

**Polytunnel and Glasshouse Development,
Fleurie Nursery, Lake Lane, Barnham, W. Sussex
Preliminary Ecological Appraisal**



For

Douglas Briggs Partnership
Flint Barns, Ham Farm, Bosham
West Sussex, PO18 8EH

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9 Pitfold Avenue, Haslemere
Surrey, GU27 1PN

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Figure 1: Location and Habitat Plan

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Photographs: Fleurie Nursery, Barnham (August 2020)

APPENDIX I: Sussex Biodiversity Record Centre Report

APPENDIX II: Fleurie Nursery Water-vole Survey (A. Rothwell 2020)

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1.0 SUMMARY

The application site (8.93ha in area) is located, off Lake Lane, Barnham, West Sussex (SU 9763 0455), with Todhurst Rife running through the middle of the site. Fleurie Nursery is seeking planning permission to replace some of the production capacity that will be lost when the existing Fleurie Springfield Site is redeveloped. The development will consist of two blocks of high specification multi-span polythene structures and two blocks of multi-span glasshouse structures. The site currently supports a plant potting nursery, with a variety of mature hedgerows around site boundaries and a ditch across the central eastern side of the site, with three associated water-bodies, a small Eucalyptus-wood and a field in the south-west corner of the site. The majority of the site supports polytunnels, glasshouses, outdoor beds and hard-standing (over 5ha) and little associated vegetation.

A habitat suitability assessment of water-bodies indicate that great crested newts are unlikely to be present. Grass snake was observed along a south-facing bank in 2019, not proposed for development. The application will have very limited impact upon areas of rest and shelter for amphibians and reptiles and therefore these species are unlikely to be impacted by the proposals. Hedgerows 1 and 2 have standing deadwood, mature trees and a wood-crete bat box located on a dead Alder. These hedgerows are to be retained and the nursery will not be in operation at night for any other purposes than crop maintenance (irrigation, temperature monitoring), therefore lighting and impact upon bats will be minimal.

The site supports water vole with evidence recorded along a 300m length of the Todhurst Rife and around the reservoir (Pond 2) along the eastern site boundary, with a low to medium sized water vole population estimated at the time of the survey. 1.1ha of semi and improved grassland will be impacted as a result of this development application and 290m of non-native hedgerow or tree-line needs to be removed to accommodate development, with limited bird-breeding habitat. With the exception of Todhurst Rife, habitat features observed on site were of site value only. It is recommended within the report that the following mitigation and enhancements are implemented as detailed below:

1. Water-voles - Sections of ditch within 25m of construction will be protected with fencing and a tool box talk provided for site workers (both during installation and for ongoing site maintenance), to detail the legislative protection, ecology and maintenance requirements for water voles at Fleurie Nursery. Todhurst Rife requires sensitive maintenance for water-voles, which should form part of a Landscape and Ecological Maintenance Plan

2. Breeding Birds - Hedgerow requiring removal should be cleared outside of the bird breeding season (September to February). A breeding bird survey would be required prior to any vegetation clearance works along hedgerows and tree-lines during the breeding season and if active nests then nearby works will need to take place once young birds have fledged.

3. Todhurst Rife Wildlife Corridor - The Nursery agree to create a wildlife corridor along the eastern spine of the site, with maintenance practises sensitive to water-voles and other priority species and habitat set-out within a Landscape and Ecological Maintenance Plan.

4. Mitigating Impact of Waste upon Aquatic Environments - The Nursery also agree to adopt a site-based 'Waste Strategy', to minimise the diffuse and indirect impact of litter and pollution entering the Rife.

2.0 INTRODUCTION

The application site is 8.93ha in area, dominated by polytunnels, off Lake Lane, Barnham, West Sussex (SU 9763 0455), with Todhurst Rife running through the middle of the application site. Fleurie Nursery is seeking planning permission to replace some of the production capacity that will be lost when the existing Fleurie Springfield Site is redeveloped as detailed in the Barnham, Eastergate and Westergate Framework Masterplan. The development will consist of two blocks of high specification multi-span polythene structures and two blocks of multi-span glasshouse structures. One polythene structure will be erected on an area that is currently uncropped, the remaining blocks will replace current glasshouses, polytunnels, outdoor cropping and associated service areas.

The intention is to protect and enhance the wildlife corridor along the stream (Todhurst Rife) and surrounding the existing reservoir with particular reference to water vole habitat creation to the southern end of the site (pers. comm. Mr C. Need of Fleurie Nursery Ltd.). GPM Ecology was commissioned by Fleurie Nursery Ltd. to conduct a preliminary ecological assessment of the site on 13th August 2020.

CJ Hedley (CJH 2019¹) conducted a Biodiversity Survey on behalf of Fleurie Nursery Ltd., producing a report as part of the LEAF Marque Scheme (member since 2017) requiring a Biodiversity Action Plan to be implemented to enhance the key environmental features around the Nursery buildings. A key aim was to engage Nursery staff in the delivery of clear and quantifiable benefits for target species, following a survey visit on 28th May 2019 and the outcomes of the site's BAP can be summarised as follows:

- *The nursery has a good range of wildlife habitats including hedgerows, grassland, mature trees, ponds and the reservoir.*
- *The majority of habitats are well connected which enhances their value.*
- *There was clear evidence that Water Vole, a species of conservation concern, are present.*
- *The rare broad-fruited cornsalad and blue pimpernel were found in different locations and need to be carefully conserved as they will need targeted management.*
- *Adopting target species for the BAP will help focus management and engagement with staff.*

2.1 Protected Species and Wildlife Legislation

All species of bat are protected through the Wildlife and Countryside Act (1981) as amended, Countryside Rights of Way Act (2000) and Habitat Regulations (1994). Other European Protected Species for which this legislation relates to include bats and great crested newts. In essence this legislation prohibits the following:

- *intentional disturbance or harm,*
- *reckless damage to a breeding site or resting place or a place used for shelter and protection*
- *intentionally obstructing a place used as shelter*

The badger and its sett are protected from disturbance and harm through the Protection of Badgers Act 1992. The Wildlife and Countryside Act 1981 also provides protection to

¹ CJH Agri-Environment Consultants Ltd (August 2019), Biodiversity Action Plan for The Fleurie Nursery Ltd, Prepared for: Fleurie Nursery Ltd, Eastergate Nursery, Church Lane, Eastergate, West Sussex, PO20 3XD, By C J Hedley, 21 Lower Grove Road, Havant, Hants, PO9 1AS cjhedley@btinternet.com. August 2019

species such as water voles and widespread reptiles (such as slow-worms and grass snake) protected from *harm only* and wild birds which are protected on the nest, as well as water-voles and their burrows.

2.2 Planning Guidance

National Planning Policy Framework (NPPF, Feb 2019²) provides guidance to Councils, to ensure protected species, statutorily (nationally protected Sites of Special Scientific Interest and internationally protected Special Areas of Conservation) and non-statutorily designated sites (e.g. Sites of Nature Conservation Importance, SNCI) are considered during the planning process. Guidance also requires '*wider benefits from natural capital and ecosystem services*' as well as '*providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures*' and '*plans should:*

- a) Identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks...; wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation; and*
- b) Promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity.*

2.3 Biodiversity Action Plans

The Natural Environment and Rural Communities (NERC) Act 2006 (S41) requires the State to consider habitats and species which are of principal importance for the conservation of biodiversity in England. This list relates to Priority Biodiversity Action Plan (BAP) Species and Habitats (BRIG ed. Ant Maddock 2008)³, as listed in 2007 (revised 2008), including habitat features such as native hedgerows and species such as water-voles. Although the Priority BAP species and habitats have been succeeded by UK Post-2010 Biodiversity Framework (JNCC 2012⁴), this list still form the basis of much biodiversity work in England.

3.0 METHODOLOGY

Sussex Biodiversity Records Centre (SxBRC, see **Appendix I**) was commissioned to conduct a biological desk-study to determine the presence and location of noteworthy ecological features in the vicinity of the application site. Ecological features on site were assessed according to CIEEM guidelines (2017⁵), which evaluates features according to their value within the geographical context (International importance; National; County; Borough; Parish or site value only), as well as other considerations such as legislation.

The site was visited on 25th August 2020 to assess the habitats present and the potential to support protected and Biodiversity Action Plan species, as well as features of ecological interest with notes made on habitat features present. In addition, a detailed water-vole survey was conducted by Andrew Rothwell (see **Appendix II**) on 26th August and Great Crested Newt Assessment (**Appendix III**) on 22nd September 2020.

² National Planning Policy Framework, Feb 2019, Ministry of Housing, Communities and Local Government

³ BRIG ed. Ant Maddock (2008), UK Biodiversity Action Plan: Priority Habitats Description

⁴ JNCC (2012), UK Post-2010 Biodiversity Framework Published by JNCC and Defra on behalf of the Four Countries' Biodiversity Group

⁵ CIEEM (2017) Guidelines for Preliminary Ecological Appraisal, 2nd edition, December 2017. Chartered Institute of Ecology and Environmental Management (CIEEM), Winchester.

4.0 SURVEY RESULTS, EVALUATIONS AND IMPACTS

4.1 Biodiversity Desk-Study

The closest statutorily protected sites (SSSI, SPA or SAC) to the application site is Fairmile Bottom SSSI, just under 4km to the north (www.magic.gov.uk), notified for its yew-woodland and unimproved calcareous grassland. There are no biodiversity action plan habitats recorded on www.magic.gov.uk on site, although Walberton Park and former Wood-pasture is located just under 500m north of the site. There are several chalk streams recorded by SxBRC (**Appendix I**) issuing 500m west of the site, into a different catchment.

Evidence of water vole *Arvicola amphibius* was recorded on site during the biodiversity survey of the site (CJH 2019¹), with water vole activity observed in 2019 and 2020 during and following a biodiversity survey of the site (CJH 2019⁵). In 2016 water-vole were observed along ditches about 300m west and in 2015 just over 700m east of the application site.

Other protected species observed on or near the site include grass snake *Natrix helvetica* was also observed in 2019 during this May 2019 biodiversity survey on a ditch-bank along the application site boundary (SU 977 045) and SxBRC (**Appendix I**) hold a slow-worm *Anguis fragilis* record from 2010, about 100m south of the south-east corner of the application site. Great crested newts *Tristurus cristatus* have been recorded just over 0.5km north of the site, with most recent records dating from 2005. There are few bat records in the vicinity of the site recorded by SxBRC (**Appendix I**), although Barbastelle bat *Barbastella barbastellus* are present in Barnham area and the closest European Protected Species licence on www.magic.gov.uk relates to a licence for Pipistrelle bats about 2km west of the site.

Priority BAP species observed in the vicinity of the site include three stag beetle *Lucanus cervus* records, the closest being 100m north of the site in 2007. There are nine hedgehog *Erinaceus europaeus* records noted between 2001 and 2017, the closest was recorded about 200m south of the site in 2017.

A number of noteworthy arable plant species have been recorded on or near the site, with the closest SxBRC (**Appendix I**) record of corn parsley *Petroselinum segetum* about 200m west of the site. Other arable species recorded in the area include corn mint, dwarf spurge and corn spurrey. The biodiversity survey recorded blue pimpernel *Anagallis foemina* (May 2019, about SU 975 045, CJH 2019¹) along a bund bordering an access road on the western perimeter of the site, which could be a relic of arable or horticulture. The survey also recorded broad-fruited corn salad *Valerianella ramosa*, near the gate to the reservoir (May 2019, about SU 975 045, CJH 2019¹). The general area of the site has an assemblage of three arable farmland Birds of Conservation Concern (BoCC), with corn bunting, grey partridge and lapwing having been recorded (www.magic.gov.uk) in the vicinity of the site. As well as these species SxBRC note a range of BOCC wetland and farmland birds at Marsh Farm (Yapton) less than 1km east of the site and Wick Farm (Yapton) 1.5km south-east of the site.

Early 1st Edition OS Map dating to 1875 indicate that the site consisted of several fields, with an historic pond still present today at the northern end of the site (www.old-maps.co.uk), as well as a pond in the vicinity of the current reservoir. The ditch across the centre of the site appears to have remained more or less in the same location over the last 150 years. A nursery is marked directly north and east of the site from 1938 OS Map, with the application site remaining farmland up until 1980s when a nursery was first developed on the site.

4.2 Habitat Evaluation and Impacts

The application site covers an area of about 8.93ha, currently supporting a plant potting nursery, with a variety of mature hedgerows around site boundaries and a ditch across the central eastern side of the site issuing, with three associated water-bodies and a small Eucalyptus-wood (**Figure 1**) and a field in the south-west corner of the site (see **Cover photo**). The majority of the site supports polytunnels, glasshouses, outdoor beds and hard-standing (over 5ha) and little associated vegetation, with other habitats and features present on site are described in more detail below.

4.2.1 Semi-improved Grassland and verges

A 1ha area of semi-improved neutral grassland (see **Figure 1** and **Cover Photo**), generally dominated by a rank-grass sward with meadow-grasses *Poa* spp. dominant, cocksfoot *Dactylis glomerata*, fescue *Festuca* spp., perennial rye-grass *Lolium perenne*, bent-grasses *Agrostis* spp. and Yorkshire-fog *Holcus lanatus* frequent in occurrence. Although forbs were not dominant the grassland had areas of richer-sward supporting clovers *Trifolium* spp., smooth sow-thistle *Sonchus oleraceus*, creeping thistle *Cirsium arvense*, common ragwort *Senecio jacobaea*, creeping buttercup *Ranunculus repens*, common fleabane *Pulicaria dysenterica*, field bindweed *Convolvulus arvensis*, bird's-foot trefoil *Lotus corniculatus*, ribwort plantain *Plantago media* and greater plantain *P. major*.

A bund on the western side of the field and site boundary (**Photo 1**), created following the construction of the adjacent development, had been reported to support blue pimpernel *Anagallis foemina* as observed during 2019 (CJH August 2019¹). The bund had grasses established, with hedge bedstraw *Galium mollugo*, nettles *Urtica dioica*, docks *Rumex* spp. and willowherb *Epilobium* spp. growing. Arable species such as blue pimpernel are now unlikely to be able to compete with the current perennial ground-cover. A small area formerly supporting potting plants parallel with the bund supports annual and early colonising ruderal species, including knotgrass *Polygonum* spp., pearlwort *Sagina procumbens*, smooth sow-thistle, willowherb, red deadnettle *Lamium purpureum*, common mouse-ear *Cerastium fontanum*, scented mayweed *Matricaria chamomilla* and tare *Vicia* spp. Two refuse piles (e.g. wooden pallets, see **Photo 2**) were also located within the field with tall ruderals growing around them including greater celandine *Chelidonium majus*, nettle, fleabane and creeping thistle.

It should be noted that the survey was conducted in late summer, outside of the optimal time-period for conducting botanical surveys. Large fruiting-bodies of *Agaricus* spp. (possibly horse mushroom *A. arvensis*) was observed as several rings at the northern end of the field. There were lots of fox *Vulpes vulpes* scats across the field and site in general and rabbit *Oryctolagus cuniculus* droppings on the southern edge of the field close to hedgerow 1.

Broad-fruited cornsalad *Valerianella rimosa* and blue pimpernel were observed during 2019 (CJH August 2019¹), with other declining arable species noted in the general area by SxBRC 2020 (**Appendix I**). This grassland area is likely to have supported arable in the past and is considered an ecological feature of Parish-value, with a potential source of arable species present within the seed bank beneath the grassland and adjacent verge. Further small areas of short improved (or amenity) grassland are located on the western side of the site dominated by perennial rye-grass, with daisy *Bellis perennis* and clovers within the sward, which are considered ecological features of site-value only.

4.2.2 Boundary Features - Hedgerow, Tree and Copse

The boundary features are described below (target noted on **Figure 1**):

1. A hedgerow (**Photo 3**) parallel with Lake Lane, dominated by dead or dying alder *Alnus* spp. having possibly succumbed to Phytophthora disease, with occasional ash *Fraxinus excelsior*, field maple *Acer campestre* and elder *Sambucus nigra*. A wood-crete bat box was present on a dead alder, likely to be part of planning permission for the adjacent nursery site that was given planning permission in 2016-2017. A seven-metre-wide bund was located between this hedge and the adjacent field, supporting tall ruderals, nettles, docks and hogweed *Heracleum sphondylium*. A seasonal ditch-line ran between the road and hedge.
2. A hedgerow (**Photo 4**) parallel with Lake Lane, dominated by tall non-native alder or poplar, several having been removed. A small area of willow *Salix* spp., grew at the site entrance at the western end of this hedge. Dense bramble and nettles to the east end with hops *Humulus lupulus* growing over the bramble. A dunnoek (bird) *Prunella modularis* appeared to hold a territory at this point. A seasonal ditch-line ran between the road and hedge. Water vole droppings were observed on the roadside between this hedge and the *Eucalyptus*-copse.
3. A hedgerow (**Photo 5**) parallel with the site entrance track, dominated by pollarded Italian alder *Alnus cordata*, with one or two ash trees. This hedge requires removal to make way for proposed polytunnels and currently has low potential for breeding birds and bat roosts
4. A tall Leyland cypress *Cupressus × leylandii* tree-belt, with a mature poplar *Populus* spp. nearby (**Photo 6**) and dense bramble to the east. This hedge and bramble-scrub have potential for breeding birds and may require removal, prior to installation of the proposed glass-house. The hedge-line is unsuitable for roosting bats, while the mature poplar could support bat roosting features, although it is currently proposed to be retained.
5. Leyland cypress hedge on the north-west corner and site boundary (possible on an adjacent plot), with a dry ditch.
6. Tall mature willow, ash, beech *Fagus sylvatica* and cherry laurel *Prunus laurocerasus* hedge. South-facing, parallel to Todhust Rife, but with little or no grass verge.
7. Tall poplar-hedge (**Photo 7**), with at least one tree having fallen. Parallel with Todhust Rife, close to where it issues from Pond 3.
8. A tall poplar hedge with several having been removed for safety, with understorey hazel *Corylus avellana* coppice stools (**Photo 8**).
9. Southern boundary of Pond 3 had alder, hazel and willow hedge or tree-line recently coppiced, with re-growth and a pile of wood-chip left *in situ* (**Photo 16**).
10. An Italian alder hedgerow along north-western site boundary.

An unmaintained *Eucalyptus* spp. copse (about 0.45ha) in area is located in the south-east corner of the site (**Photos 9 and 10**), with occasional sycamore *Acer pseudoplatanus* and elder. This copse had low potential to support bats with no deadwood features observed, despite several trees having fallen to the ground. A small copse of oak *Quercus robur* and ash *Fraxinus*

excelsior with bramble ground-cover was located between Ponds 1 and 2. On the edge of this copse a family of three stoats *Mustela erminea* were observed within a log pile close to Pond 1.

4.2.2 Rife, ponds and reservoir

Todhurst Rife: The Rife rises at the narrow northern end of the nursery, running the length of the application site for about 525m, before exiting at the south-east corner. The rife appears to issue from Pond 3, running parallel to hedgerows 6 and 7, with a limited grass verge at this point. As the Rife passes Ponds 1 and 2, the bankside verges are mostly dominated by tall ruderals, with limited grass-verge. This 125m stretch of Rife is where most of the water vole activity on site was observed (see **Appendix II**). At this point the rife is about 1 to 1.5m deep, with shallow, slow flow (about 0.2m depth) and lush aquatic vegetation, including willowherb *Epilobium* spp., bittersweet *Solanum dulcamara* and lesser water parsnip *Berula erecta* (**Photo 11**), with the rife described in more detail for water vole in **Appendix II**. Just south of Pond 1 there is a raised tall ruderal (supporting creeping thistle, nettles and burdock *Arctium minus*) bank above the rife. The rife is culverted for a 75m section (**Photo 12**), where a glass-house is located on a neighbour's nursery plot and grass snake were observed in 2019. The grass-verge at this point supports tall-grass and ruderals, including false oat-grass *Arrhenatherum elatius* and cocks-foot with several short section of bramble *Rubus fruticosus* agg. in the central part of the bank length. The southern 160m section of the rife is bounded by *Eucalyptus*-copse, with dense tall ruderal (nettles and scattered brambles) growing completely over the rife.

Pond 1: A sump to fill the reservoir (Pond 2). Relatively recent feature, not present on 1989 OS Map. This pond had 100% shading (surrounded by oak-ash copse), was nearly dry during the visit on 22nd September, had no aquatic plant cover and was considered to be of 'Poor' suitability for great crested newts (see sections below **3.3.2**, **Photo 13** and **Appendix III**).

Pond 2: A reservoir to be retained for conservation purposes, no longer functioning a water supply for the nursery. A relatively recent feature likely to have been constructed in the 1980s (present on 1989 map). This pond had 80% aquatic plant-cover (include reedmace *Typha latifolia*, fringing water lily *Nymphoides peltata* and white-flowered water-lily *Nymphoides peltata* was reported to have a large fish population (mature carp and young roach, visited by heron, kingfisher and cormorants). This water-feature was considered to be 'Below Average' suitability for great crested newts (see sections below **3.3.2**, **Photo 14** and **Appendix III**).

Pond 3: An historic pond, marked on first edition OS Maps, dating to 1875 and appears to be a source of Todhurst Rife. This pond is largely off the application site, with the south pond margins on along the northern boundary of this nursery site. It was full of sediment (0.5 to 1m depth), with 80% over-shading by willow and about 5% aquatic plant cover (pond sedges *Carex* spp.). A row of alder and hazel had been coppiced along the south boundary of the pond with a pile of wood-chips along the pond margins. This water-feature was considered to be 'Below Average' suitability for great crested newts (see sections below **3.3.2**, **Photos 15, 16** and **Appendix III**).

Todhurst Rife is considered a feature of Parish to Borough-value and if it issues from Pond 3 would be classed a priority BAP habitat. Little in the way of litter was observed in the rife, possibly due to the dense vegetation cover across most of the rife. The Ponds are considered features of Parish to Borough-value with potential for enhancement of the historic Pond 3.

4.3 Protected Species Evaluation and Impacts

4.3.1 Water-vole

Signs of water vole (dropping and feeding remains) were observed around Pond 2, along the ditch immediately next to and south of Pond 2 and on the southern boundary of the site, adjacent Lake Lane (see **Appendix II**). The habitat for water vole were largely sub-optimal, although the 125m section immediately south of Pond 2 did support good habitat structure for this species. The amount of field signs for water vole together with the numbers of latrines found, would indicate a low to medium population level, albeit a relatively isolated along this part of Todhurst Rife, at Fleurie Nursery. This Rife and associated water-features are considered of Parish to Borough value for water vole and other associated species. Although the proposed polytunnel development is unlikely to have a significant impact in the long-term (provided the rife remains intact) the rife and voles could suffer a medium impact during construction in the absence of mitigation. Water voles and their burrows are protected from harm under the Wildlife and Countryside Act 1981 and in addition to the legislation water-voles are a priority BAP species, with Arun valley and Chichester Plain key water-vole strongholds in Sussex and south-east England.

4.3.2 Reptiles and Amphibians

A habitat suitability assessment for great crested newts was conducted confirming that the three ponds score as Below Average to Poor suitability for Great Crested Newt (GCN, see **Appendix III** for more detail), as summarised in the table below.

Table 1: Habitat Suitability for Great Crested Newts

Pond Number	Pond 1 (Sump)	Pond 2 (Reservoir)	Pond 3 (Historic)
Habitat Suitability Score	0.46 (Poor)	0.54 (Below Average)	0.57 (Below Average)

The habitat suitability index suggests that GCN are unlikely to be present, with species such as common toad likely to breed in Pond 2. Grass snake was observed along a south-facing bank, not proposed for development. The impacts upon potential amphibian and reptile habitats is currently likely to be minimal, with most of proposed development areas under hard-standing, with the exception of the 1ha area of maintained grassland about 115m from Ponds 1 and 2 and a further 0.1ha of improved, maintained grassland about 60m south of these ponds. Due to the intensive management of these areas of grassland amphibians and reptiles are unlikely to rest and shelter within these features. If these habitats were left unmaintained, they could become suitable for species such as grass snake and common toad.

4.3.3 Birds

Wren *Troglodytes troglodytes*, blackbird *Turdus merula*, robin *Erithacus rubecula*, and dunnock (an amber status Birds of Conservation Concern) were observed along boundary features on site. Several mallards *Anas platyrhynchos* were observed on Pond 2, with heron, cormorant and kingfisher having also been observed at this pond in the past. Hedges on site have potential to support breeding birds, but removal of hedges is likely to have a low overall impact on birds breeding on site. This ecological feature is considered to be of site-value only.

4.3.4 Other protected and priority BAP species

The site has limited bat roosting potential, confined to a wood-crete bat box and standing deadwood within the Hedges 1 and 2, parallel to Lake Lane. Hedgehog and stag beetle could utilise hedgerows on site. No sign of badger was observed during the survey visit.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The site supports water vole with evidence picked-up along a 300m length of the Todhurst Rife and around the reservoir (Pond 2) along the eastern site boundary, with a low to medium sized water vole population estimated at the time of the survey (**Appendix II**). 1.1ha of maintained semi and improved grassland will be impacted as a result of this development application. 290m of non-native hedgerow or tree-line needs to be removed to accommodate development, with limited bird-breeding habitat. Hedgerows 1 and 2, which support dead trees and potential bat roost sites are to be retained and the nursery will not be in operation at night for any other purposes than crop maintenance (irrigation, temperature monitoring), so lighting and impact upon bats will be minimal. The application will have very limited impact upon areas of rest and shelter for amphibians and reptiles and therefore these species are unlikely to be impacted by the proposals. With the exception of Todhurst Rife, habitat features observed on site were of site value only. It is recommended that mitigation and enhancements as detailed below should be considered (see **Figure 2**).

5.1 Water-voles

Water-voles are protected under the Wildlife and Countryside Act 1981, which prohibits intentional killing, taking or injury, possession and sale of water voles. Although the Rife is unlikely to be directly impacted by development, construction traffic of the new glasshouse at the eastern side of the site, will need to cross a key area of water vole habitat and therefore could inadvertently impact the Rife and water voles. Sections of ditch within 25m of construction needs to be protected with fencing and a tool box talk provided for site workers (both during installation and for ongoing site maintenance), to detail the legislative protection, ecology and maintenance requirements for water voles at Fleurie Nursery.

Todhurst Rife requires sensitive maintenance (as per SORP 2008⁶, p4-5), with the following practises recommended for water voles at Fleurie Nursery (dated 2019, see **Appendix IV**):

- *Suggest extending width of the area of unmown bankside vegetation downstream of Liner Unit bridge by 1m to enlarge habitat*
- *Consider clearing ditch south of Fresh Acres House 4 to road and cutting back scrubby vegetation to create new habitat suitable for Water Voles (possibly in conjunction with potential redevelopment)*
- *Remove Laurels adjacent to reservoir to give new areas of unshaded stream where bankside and in stream vegetation can flourish*
- *All stream clearance and bankside work in currently well vegetated areas to only be completed October to late January*
- *When working on banks in any area, work on one side at a time.*

Further to this maintenance it is recommended that the practices are detailed in a Landscape and Ecological Maintenance Plan, to be agreed for the site (see section **5.3** below)

5.2 Breeding Birds

Breeding birds at an active nest are protected under the Wildlife and Countryside Act 1981 from disturbance and harm. Hedgerow requiring removal should be cleared outside of the bird breeding season (September to February). A breeding bird survey would be required prior to any vegetation clearance works along any hedgerows and tree-lines during the breeding season. If active nests are located along hedgerows requiring removal then works in the vicinity of active nests will need to be delayed until young birds have fledged.

⁶ SORP (2008), Managing land for Water voles, A Guide for Landowners, Sussex Otters & Rivers Project

5.3 Todhurst Rife Wildlife Corridor

The maintenance of the Rife for water voles has been discussed within a Biodiversity Report in 2019, following Fleurie Nursery Ltd. acquisition of the site, with specific maintenance practises agreed as per **Appendix IV**. Fleurie Nursery intend to create a wildlife corridor along the eastern spine of the site. It is recommended that the agreed water vole maintenance and other practises set-out below are detailed in a Landscape and Ecological Maintenance Plan, to demonstrate how this Corridor will be implemented for wildlife:

1. Sensitive Rife and bankside maintenance for water voles (see **Appendix IV**).
2. Restoration of Pond 3, with removal of tree stumps along the southern margins and desilting the pond. The southern margin should remain unplanted in order to allow the pond to have easier access for desilting in the future, minimising shading and leaf litter inputs.
3. The Eucalyptus-copse is to be removed and reverted to grassland, with a 5m wayleave along the Rife maintained for water voles. The eastern boundary of the former Eucalyptus-copse will be planted with a native hedge up to 125m in length.
4. Over-time non-native poplars and alders within hedgerows 1 and 2 will be replaced with native hedgerow shrubs and ditch maintenance (which feeds into Todhurst Rife), will take place parallel to Lake Lane.
5. Site based Waste Strategy, with focus upon Todhurst Rife (see below).

5.4 Mitigating Impact of Waste upon Aquatic Environments

As part of Rife and water body maintenance it is also recommended that a site-based 'Waste Strategy' is adopted, to minimise the diffuse and indirect impact of litter and pollution entering the Rife. It should be noted that litter was not observed as a current issue on the site, however it can present as an issue during development and on labour intensive sites when site operations increase and where Rifers are maintained. The strategy should include the following elements:

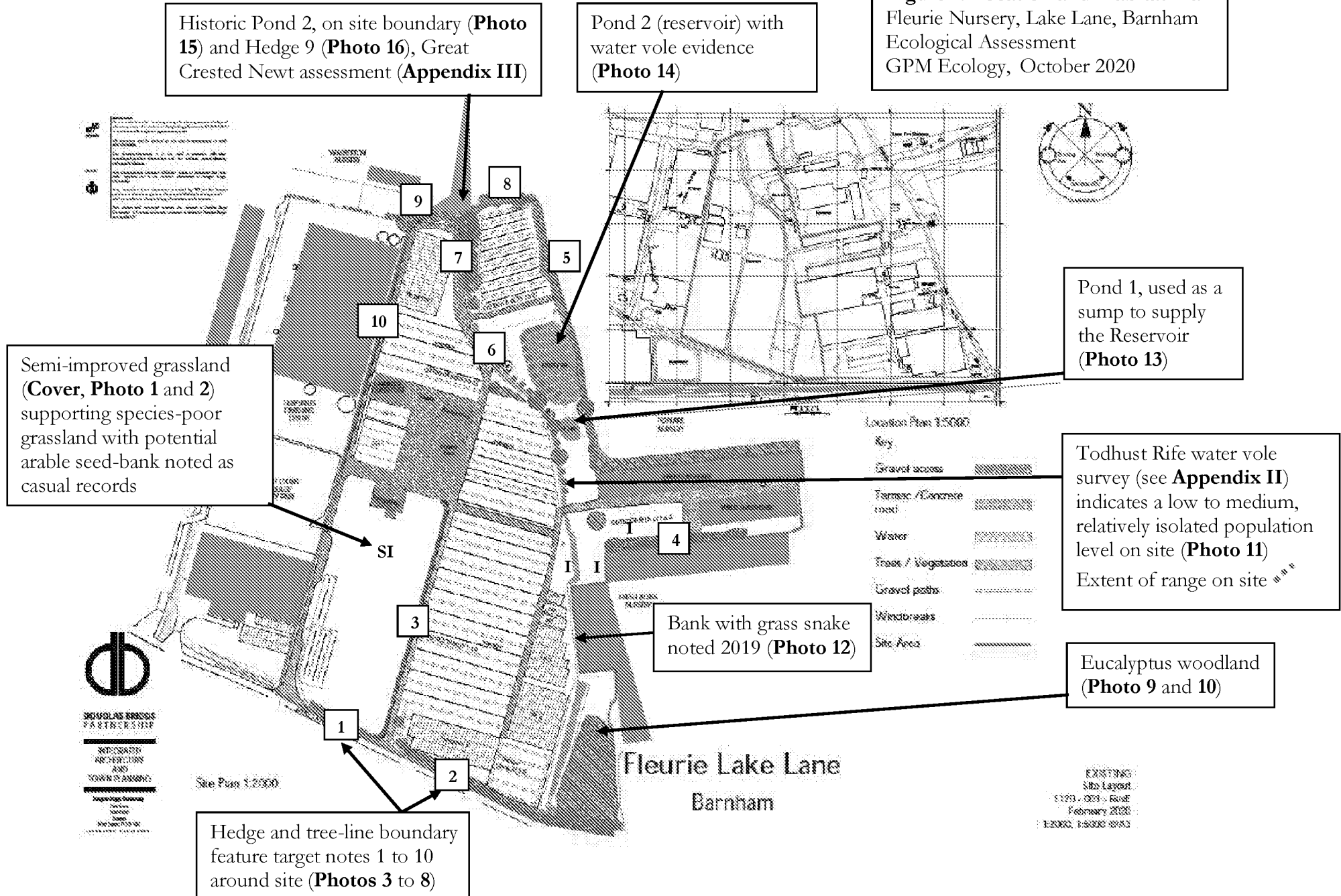
- a) Sighting waste bins and toilets a minimum distance from water-ways (e.g. over 5m), to minimise litter and incidental pollutants from entering water courses.
- b) Daily inspection to ensure all waste bins have lids present and litter is picked out of ditches, hedges and verges as necessary.
- c) Storage of nursery-related materials should be avoided along the rife-verge, to minimise litter and impacting potential ecological services and sites for wildlife to utilise.

6.0 SUMMARY OF RECOMMENDATIONS

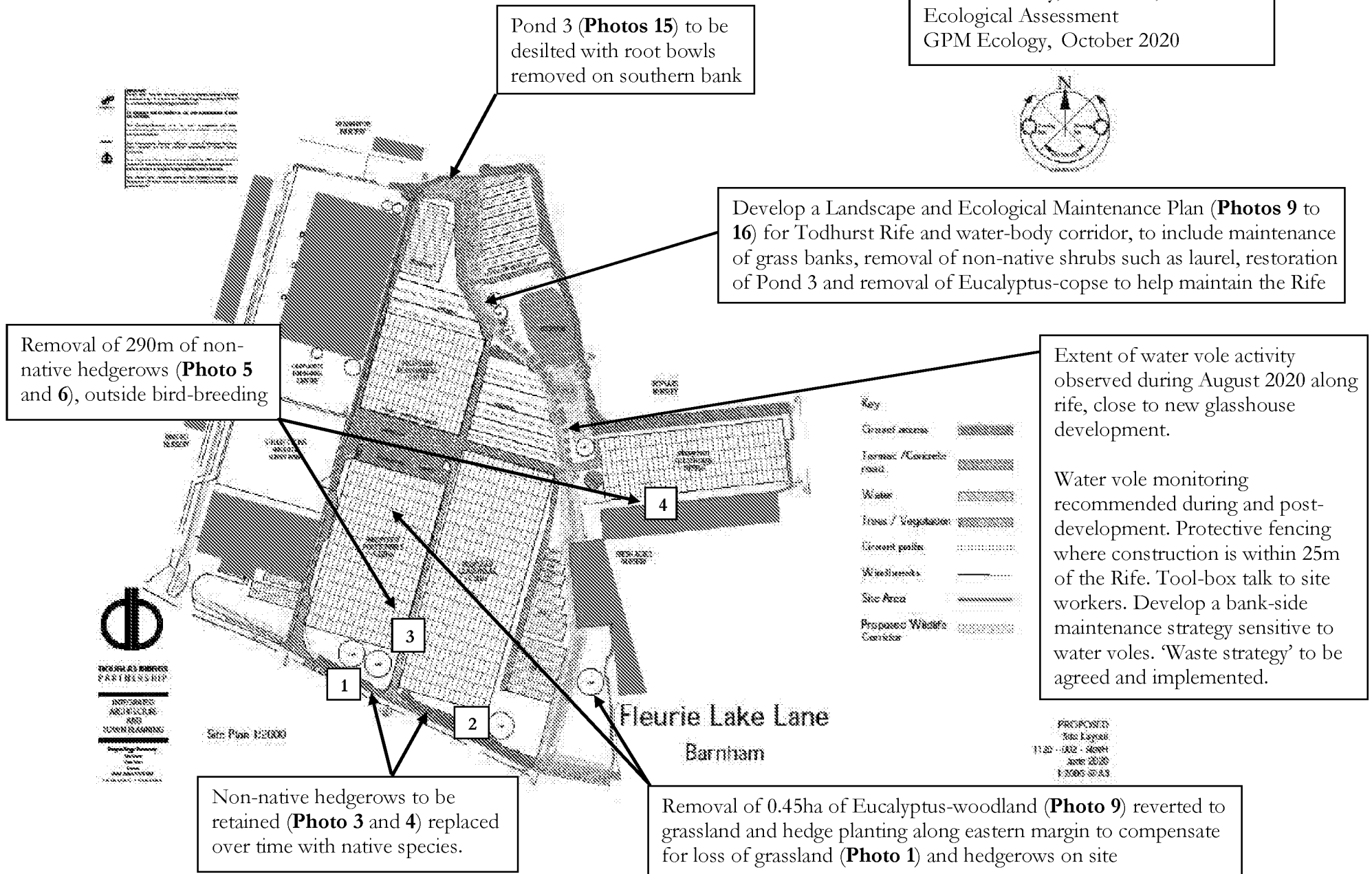
Table 1: Summary of features, impacts, mitigation and further monitoring required.

Feature	Value	Impact	Mitigation / Enhancement	Further Monitoring
Water voles	Parish to Borough	Medium	Tool box talk. Water-vole monitoring and agree sensitive Rife maintenance regime.	Monitoring during and post-development
Todhurst Rife Wildlife Corridor	Parish to Borough	Indirect, diffuse	Agree Maintenance Plan for Rife Wildlife Corridor	Monitor status of water features and litter
Trees, Hedgerows and copses	Site	Medium to High	Remove non-native hedgerows outside bird breeding.	If tree-work in breeding season. Native planting at hedges 1 and 2
Grassland	Site to Parish	High	Creation of new grassland area to replace a Eucalyptus-copse	Establishment of new grassland and hedges

Figure 1: Location and Habitat Plan
Fleurie Nursery, Lake Lane, Barnham
Ecological Assessment
GPM Ecology, October 2020



Fleurie Nursery, Lake Lane, Barnham
Ecological Assessment
GPM Ecology, October 2020



Pond 3 (**Photos 15**) to be
desilted with root bowls
removed on southern bank

Develop a Landscape and Ecological Maintenance Plan (**Photos 9 to 16**) for Todhust Rife and water-body corridor, to include maintenance of grass banks, removal of non-native shrubs such as laurel, restoration of Pond 3 and removal of Eucalyptus-copse to help maintain the Rife

Removal of 290m of non-native hedgerows (**Photo 5 and 6**), outside bird-breeding

Extent of water vole activity
observed during August 2020 along
rife, close to new glasshouse
development.

Water vole monitoring recommended during and post-development. Protective fencing where construction is within 25m of the Rife. Tool-box talk to site workers. Develop a bank-side maintenance strategy sensitive to water voles. 'Waste strategy' to be agreed and implemented.

Non-native hedgerows to be retained (**Photo 3** and **4**) replaced over time with native species.

Removal of 0.45ha of Eucalyptus-woodland (**Photo 9**) reverted to grassland and hedge planting along eastern margin to compensate for loss of grassland (**Photo 1**) and hedgerows on site

Photographs: Fleurie Nursery, Barnham (August 2020)

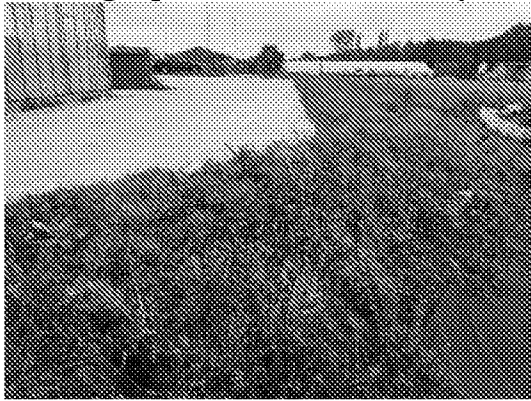


Photo 1: Recently created grass-bank (blue-flowered pimpernel recorded in 2019)



Photo 2: Pallet and ruderals within field

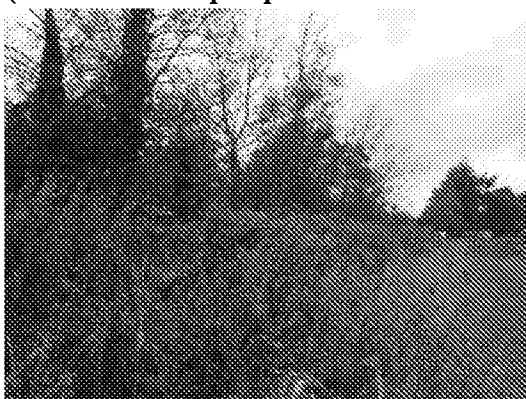


Photo 3: Hedge 1 at south-western end of site with Alder die-back



Photo 4: Hedge 2 in southern corner of site, ditch with water-vole evidence



Photo 5: Hedge 3 is dominated by Italian Alder (similar to hedge 10)



Photo 6: Hedge 4, a tall conifer tree-line adjacent mature Poplar tree.



Photo 7: Hedge 6, Poplar-tree-line with a tree fallen during recent gales



Photo 8: Hedge 8, with leaning Poplars and hazel coppice



Photo 9: Eucalyptus-woodland with Bramble-nettle edge and ivy under-story



Photo 10: Eucalyptus-woodland next and over-growing Todhurst Rife

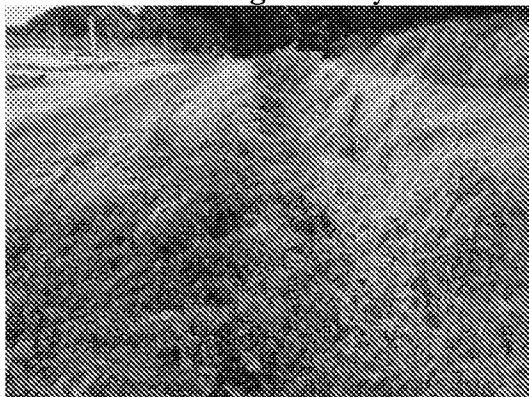


Photo 11: Rife with tall ruderals with water vole latrines observed



Photo 12: South-west facing bank with Grass snake observed in May 2019



Photo 13: Pond 1, shaded with no macrophytes, adjacent Todhurst Rife



Photo 14: Reservoir, with evidence of water-vole. Large fish population.

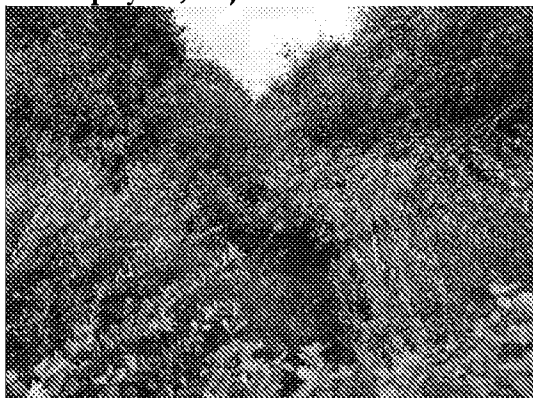


Photo 15: Pond 2, historic pond on northern boundary of site



Photo 16: Wood-chippings and alder / hazel stumps on south-side of Pond 2

APPENDIX I: Sussex Biodiversity Record Centre Report



Ecological Data Search SxBRC/20/386 - Summary Report

An ecological data search was carried out for land at Fleurie Nursery, Lake Road, Barnham on behalf of Gareth Matthes (GPM Ecology) on 04/09/2020.

The following datasets were consulted for this report:

	Requested	Radius/buffer size
Designated sites, habitats & ownership maps	Yes	1km
Protected, designated and invasive species	Yes	1km

Summary of results

Sites and habitats

Statutory sites	None present
Non-statutory sites	None present
Section 41 habitats	3 habitats
Ancient and/or ghyll woodland	None present

Protected and designated species

International designations	21 species	104 records
National designations	59 species	1,449 records
Other designations	118 species	2,500 records
Total	131 species	2,604 records
Invasive non-native	21 species	120 records

The report is compiled using data held by Sussex Biodiversity Record Centre (SxBRC) at the time of the request. SxBRC does not hold comprehensive species data for all sites. Even where data are held, a lack of records for a species in a defined geographical area does not necessarily mean that the species does not occur there – the area may simply not have been surveyed.

This summary page may be published.
The full report and maps may not be published or otherwise shared.

The data search report is valid until 04/09/2021 for the site named above.

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APPENDIX II:

Fleurie Nursery Water-vole Survey (A. Rothwell 2020)

A Water Vole Survey at Fleurie Nursery, West Sussex. August 2020

Introduction

The upper reaches of a small spring-fed stream known as Todhurst Rife, flows through Fleurie Nursery and eventually joins the River Arun just east of Ford. A small reservoir and pond are also present at Fleurie Nursery.

During May 2019 evidence of water vole activity was found on the Todhurst Rife at Fleurie Nursery. **Appendix III.I** provides more info on the current status and protection of water voles.

Subsequently, a full water vole survey was commissioned, and was conducted by Andrew Rothwell (with over eighteen years of experience as a water vole surveyor) to determine the extent of water vole activity on the waterbodies at Fleurie Nursery.

Methodologies

A standard survey technique, as outlined in the Water Vole Conservation Handbook (Strachan, 1998; Dean *et al*, 2016) was employed to determine presence of water vole activity on the waterbodies at Fleurie Nursery. The banks of the study area were intensively examined for the field signs of water voles (which includes latrines, burrows, footprints and feeding remains). **Appendix III.II** gives further details describing the field signs of water voles. The presence of other important riparian mammals was also recorded.

Where practicable, the watercourse was examined from within the channel itself. In the event of dense vegetation, deep water or other obstruction disabling a thorough search, a series of spot checks would be employed at every available access point along the fringing banks.

Where present the number of water vole latrines found were tallied to give an indication of water vole activity, together with an estimate of water vole numbers (see note in **Appendix III.II** for calculating a water vole index).

Survey Results

This water vole survey was conducted on 26th August 2020 during favourable weather conditions.

The total linear length of the Todhurst Rife surveyed was approximately 350m – however its length through the site is much longer at around 780m, but not all of the Rife was accessible due to dense vegetation (predominantly bramble scrub, deadly nightshade and hedgerow). The Rife had steep banks with a low water depth (average range of 0.1 to 0.3m). It had a very sluggish flow.

Field signs of water vole activity were mainly found on the Todhurst Rife, which runs north to south, opposite the small reservoir (see **Figure 1**). Along this stretch, six latrines, eight burrows, ten

dropping sites and feeding evidence (grasses and sedges) were observed. One other latrine site was found along the roadside (Lake Lane) stretch of the Rife.

The margins of the small reservoir were examined and water vole activity was confirmed here with feeding evidence (food cache – *Juncus*), a burrow in the upper bank just above pond lining on the western side and droppings on a raft of *Typha* leaves on the northern margins of the reservoir.

The pond at Fleurie Nursery (just south of the small reservoir) was not accessible, however it was noted that the habitat was sub-optimal for water voles (heavily shaded banks with sparse monoculture understory – predominantly nettles and ivy, together with a shallow bank profile).

A secondary pond on the south-eastern corner of the nursery complex (where Lake Lane and Yapton Lane converge) was also examined; however there was no evidence of water vole activity on this waterbody.

A very small scatterings of brown rat droppings were observed on the Todhurst Rife and the small reservoir.

No other important riparian mammals (namely otter, mink, and harvest mouse), were observed as being present on the waterbodies at Fleurie Nursery during this survey.

Survey implications and evaluations

At the time of year of the survey, water vole populations are reaching their highest levels, with a peak in the breeding season. Juveniles have dispersed and immigration compliments the overall population status (Strachan, 1997). Therefore, any water vole activity would be well represented during the timing of this survey. However, this can fluctuate, depending on many biotic and abiotic factors.

The survey effort can be significantly hampered during the summer months, due to dense vegetation and sensitive methods used to avoid disturbance to breeding riparian birds. Despite this, most of the Todhurst Rife and the small reservoir were surveyed proficiently to detect the presence/absence of water vole activity. Spot checks were mainly employed on the southern stretches of the Rife towards Lake Lane, and the west-east stretch along Lake Lane (see **Figure 1**).

The majority of the Todhurst Rife is suitable for water voles despite the water levels being relatively low. Water voles tend to use deep waters as a primary means of escaping predators (Strachan, 1997).

Few signs of water vole activity were found south of the small reservoir, possibly due to the limited access from the dense vegetation (see **Figure 1** and **Appendix III** photos). Despite this, it was considered to support good water vole habitat.

However, travelling further downstream (southwards), the habitat becomes sub-optimal, due to the very dense bramble blocks enclosing the stream path. Water voles tend not to utilise such areas, especially if there is more suitable habitat geographically close by. Nonetheless, this part of the Rife is still viable habitat for water voles and would provide plenty of cover despite the limited food resource; particularly for any transient water voles. It also provides a continuous linking network to

the main watercourse in the catchment area. Similarly, the west-east run of the Rife soon becomes encompassed under a dense hedgerow along Lake Lane.

There was however water vole activity on the sub-optimal part of the Rife close to where the confluence of the north-south run meets the west-east run adjacent Lake Lane (see **Figure 1**).

The amount of field signs of water vole together with the numbers of latrines found, would indicate a low to medium population level, albeit a relatively isolated population, along the Todhurst Rife at Fleurie Nursery.

Recommendations

Maintaining a wide vegetation buffer zone is very important in riparian structures, not only for water voles, but also for a whole host of other wildlife, and even beneficial for the river dynamics itself (stabilises the bank structure, reduces flooding). Maintaining a wide buffer zone will provide a reduction in water vole disturbance, provide plenty of food and provide cover from aerial predation.

Water voles confine the majority of their activity to within two metres of water, and externally a burrow system can occur up to three metres from the water's edge, but extend much further inland underground (Strachan, 1998). It may not always be physically possible or practical, but it would be recommended to allow the buffer zone to remain wide on both sides of the stream bank, to at least two metres in width (perpendicular to the water's edge). Where practical, an even wider buffer zone should be orchestrated (ideally five metres).

It is recommended that any groundworks, particularly with the use of heavy machinery and earth movements, are best avoided over the period of the prime breeding months for water voles (May to August), to avoid disturbance during this crucial phase in the life cycle of the water vole.

At no time should any machinery, vehicles, materials or other heavy items be stored on or within 5 metres of the banks. Doing so may cause underground chambers and burrow systems to collapse.

Finally, it would be advised to set up a post-construction survey after the works have been completed. This should consist of at least one survey visit during the following year after construction is complete, to establish whether the works have had any detrimental effect on the water voles inhabiting the waterbodies at Fleurie Nursery.

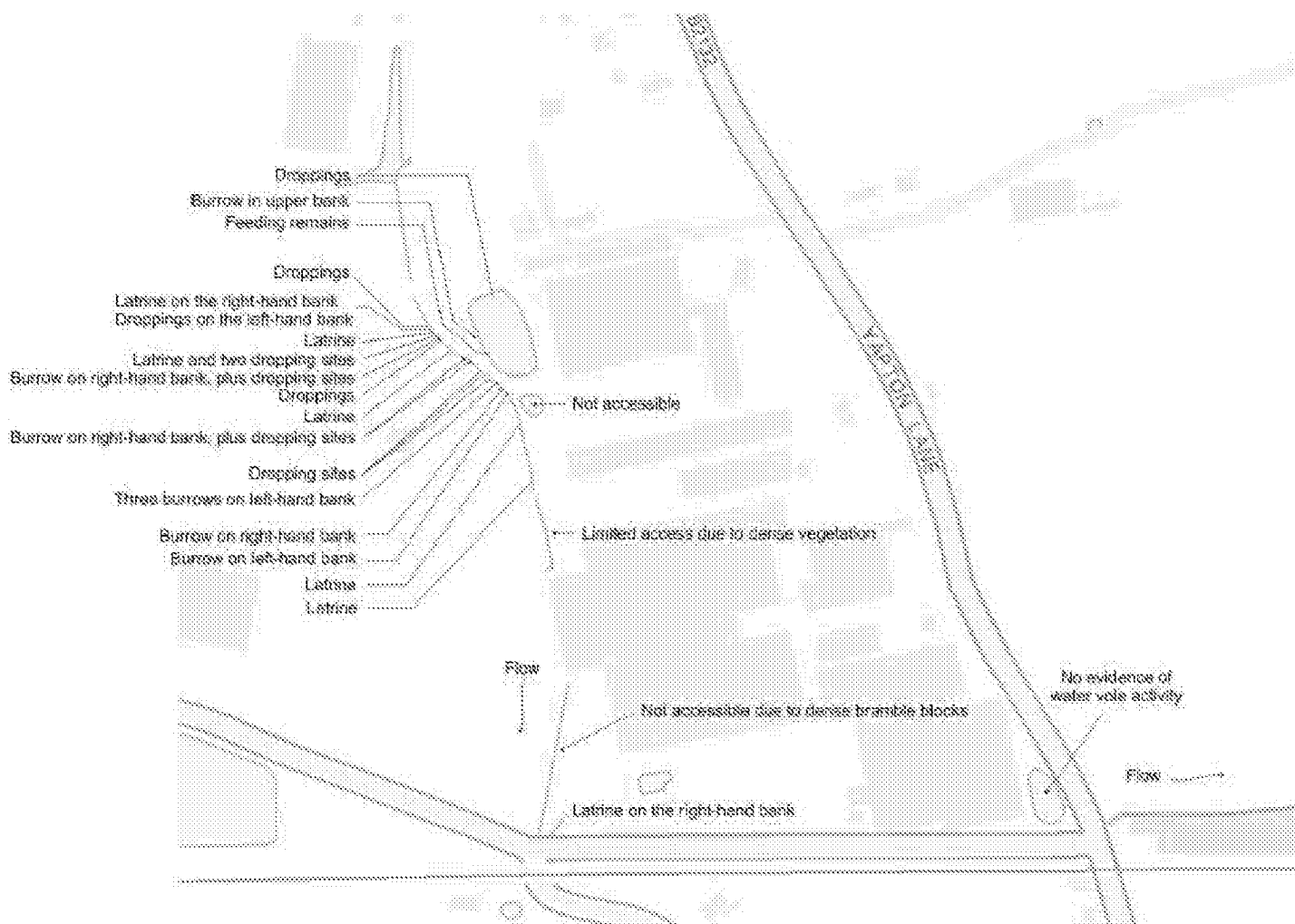


Figure 1. Water vole activity along the waterbodies at Fleurie Nursery, August 2020.

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APPENDIX III.I: CURRENT STATUS OF THE WATER VOLE

Brief History

The water vole [*Arvicola amphibius* (formerly *A. terrestris*)] is the largest of the British voles. They are adapted to living in burrows and were once seen to inhabit the majority of the river banks throughout Britain, favouring sites with lush waterside vegetation for food and shelter (Strachan, 1997).

From the first nationwide survey 1989 - 1990 it was seen that the water vole had suffered a long-term decline since 1990, with 94% of the sites no longer supporting water voles (Strachan, 1998). Furthermore, from the most recent national survey (1996 - 1998) this decline has developed into a serious population crash with a further loss of 67.5% of the survey sites occupied by water voles, (or an overall 88% loss of the British population) since the first national survey (Strachan *et al*, 2000).

A further trend in the decline of the water voles across England and Wales has also been recently observed from a study conducted by Hampshire & Isle of Wight Wildlife Trust on a ten year data set from 2006 to 2015; the overall decline is estimated at 30% during this survey period (McGuire and Whitfield, 2017).

The main cause of this decline was changes in agricultural practices and river habitat management (Strachan, 1997). Consequentially habitat degradation and loss resulted in isolation and fragmented populations of water voles in Britain. This increased the predation risk, especially from the introduced American mink [*Neovison vison* (formerly *Mustela vison*)], which has been well documented as an important predator of the water vole (Strachan, 1997; Strachan, 1998; Strachan and Jefferies, 1998; Macdonald and Strachan, 1999).

Legal Status

On the 6th April 2008 water voles received an increased level of protection, becoming fully covered by the provisions of section 9 of the Wildlife and Countryside Act 1981 (as amended). Prior to this the water vole was only covered by section 9(4) and had limited legal protection.

The new amendment to this piece of legislation now makes it an offence to intentionally kill, injure, take from the wild, possess or trade in a water vole. Furthermore, it is also an offence to intentionally or recklessly damage, destroy or obstruct access to any structure or place that water voles use for shelter or protection, and to disturb water voles while they are using such a place.

The water vole is listed as a species of '*Principal Importance*' for the conservation of biodiversity of England, under Section 41 of the NERC Act 2006, and a '*Priority Species*' included in the UK Post-2010 Biodiversity Framework (July 2012) [Formerly UK Biodiversity Action Plan (BAP) 1994]. Water voles are also a Local Area BAP species.

APPENDIX III.II: FIELD SIGNS OF WATER VOLE

• Droppings and Latrine Sites

The presence of the water vole can be determined from its droppings, which provide the most distinctive field sign. They are roughly 8-12mm long and 4-5mm wide, cylindrical with blunt ends. Their colour ranges from black, brown and green, depending on age, diet and water content.

Most droppings are deposited on latrine sites (distinct area of droppings), which can be found at favoured areas where the voles leave and enter the water, at discrete sites near to their burrows and are used to mark territorial boundaries. Breeding voles use regular latrine sites along water margins, and often consist of a flattened mass of old droppings with fresh ones on top.

• Burrows

Water vole burrows have an approximate hole size of 4-8cm. The burrows can appear as a series of holes along the waters edge, some may open below the water line, whilst others can occur amongst the vegetation up to three metres from the water. Land holes may also show evidence of a closely cropped grazed lawn, where a female water vole has nibbled the vegetation short within easy reach of the burrow.

• Grazing Remains

Water voles often bring food items to favoured feeding stations along the waters edge and at burrow entrances. Feeding remains consist of neat piles of chewed off lengths of vegetation. These grazing remains typically measure 8-10cm, showing two large incisor marks. Grazing remains also double as food caches and are often accompanied by droppings.

• Footprints

Imprints from water voles show four digits from the fore foot and five digits in the hind foot. The imprinted digits form a star shape of splayed-out toes. Water vole tracks are very difficult to distinguish between tracks made from the brown rat, particularly young animals. Generally, water vole prints tend to be much smaller than rat prints and cannot always be used as reliable indicators in the absence of other water vole field signs.

• Latrine Densities and Water Vole numbers

Latrine counts not only provide a useful index of water vole activity they can also give an indication of the strength of the water vole colony. A predictive equation has been established to estimate the numbers of water voles from the number of latrines found in a given area (Morris *et al.* in Strachan, 1998):

$$y = 1.48 + 0.683x$$

[where y = number of water voles inhabiting a stated length of waterway, and x = number of latrines counted in that same length].

Note: The original research leading to the equation was not aimed at producing a formula for estimating population density from latrine density. Consequently it may not be applicable to all habitats and situations where water voles

occur; nevertheless it gives a useful index of water vole densities. As such, a survey area can be subdivided into relative population densities categorised as 'high', 'medium' or 'low', based on the number of latrines per 100m of bankside habitat during of the survey season [see Dean et al, 2016]

APPENDIX III: Selection of accompanying survey site photos

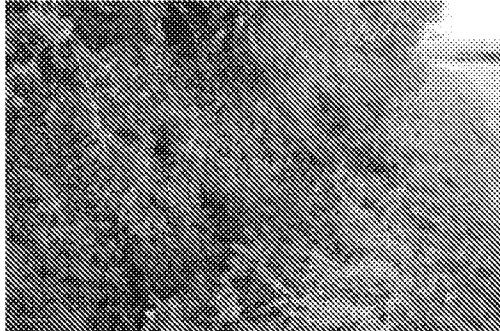


Plate 1. General profile of the Todhurst Rife, Northern (upstream) section.



Plate 2. General profile of the Todhurst Rife, mid section, opposite the reservoir and pond.



Plate 3. Three burrows on the left-hand (eastern-side) bank, below the small pump house.



Plate 4. General profile of the Todhurst Rife, southern section, showing dense lush riparian vegetation.

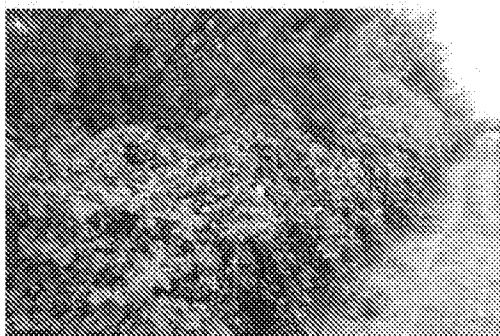


Plate 5. Dense bramble block encompassing the Todhurst Rife at its southern most section.



Plate 6. Roadside section of the Todhurst Rife (latrine site found in this sub-optimal section).

APPENDIX III: Selection of accompanying survey site photos



Plate 7. Roadside section of the Todhurst Rife (showing dense hedgerow).

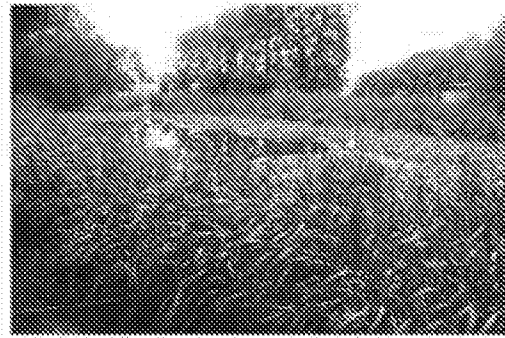


Plate 8. General profile of the small reservoir.



Plate 9. Droppings on reed raft on the small reservoir.

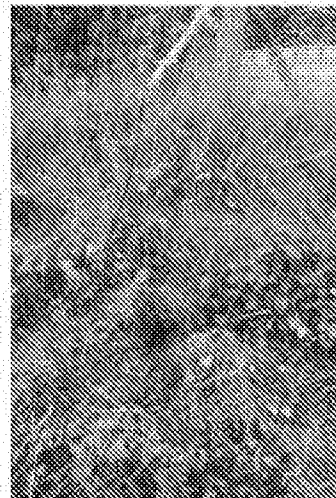


Plate 10. Burrow on the upper banks of the small reservoir.

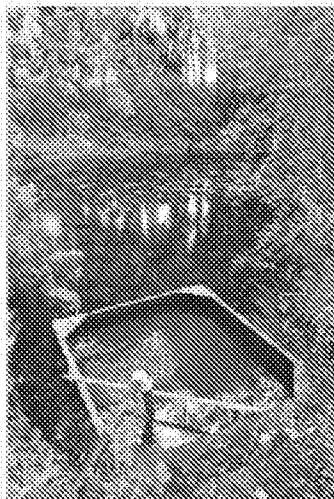


Plate 11. Pond not accessible.



Plate 12. Pond on the outskirts of the site (no evidence of water vole activity found).

APPENDIX III: Great Crested Newt Habitat Suitability Assessment

Background Information													
Pond Number:	1												
Site name:	Fleurie Nursery												
National Grid Ref:	SU 9770 0470												
Land owner:	Fleurie Nursery Ltd												
Access:	Off Lake Lane, Barnham												
History:	Pond constructed as a sump from which to pump and refill reservoir												
Habitat Suitability													
Location (SI ₁):	Good												
Pond Area (SI ₂):	Approximately 0.016ha Small sump pond pond												
Permanence (SI ₃):	Pond used to top-up reservoir, therefore likely to dry annually												
Water Quality (SI ₄):	Poor - Heavily silted with leaf litter												
Shading (SI ₅):	100% shading surrounded by oak and ash												
Waterfowl (SI ₆):	No water fowl observed												
Fish (SI ₇):	None observed, nearly dry on 22nd September												
Pond Density (SI ₈):	4.777/km ²												
Habitat (SI ₉):	Average - mature hedges and and small copse, but surrounded by hard-standing nurseries												
Macrophytes (SI ₁₀):	No macrophytes cover												
Survey results:	Current HSI - 'Poor' suitability for GCN												
<table border="1"> <thead> <tr> <th>Key reason waterbody screen out / HSI-value</th> </tr> </thead> <tbody> <tr> <td>1</td> </tr> <tr> <td>0.32</td> </tr> <tr> <td>0.1</td> </tr> <tr> <td>0.33</td> </tr> <tr> <td>0.2</td> </tr> <tr> <td>1</td> </tr> <tr> <td>1</td> </tr> <tr> <td>1</td> </tr> <tr> <td>0.67</td> </tr> <tr> <td>0.3</td> </tr> <tr> <td>0.46</td> </tr> </tbody> </table>		Key reason waterbody screen out / HSI-value	1	0.32	0.1	0.33	0.2	1	1	1	0.67	0.3	0.46
Key reason waterbody screen out / HSI-value													
1													
0.32													
0.1													
0.33													
0.2													
1													
1													
1													
0.67													
0.3													
0.46													
Surveyors	Date	Eggs	Larvae	Traps	Min/max	Other trap data							
GCN - Great Crested Newt; PN - Palmate Newt; SN - Smooth Newt; Td - Toads; Fg - Frogs													
Presence / absence: Likely absent Regular drying, shading, poor water quality and lack of macrophytes likely to preclude GCN from breeding in the pond													

Background Information	
Pond Number:	2
Site name:	Fleurie Nursery
National Grid Ref:	SU 9788 0476
Land owner:	Fleurie Nursery Ltd
Access:	Off Lake Lane, Barnham
History:	Reservoir Pond
Habitat Suitability	
	May reason waterbody screen out / HSI-value
Location (SI ₁):	Good
Pond Area (SI ₂):	Approximately 0.16ha
Permanence (SI ₃):	Pond never dries
Water Quality (SI ₄):	Moderate - Large fish population likely to lower pond quality with faeces
Shading (SI ₅):	5% shading from adjacent hedge
Waterfowl (SI ₆):	Several mallard observed, with heron, kingfisher and cormorant understood to visit water-body
Fish (SI ₇):	Large fish population, understood to support mature carp and small fish (possibly roach)
Pond Density (SI ₈):	4.777/km ²
Habitat (SI ₉):	Average - mature hedges and and small copse, but surrounded by hard-standing nurseries
Macrophytes (SI ₁₀):	80% macrophytes cover - extensive reedmacro Typha cover, with lillies towards centre of pond
Survey results:	Current HSI - 'Below Average' suitability for GCN
Surveyors	Date
Eggs	Larvae
Traps	Min/max
Other trap data	
GCN - Great Crested Newt; PN - Palmate Newt; SN - Smooth Newt; Td - Toads; Fg - Frogs	
Presence / absence: Likely absent	
Large fish population likely to preclude GCN	

Background Information						
Pond Number:	3					
Site name:	Fleurie Nursery					
National Grid Ref:	SU 9761 0489					
Land owner:	Fleurie Nursery Ltd					
Access:	Off Lake Lane, Bamham					
History:	Old historic pond, possible source of Todhurst Rife					
Habitat Suitability						
	Key reason waterbody screen out / HSI-value					
Location (SI ₁):	Good					
Pond Area (SI ₂):	Approximately 0.01ha					
Permanence (SI ₃):	Due to high silt level pond likely to dry annually					
Water Quality (SI ₄):	Poor - Very heavily silted with leaf litter, silt possibly up to 0.5-1m deep in places					
Shading (SI ₅):	80% shading by willow, alder and hazel scrub					
Waterfowl (SI ₆):	Several mallard observed					
Fish (SI ₇):	None observed, nearly dry on 22nd September					
Pond Density (SI ₈):	4.777/km ²					
Habitat (SI ₉):	Average - mature hedges and and small copse, but surrounded by hard-standing nurseries					
Macrophytes (SI ₁₀):	5% macrophytes					
Survey results:	Current HSI - 'Below Average' suitability for GCN					
	0.57					
Surveyors	Date	Eggs	Larvae	Traps	Min/max	Other trap data
GCN - Great Crested Newt, PN - Palmate Newt, SN - Smooth Newt, Td - Toads, Fg - Frogs						
Presence / absence: Likely absent						
Poor water quality, shading and regular drying likely to preclude GCN from breeding in the pond						

**APPENDIX IV: Management recommendations for Water-Vole
(Minutes of Meeting, Dated 3rd December 2019)**

Water Voles at Fleurie, Lake Lane

Colin Hedley CJH Agri Environment Consultants Ltd

Present Steve Carter, Moira Shephard, James Bardgett, Chris Need

Notes

- Spring fed stream known as Todhurst Rife
- Very good evidence of presence of water voles, burrows, runs and vegetation with characteristic 45 degree cuts from feeding
- Good bankside and in stream vegetation including Water Parsnip
- Suggest extending width of the area of unmown bankside vegetation downstream of Liner Unit bridge by 1m to enlarge habitat
- Consider clearing ditch south of Fresh Acres House 4 to road and cutting back scrubby vegetation to create new habitat suitable for Water Voles (possibly on conjunction with potential redevelopment)
- Remove Laurels adjacent to reservoir to give new areas of unshaded stream where bankside and in stream vegetation can flourish
- All stream clearance and bankside work in currently well vegetated areas to only be completed October to late January
- When working on banks in any area, work on one side at a time where possible.