatum</i> - Rhododendron <i>Rhododendron ponticum</i> Factsheets of these invasive non-native plant species can be found on the GB non-native species secretariat website. http://www.nonnativespecies.org/home/index.cfm		
Notes The following information should be recorded: - Dominant tree species - Regenerating tree or shrub species		

- Ground flora species – any specialist woodland plants present.
- The average age class throughout the wood – establishment (E), semi-mature (S/M), mature (M) or ancient (A).
- Whether the woodland is accessed by livestock and amount of deer pressure.
- Past management – whether any trees are coppiced or pollarded;
- Threats – damage by pests, invasion by undesirable.

Additional information relevant to data collection:

Woodland - Felled woodland

The condition assessment of this habitat type needs to be based – so far as possible - on the trees that stood on the site prior to felling. It should be possible to determine what these were from the stumps, bark and leaf litter. It should then be recorded as the original woodland type, the age of the trees and note that it has been felled. Condition assessment will be harder in these situation, but should be considered good unless good ecological justification can be given preferably with accompanying photographic evidence.

If it is not possible to record the woodland type, record any tree recovery or seedlings present between the stumps. Where felling occurred a considerable time previously (4-5 year +) with no obvious replanting progressing it may be appropriate in some circumstances to classify as the predominant habitat that is now replacing the felled trees (with stumps still present), particularly when they have high biodiversity value such as heathland or grassland development. Notes of what other species are present on the site will need to be recorded, such as ground flora; felled brash predominates; heather present; grass species; scrub and tree species regenerating etc.

Woodland - Planted young trees

This is recently planted trees (often in tree tubes) within grassland. Where the tree species planted match another woodland description they should be recorded under this description (with a note to state the tree age and that recently planted). If none match then they can be recorded under this catch all category. The grassland sward species and herbs present should also be recorded and described in field notes. Particular note should be made of habitat enhancement practices, such as where native flowers and herbs are created surrounding the planting, to give a wildlife boost until full tree canopy has developed.

Woodland and forest - Wood-pasture and parkland

These are mosaic habitats valued for their trees, especially veteran and ancient trees, with a grazed grassland below. They have open grown trees, sometimes in clumps, but with space between them. They may contain patches of scrub in some circumstances. If it is clearly this habitat then it needs to be recorded under this habitat type for all the area being surveyed. But for condition it may well be preferable to condition assess and map different components separately using different sheets. Please record how this was done, along with recording area amounts for each split section. So below the tree canopy use the woodland condition table; in open grassland use the grassland condition; on mappable areas of scrub use the scrub condition etc. This is relatively complex on the different components of the mosaic, but will be useful for large areas of parkland being surveyed. To make an accurate assessment of the biodiversity value we need to know if the grassland is made of poor or good quality species composition, is the scrub of high quality, the age of the trees and key feature etc. This is likely to involve quite extensive field notes and ecological report to capture this information accurately.

Wood pasture and parkland that has been converted to other land uses such as arable fields, forestry and amenity land but where veteran trees survive are still of high nature conservation interest. They offer great opportunities for restoration to increase biodiversity habitat and should still

11.8 SCRUB AND WOODLAND UNDERSTORY

Areas of scrub are present on site, including as understory of newly planted woodland

Preparation

Native scrub and woodland understorey mix is described in Table x.

Table x Scrub/Woodland Understorey Mix

% mix	Species	Age/ form	Height cms	Breaks	Roots
15	<i>Crataegus monogyna</i>	1+1	40-60	3	Br
15	<i>Prunus spinosa</i>	1+1	40-60	2	Br
10	<i>Ilex aquifolium</i>	2l pot	40-60	1	Cg
10	<i>Acer campestre</i>	1+1	40-60	3	Br
5	<i>Rosa canina</i>	1+0	40-60	Branched	Br
5	<i>Rosa spinosa</i>	1+0	40-60	Branched	Br
40	<i>Rubus fruticosus</i>	0/1	40-60	2	Br

To be planted at 1 m centres in species groups of 5-10. *Rubus fruticosus* to be evenly distributed throughout the mix avoiding obvious straight lines. Understorey planting to be deep mulched with 100 m approved mulch unless otherwise instructed.

Maintenance Year 1

Native understorey scrub to be left largely unmanaged and allowed to develop into dense scrub cover as wildlife habitat. Any maintenance works to be carried out following prior approval of the SQE.

Long Term (30 years) Monitoring & Management

The scrub will be monitored every three years and management measures to either enhance or reduce the scrub will be implemented. Measures may include mowing, flailing, coppicing, layering, thinning, edge management, glade management, removal of non-desirable/non-native invasive species, weeding new species, cutting and stump removal. Decaying wood will be left for cover and hibernation for great crested newts. Good layers of leaf litter optimal and a mosaic of scrub, bare ground and ground vegetation optimal for great crested newts.

Any dead or damaged plants are to be replaced with matching species and size. Size should match that of the surrounding plants, rather than the originally specified size. Soil around roots is to be refirmed as necessary to ensure plants are securely planted and upright especially following periods of high winds. Shelterguards are to be removed at between years 3-5, dependent on growth and condition. At approximately 5 yearly intervals the planting should be reviewed in terms of thinning and trimming for the benefit of long term good health and diversity.

11.9 SEMI-IMPROVED NEUTRAL GRASSLAND/ MARSHY GRASSLAND

Areas of grassland habitats, predominantly poor semi improved and other neutral grassland, will be delivered across the site to the specification outline below. These areas form key components of the green infrastructure corridors and connective habitats that will facilitate continued use of the site for wildlife and ensure landscape connectivity to the habitat areas beyond. The extent and location of these habitats, in combination with the requirements for accessible open space, will constrain the ultimate condition that can be achieved. However, all reasonable measures will be taken throughout the detailed design, delivery and ongoing management of these habitats to deliver the maximum possible value for wildlife.

Grassland within the ecological mitigation area to include semi-improved grassland, species-rich meadow grassland on bund, and marshy grassland. All grassland habitats within the areas identified for great crested newts are to be managed expressly to provide optimum habitat conditions for this species.

All grassland areas within the ecological mitigation area to be managed and maintained to maximise biodiversity on site, to include provision of GCN habitat and connectivity of grassland habitats/types wherever possible.

Carry out operations in accordance with BS7370 Part 31991. To be carried out as agreed with the SQE.

Meadow Grassland

Preparation

- Scarify existing grassland during winter, ensuring no damage to amphibians, reptiles or their habitat avoiding any areas of tussocks to promote establishment of tussocky sward.
- Sow with species rich meadow mix Emorsgate EM2 General Purpose Meadow Mixture or similar approved in spring (February March) including a high percentage of yellow rattle (*Rhinanthus minor*) to reduce the prevalence of dominant grasses and to facilitate the colonisation of a diverse herb community.
- The sowing rate is subject to agreement with the SQE.
- Seed dispersal to be by hand/pedestrian broadcaster

Maintenance Year 1

- Maintain area of grassland to create a tussocky grassland sward/mosaic of diverse grassland habitats. Management within the first year to be reactive and will include reseeding where necessary. Remove/hand pull non-native scrub and noxious weeds where necessary. Do not apply fertiliser or herbicide other than to spot treat problem weed species.
- Cut grassland areas in very early spring (late February) to 150 mm. Allow grassland to develop and strim to carry out traditional hay-cut in July during period of hot, dry weather to 150mm. Final cut to be carried out to 150mm in autumn as required (mid-November onwards to avoid amphibians/reptiles) and under supervision of SQE should there be any hibernation suitability for GCN within tussocks.
- Remove all arising from site or deposit in specified location to compost for reptile/invertebrate habitat.

Long Term (30 years) Monitoring & Management

- Grassland will be mown twice annually in early season and once the seed has set in late summer. The vegetation will be cut to 150 mm in the summer cut and dried on site, turning it to assist drying and dispersing seeds. A variety of sward heights is to be maintained to create habitat variation and to allow the establishment of tussocks. The dry hay will be removed within 7 days of cutting. Additional treatments with yellow rattle should be considered should the initial application fail to control non-target species (e.g. perennial ryegrass).

Semi-improved Grassland Adjacent to Ponds

Preparation

- Scarify existing grassland during winter, ensuring no damage to amphibians, reptiles or their habitat avoiding any areas of tussocks to promote establishment of tussocky sward.
- Sow with species rich meadow mix Emorsgate EM2 General Purpose Meadow Mixture or similar approved in spring (February March) including a high percentage of yellow rattle (*Rhinanthus minor*) to reduce the prevalence of dominant grasses and to facilitate the colonisation of a diverse herb community.
- Seed dispersal to be by hand/pedestrian broadcaster

Maintenance Year 1

- Maintain area of grassland around ponds to create a tussocky grassland sward/mosaic of diverse grassland habitats. Management within the first year to be reactive, and will include reseeding where necessary. Remove/hand pull non-native scrub and noxious weeds where necessary. Do not apply fertiliser or herbicide.
- Strim approximately 50% of grassland area. Strimmed area to be agreed with SQE. To be maintained at approximately 150mm in height. Remaining areas to be allowed to form long/tussocky grassland.
- Strim grassland areas in very early spring (late February) to 150 mm. Allow grassland to develop and strim to

carry out traditional hay-cut in July during period of hot, dry weather to 150mm. Final cut to be carried out to 150mm in autumn as required (mid-November onwards to avoid amphibians/reptiles) and under supervision of SQE should there be any hibernation suitability for GCN within tussocks.

- Remove all arising from site.

Long Term (30 years) Monitoring & Management

Grassland around ponds will be mown annually in July to minimise disturbance and harm to newts. The vegetation will be cut to 150 mm in the summer cut and dried on site, turning it to assist drying and dispersing seeds. A variety of sward heights is to be maintained to create habitat variation and to allow the establishment of tussocks. The dry hay will be removed within 7 days of cutting. Additional treatments with Yellow Rattle should be considered should the initial application fail to control non-target species (e.g. perennial ryegrass).

Marshy Grassland

Preparation

The existing area of marshy grassland is to be maintained and managed as an existing habitat. No prior preparation works are required.

Maintenance Year 1

To be maintained as grazed pastureland, cattle grazed where possible. Where cutting is required carry out traditional hay-cut to 150mm during August/September. Cutting regime to be agreed. Remove arisings.

Long Term (30 years) Monitoring & Management

Grazing of grassland is preferred. Stocking rates should not exceed 0.2 – 0.3 livestock/ha/year and a lower stocking rate over a longer period is preferable. If seasonally grazed, roughly 1 head of cattle per hectare for three months per year is recommended. Grazing animals will be removed if vegetation in drier areas get grazed too short or if the ground is too wet. If cut, the area will be cut in thirds on rotation between October and February. An annual inspection will be conducted to inform grazing/mowing regime and to inspect for scrub encroachment and invasive species. Scrub cover will be kept below 5% of the area.

Grass Bunds–Species Rich Grassland

Preparation

Suitable ground preparation of bund to be carried out and seeded with species rich meadow mix Emorsgate EM2 General Purpose Meadow Mixture or similar approved subject to soil analysis. Seeding to be carried out in spring (February/March weather dependent) or autumn (September/October).

Maintenance Year 1

Grassland habitat on bunds to be left to establish without cutting/strimming during the first year following establishment. Maintain area of grassland on bund to create a tussocky grassland sward/mosaic of diverse grassland habitats.

Management within the first year to be reactive but will include reseeding where necessary.

Remove/hand pull non-native scrub and noxious weeds where necessary. Do not apply fertiliser.

Any cutting/strimming must be agreed with SQE.

A specific risk assessment is to be carried out prior to mowing/cutting grass banks, to include assessment of weather and surface conditions to identify any potential hazards.

Mowing is to be carried out using approved machinery suitable for use on slopes.

Refer to all relevant British Standard Code of Practice for Landscaping and HSE guidelines for suitable mowing machinery, all machinery is to be used within its specified safe working angle. Contractor is to provide working method statements to be approved by the Management Team.

In general slopes greater than 1:3 will require either a specialist rotary machine or strimmer/brushcutter.

Long Term (30 years) Monitoring & Management

In years two and three from sowing the bunds are left uncut to flower and the first cut will be in July. The vegetation will be cut to 150 mm in the summer cut and dried on site, turning it to assist drying and dispersing seeds. The dry hay will be removed within 7 days of cutting.

The species composition of the bund will be monitored as the slower establishing species start to establish in addition to the more quickly establishing pioneer perennials such as oxeye daisy to develop a relatively stable community. The cutting regime will contain a combination of: a mid-summer cut and cutting regrowth in late summer/autumn in conditions as described above. Cutting of spring growth and in wet weather in August and September will be avoided to avoid injuring newts migrating to breeding ponds and metamorphs emerging respectively.

Target Conditions

Grassland to be managed as 'other neutral grassland' (BNG category) to encourage a species rich sward and subject to a minimal cutting regime.

Table 6 Other Neutral Grassland - Habitat Objectives			
Target Criteria	Measure	Tolerances	Management and Monitoring Actions
A. To provide a species rich habitat that supports wildlife including nesting birds, amphibians, reptiles, invertebrates, and small mammal species.	The value of a grassland is a function of its structure, diversity, and ongoing management. The grassland areas are important foraging, resting and nesting habitats for a variety of species. The sward should be diverse both in terms of its species and structure, with long areas adjacent to hedgerows and other habitat features providing a mosaic of long and short sward heights with areas of tussocky grass included.	The establishment of animal species in any given habitat, particularly those that are new or establishing. Whilst the ultimate target condition should be achieved, that key tolerance is in terms of the period post construction at which this target is met. Time to target condition is estimated at 5-10 years.	See above
B. To achieve a target condition of Good according to the DEFRA 2.0 metric criteria	(see Table 7)	The target condition should be achievable within 5-10 years post construction.	See above Botanical monitoring should be conducted in years 1, 3, 5, 10 and then every 5 years to inform remedial management required to retain target condition.
C. To provide habitat connectivity across the landscape	Grassland vegetation should be managed to create a substantial natural feature in the landscape, providing a landmark for navigation and suitable habitat for small animals to disperse across the site and into the landscape beyond. Hedgerows will be sites so that they form a well-connected network.	N/A	See above

Table 7 Other Neutral Grassland - Habitat Condition Criteria
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Habitat Description		
Includes both agricultural, recreational, amenity, road verges and semi-natural grassland types including Priority Habitat Grasslands on all soil types. Will be dominated by grassland species with very little (if any) dwarf shrub, wetland or wooded species within the sward. Will exist above and below the level of enclosure at all altitudes		
Condition Assessment Criteria		
1. The area is clearly and easily recognisable as a good example of this type of habitat and there is little difference between what is described in the relevant habitat classifications and what is visible on site. 2. The appearance and composition of the vegetation on site should very closely match the characteristics for the specific Priority Habitat [i.e as described by either the Phase 1 Habitat Classification or the UK Habitat Classification], with species typical of the habitat representing a significant majority of the vegetation. 3. Wildflowers, sedges and indicator species for the specific Priority grassland habitat are very clearly and easily visible throughout the sward and occur at high densities in high frequency. See relevant Habitat Classification for details of indicator species for specific habitat. 4. Undesirable species and physical damage is below 5% cover. 5. Cover of bare ground greater than 10% (including localised areas, for example, rabbit warrens). 6. Cover of bracken less than 20% and cover of scrub and bramble less than 5%.		
Condition	Assessment Criteria	Score
Good	- Species-rich Grassland of all Priority Habitat Types. Of high to moderate quality. - Wildflower and sedges above 30% excluding white clover <i>Trifolium repens</i>, creeping buttercup <i>Ranunculus repens</i> and injurious weeds. - Meets all of the condition criteria with only minor variation - None of the indicators of poor condition are present (4, 5 & 6).	3
Moderate	- Semi-improved grassland occurs on a wide range of soils and may be derived from higher quality Priority Habitat grassland habitats in poor condition. Often as they deteriorate following nutrient inputs. Typical grasses include: cock's-foot, common bent, creeping bent, crested dog's-tail, false oat-grass, meadow fescue, meadow foxtail, red fescue, sweet vernal grass, Timothy, tufted hair-grass and Yorkshire-fog. - Total cover of wildflowers and sedges less than 30%, excluding white clover, creeping buttercup and injurious weeds. - Rye-grass cover is less than 25% including amenity grasslands. - OR - Clearly fails at least 1 of the condition criteria - OR - The grassland type has some differences between what is described in the relevant habitat classifications and what is visible on site. It is a Lower Quality Priority Habitat, but clearly recognisable as such. - Potentially restorable to grassland Priority Habitat with improved management. - Cover of undesirable species at 5- 15%.	2
Poor	- Agricultural grasslands is characterised by vegetation dominated by a few fast-growing grasses on fertile, neutral soils. It is frequently characterised by an abundance of rye-grass <i>Lolium</i> spp. (above 25% cover) and white clover <i>Trifolium repens</i>. These grasslands are typically either managed as pasture or mown regularly for silage production or in non-agricultural contexts for recreation and amenity purposes; they are often periodically re-sown and are maintained by fertiliser treatment and weed control. They may also be temporary and sown as part of the rotation of arable crops but they are only included in this broad habitat type if they are more than one year old. - Amenity and Road verge grasslands with similar species to description for agriculture grasslands. - OR Most of the condition criteria are being failed. - Cover of undesirable species above 15% usually resulting in a dense scrub or tree cover, or high cover of exotic species.	

Undesirable species:

Creeping thistle *Cirsium arvense*, spear thistle *Cirsium vulgare*, curled dock *Rumex crispus*, broad-leaved dock *Rumex obtusifolius*, common ragwort *Senecio jacobaea*, common nettle *Urtica dioica*, creeping buttercup *Ranunculus repens*, white clover *Trifolium repens*, cow parsley *Anthriscus sylvestris*, marsh thistle *Cirsium palustre* and marsh ragwort *Senecio aquaticus*.

Notes

Physical damage to the vegetation from: excessive poaching, damage from machinery use or storage, or any other damaging management activities.

Carry out operations in accordance with BS7370 Part 31991. To be carried out as agreed with the SQE.

11.10 WATER BODIES

Six new rain-fed GCN ponds have been installed to the north of Quobleigh Stream. Additional wildlife ponds will be created during the construction to add diversity to the site.

Running Water - Quobleigh Stream, Moorgreen Stream, Foxholes Stream and other ordinary watercourses

Preparation

The existing streams are to be maintained and managed as existing water features and habitat. No prior preparation works are required.

Maintenance Year 1

A level of maintenance must be carried out to ensure the free-flowing conveyance of water, as well as the removal of all general waste and litter from the channel and banks, and to maintain a healthy, diverse and vigorous growth of aquatic/marginal vegetation along the banks in order to maximise the nature conservation value of the water-body. All maintenance to protect the animal species using the wet and marginal areas; particularly protected species or at critical times for a particular species (e.g. spawning). Carry out regular on going monitoring of steep sided banks and fords for signs of damage or collapse. Repair where necessary. All works to the stream and channel to be carried out by hand unless otherwise approved by the SQE. Where necessary the minimum of de-silting should be undertaken in order to promote healthy aquatic communities whilst retaining the operational functions of the water body. Silt should be removed from the bed, but pockets of silt may be retained in specified areas, where this will not restrict flow or compromise flood defences.

If bank slips occur the bank profile is to be reshaped to the original cross section under supervision of the SQE. De-silting and reshaping works will not be undertaken between March and mid-August (and ideally should take place in late September/October).

Where Himalayan balsam is present within the stream corridor then works must ensure that this is not permitted to spread.

Long Term (30 years) Monitoring and Management

Year 1 maintenance measures to be conducted annually in September and any clearance works to be carried out in late September/October in preparation for increased winter flows and avoiding sensitive ecological times of the year. Works to be carried out when the water level is as low as possible e.g. not following periods of prolonged, heavy rainfall. Vegetation and siltation clearance to be carried out on rotation of one third each year or as required, subject to approval from SQE.

Ponds

Preparation

All ponds to be within 250m of at least one adjacent pond to create a close complex of ponds. These ponds will have close by excavated shallow, wide scrapes to facilitate GCN movement and to create additional structural diversity and foraging resource.

All ponds will be created to the following specifications Irregular shape. Retaining sufficient water in most years. Shallow marginal areas with undulating slopes, deeper (e.g. up to 2 m in the centre). Planting to consist of suitable native aquatic emergent and marginal plants including spiked water-milfoil *Myriophyllum spicatum* water forget me not *Myosotis scorpioides*, water mint *Mentha aquatica* and common water-crowfoot *Ranunculus aquatilis* or similar. Suitable GCN shelter/hibernation sites to be created close to the pond, e.g. rubble piles with soil capping.

Maintenance Year 1

Four maintenance/monitoring visits (minimum) per year to be carried out under supervision of a SQE holding a great crested newt survey licence. Ponds to be managed as healthy waterbodies suitable as GCN habitat, to include the removal of general waste and litter from the ponds. Rubbish/detritus to be cleared by hand and removed from site. Ponds to be managed sensitively to maintain a healthy, diverse and vigorous community of emergent and marginal planting in order to maximise biodiversity, prevent any abstraction from the ponds or runoff of water into the ponds from site drainage or sediment laden water.

Care must be taken to ensure strict biosecurity measures are observed to prevent the transfer of invasive seeds, fungal spores and amphibian pathogens.

Long Term (30 years) Monitoring and Management

Monitoring and management of the ponds will occur every three years on a rotation of the ponds on site. Aquatic vegetation will be managed within the ponds and shading trees or scrub around the edges of the ponds will be cleared on the south side of the pond. The ponds will be partially desilted and leaf fall cleared. The ponds will be monitored for introduction of fish and fish removed if present through draining or netting. Pond leakage, rubbish, acute pollution, siltation or blockage will be monitored and remediating actions implemented where required.

Table 0.8 Pond Habitat Type - Condition Table

Condition Table		Pond Habitat Type
Habitat Description		
This covers all water bodies up to 1 ha in area. Expert judgement should be used to decide if a water body between 1 and 2 ha area is assessed as a pond or as a lake. It includes sunny or shaded and temporary or permanent ponds at any stage of succession, from newly created ponds to ones that are completely overgrown. It also includes scrapes, and other temporary ponds which may be dry certain times of the year.		
Condition Assessment Criteria		
1. Are of good water quality, with clear water (substrate can be seen) and no obvious sign of pollution in the water body. 2. The water body should have semi natural riparian land for at least 10 m from the pond edge. 3. Non-woodland ponds should be dominated by plants, be they submerged or floating (note dominance of duckweed is a sign of eutrophication). 4. Non-woodland ponds [i.e. that have always been open] should not be shaded more than 50% 5. Many ponds will be fishless, those which naturally contain fish should not be stocked and should contain a native fish assemblage. 6. Ponds should not be artificially connected to other water bodies, e.g. ditches. 7. Pond water levels should be able to fluctuate naturally throughout the year. 8. Non-native species should be absent. 9. Less than 10% of the pond should be covered with duckweed or filamentous algae.		
Condition	Assessment Criteria	Score
Good	Meets the majority of the criteria with only minor variation Few of the indicators of poor condition are present.	3
Moderate	Fails a number of the criteria above There is only moderate water quality Where non-native species comprise more than 10% of the vegetation. There is insufficient extent of semi natural riparian land Water levels are subject to some control. There are some artificial connections to other water bodies, but they are not delivering water of poor water quality or preventing water level fluctuations. Fish have been stocked at a low density, but they are native species and there is sufficient aquatic plants and habitat heterogeneity to reduce the effects of predation. Moderate shading of non-woodland ponds. Submerged and floating plants are limited but still present	2

Poor	Poor water quality present Ponds in poor health Fails the majority of criteria. Extensive filamentous algae or duckweed Absence of semi-natural riparian land. No natural fluctuations in water levels Extensive non-native species High density of stocked fish Absence of submerged and floating plants (unless naturally a shaded woodland pond). Non-woodland ponds completely over-grown with trees and scrub.	1
Undesirable species: Any non-native species. Frequently observed non-native plant species include water fern, Australian swamp stonecrop, parrot's feather, floating pennywort and Japanese knotweed and giant hogweed (on the banks). Frequently occurring non-native animals include signal crayfish, zebra mussels, killer and demon shrimp and carp. Cover of more than 10% of duckweeds or filamentous algae are signs of eutrophication.		

11.11 ECOLOGICAL FEATURES

Hibernacula/ refugia

Preparation

For all newt mitigation habitat including construction and maintenance of hibernacula see Johns Associates GCN Mitigation Strategy (2019) and the GCN EPS Mitigation Licences for the site. Construction of at least 24 refugia to be carried out to provide suitable habitat for wintering, refuge and to facilitate enhanced foraging habitat. To be constructed of split log, dead wood and roots, stone/rocks, loose topsoil etc. To be carried out on site under the supervision of a SQE.

Maintenance Year 1

Refugia will be subject to seasonal inspections with requirement for maintenance agreed with SQE subject to conditions.

Long Term (30 years) Monitoring & Management

Inspect the hibernacula every five years for damage and repair any damage which may occur from human disturbance.

Table 9 EMMS Schedule of Operations

EMMS - Schedule of Operations													
OPERATION	Notes	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
Principal Ecological Seasonal Constraints													
Bats Hibernation and Active Periods													
Common Reptiles & Amphibians Hibernation and Active Periods													
Nesting Birds nesting period													
Construction Phase													
Works													
Woodland													
Woodland													
Scrub													
Scrub													
Hedgerows													
Defunct Existing Hedgerow													

New Species Rich Hedgerow		Trim/ thin	Replacement Planting as required	Mulch top up	Watering (if required)	Replacement Planting as required	Trim/ thin	Trim/ thin	
Grassland									
Other Neutral Grassland				Cut	Targeted Weed Control (hand/weed wipe)	Cut	Reseed		
Waterbodies									
Streams							De- silting and reshaping works will not be undertaken between March and mid-August (and ideally should take place in late September/Octobe r).	Salmon spawning – avoid works which may leak sediment into watercourses	
Ponds			Replacement Planting as required						
Ecological Features									
Refugia	Monitor and maintain during maintenance visits								

12 APPENDICES (TO BE SEPARATE)

Document Control

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