

Havant Thicket Reservoir Project

Environmental Statement Volume 4 - Appendices

Appendix A9 Biodiversity

A9.13 Pipeline Preliminary Ecological Appraisal

Portsmouth Water Ltd.



**HAVANT THICKET WINTER STORAGE RESERVOIR,
ROWLANDS CASTLE, HAMPSHIRE**

**APPENDIX 9.13
PIPELINE ROUTE ECOLOGY REPORT**

Final Document

February 2020

Preliminary Ecological Appraisals • Protected Species Surveys and Licensing • NVC • EclA • HRA • Management Plans
Habitats • Badger • Bats • Hazel Dormouse • Birds • Reptiles • Amphibians • Invertebrates • Riparian and Aquatic Species

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ECOSA Quality Assurance Record

The Preliminary Ecological Appraisal has been undertaken with reference to the Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Preliminary Ecological Appraisal (CIEEM, 2017). This report has been produced in accordance with the CIEEM Guidelines for Ecological Report Writing 2017 (CIEEM, 2017). The survey work has been undertaken in line with references within CIEEM's Source of Survey Guidance (CIEEM, 2017).

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HAVANT THICKET WINTER STORAGE RESERVOIR, ROWLANDS CASTLE, HAMPSHIRE

PIPELINE ROUTE ECOLOGY REPORT

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EXECUTIVE SUMMARY

Ecological Survey and Assessment Ltd (ECOSA) have been appointed by Portsmouth Water Limited to undertake a baseline conditions report of the pipeline route for the proposed Havant Thicket Winter Storage Reservoir site. The main function of the pipeline will be to transfer water from Bedhampton Springs to the proposed Havant Thicket Winter Storage Reservoir and back. The northern section of the pipeline will also be utilised in an emergency to drawdown water into the Hermitage Stream near Purbrook Way. The purpose of the appraisal is to assess the ecological baseline of the proposed route. Action has already been taken to select a route which minimises the ecological impact of the pipeline construction before the pipeline route was safeguarded in the Havant Borough Council Local Plan.

The main findings of the Preliminary Ecological Appraisal are:

- Desktop study data indicated that at its southernmost point the pipeline route is located approximately one kilometre north of three European / internationally designated sites; Chichester and Langstone Harbours SPA and Ramsar site and Solent Maritime SAC.
- The pipeline route is hydrologically linked to Langstone Harbour and the associated European / international designated sites. Potential impacts on these statutory designated sites are covered in the shadow Habitat Regulations Assessment to inform an Appropriate Assessment which accompanies the planning application.
- The pipeline route intersects Thicket Lawn SINC and High Lawn SINC which are designated for their species-rich grassland habitat. The pipeline route is located adjacent to Great Copse SINC, an ancient woodland site.
- The majority of the route is low value road, hardstanding and amenity grassland, or poor semi-improved grassland typical of an urban setting. However, parts of the route also support a number of habitats of relatively greater ecological importance including Habitats of Principal Importance.
- The site has been assessed in places as supporting suitability for tree roosting bats, foraging and commuting bats, otter, badger, hazel dormouse, water vole, breeding and wintering birds, and widespread species of reptile.
- The development proposals have the potential to impact on the above ecological features supported by the site through temporary damage and disturbance during the construction phase and, habitat loss and fragmentation, if not mitigated.
- This report includes high level interim recommendation measures in order to mitigate potential impacts including retention and protection of existing habitats and sensitive working methods.

- Recommendations have also been made for further survey work in relation to various protected species once more detailed proposals for the construction of the pipeline have been developed.
- Further assessment of the impacts and necessary avoidance/mitigation measures will require developing as the exact route and construction methods for the pipeline are finalised.
- If the planning application boundary changes or the proposals for the site alter, a re-assessment of the scheme in relation to ecology may be required.

1.0 INTRODUCTION

1.1 Background

Ecological Survey & Assessment Limited (ECOSA) have been appointed by Portsmouth Water Limited to undertake a Preliminary Ecological Appraisal to identify the ecological constraints and opportunities associated with the proposed pipeline route for Havant Thicket Winter Storage Reservoir (HTWSR), Rowlands Castle, Hampshire.

ECOSA have carried out extensive ecological survey work over a number of years in the area to the north of the proposed pipeline route as part of the proposed HTWSR development (ECOSA, 2019). A previous Extended Phase 1 Habitat Survey of the pipeline route (northern section only) was undertaken in 2007 (ECOSA, 2007) and a survey of the whole pipeline route was undertaken by ARUP in 2009 (ARUP, 2009).

Four pipeline options were considered during a public consultation undertaken in 2008. During this process ecological support was provided by ECOSA. The public response favoured a route which followed the public open space along the streams through Leigh Park, while minimising the ecological impact. A revised route is now proposed that utilises the open space along the streams, but avoids the more sensitive wooded stream banks including diverting the pipeline around the edge of Great Copse. A decision has yet to be made about the final routing around / along the edge of Great Copse and therefore this assessment considers two options in this location.

Due to the time that has elapsed since this initial survey was undertaken, an updating Preliminary Ecological Appraisal was required.

This report forms one Appendix to the ES prepared for the reservoir site to which the pipeline joins at its northern end. This report is a standalone assessment of the pipeline route which forms part of the larger reservoir proposals. Within this report reference to a 'reservoir' always related to Havant Thicket Winter Storage Reservoir.

1.2 The Pipeline Route

The pipeline route extends from the Portsmouth Water pumping station at Bedhampton, northwards through the town of Havant, to the southern edge of the proposed reservoir site. The beginning and end points of the route are centred on National Grid References (NGR) SU 7134 0911 and SU 7053 0638 respectively (**Map M1**). There is a ten metre wide easement for the route with an additional five metre buffer either side of the easement.

As part of this report the pipeline route has been split into sections to aid the description of features. The location of each section from A-I is shown in **Map M2**.

In simple terms the pipeline route runs north along the Hermitage Stream before turning north-east and broadly following the Riders Lane Stream towards the proposed reservoir site. A more detailed description is provided below.

The most southerly point of the pipeline route is at the Bedhampton Pumping Station Water Works (Section A). From here, the route extends north and east along residential roads (Section B) and through school grounds (Section C). At Fraser Road, the route runs north in parallel to Hermitage Stream for approximately 1.2 kilometres (Sections D and E) before crossing the stream and turning east along Highclere Avenue through further residential development (Sections F). The pipeline route then crosses the Riders Lane Stream east of Ellisfield Drive before re-entering a residential area (Section G). At the northern end of the route, the pipeline splits into two route options; one which flanks the eastern edge of Great Copse (Section H) and the other which runs along High Lawn Way. North of this the pipeline route crosses Middle Park Way and enters grassland within Staunton Country Park (SCP) (Section I). The route terminates at the southern end of the proposed reservoir site.

1.3 Aims and Scope of Report

The information within this report is based on a field survey carried out on 16th November 2018 and desktop study carried out in May 2018. The objectives of the appraisal are:

- To provide up-to-date baseline information on the current habitats, the suitability of the pipeline route to support notable and protected species, and evidence of notable and protected species both within and in the immediate vicinity of the pipeline route, where relevant;
- To identify any changes that have occurred since the previous ecological surveys were undertaken in 2007 (ECOSA, 2007) and 2009 (ARUP, 2009);
- To identify the proximity of any sites designated for nature conservation importance;
- To identify the likely ecological constraints and opportunities;
- To identify any mitigation measures likely to be required, following the 'Mitigation Hierarchy'¹ with a preference for avoidance;

¹ In accordance with CIEEM Ecological Impact Assessment guidance (CIEEM, 2018) a sequential process is adopted to address impacts on features of ecological interest, with 'Avoidance' prioritised at the top of the hierarchy and 'Compensation/Enhancement' at the bottom. This is often referred to as the 'mitigation hierarchy'.

- To identify any additional surveys that may be required to inform the mitigation requirements; and
- To identify the opportunities offered by the proposal to deliver ecological enhancement.

1.4 Pipeline Route Proposals

The proposals are for the installation of a water pipeline to serve the Havant Thicket Winter Storage Reservoir at Rowlands Castle. At the time of the survey the pipeline route included two potential routes as shown in **Map M1**. The only difference between the two potential routes comprise the routing associated with High Lawn Way and Great Copse towards the north of the site. One option has the pipeline running along High Lawn Way, a residential road with a school. This route has engineering constraints. The other route skirts along the southern edge of Great Copse, an area of broadleaved woodland. It is unclear at this stage whether the Great Copse route could be installed underground using trenchless techniques or if an open trench would be necessary.

The pipeline is required to pump surplus water from the Havant and Bedhampton Springs, at the southern end of the pipeline, to fill the reservoir. The same pipeline will carry water back to the springs to link in with existing Portsmouth Water supply and treatment infrastructure. A plan of the proposed pipeline route in relation to the reservoir site is provided in **Map M1**.

Two sections of the route either side of Purbrook Way in a central location on the route have been identified as potential locations for underground flow reduction chambers and associated spillways into the Hermitage Stream. These spillways would only be utilised to their full capacity in an emergency drawdown situation. Each valve would need to be tested for a short period annually. The structures will be carefully designed to prevent erosion of the stream bed. The pipeline also crosses the Hermitage Stream and Riders Lane Stream at single locations along the proposed route.

Through a public consultation process and ecological advice the route has been selected and construction techniques chosen to minimise the environmental impact by avoiding features of ecological interest, whilst taking into consideration engineering constraints. Therefore, as far as possible potential impacts and effects have been 'designed out' of the scheme significantly reducing the need for mitigation and compensation. For example, earlier routes included following the stream more closely, especially along wooded sections of the Riders Lane stream including following the stream edge through the middle of Great Copse. This would have resulted in the loss of more trees/scrub and protected species habitat. The new route has been specifically selected to follow roads, hard standings and public open space/amenity grassland wherever practical.

The timings of installation of the pipeline was unknown, however it is estimated that construction will not begin for at least five years.

2.0 METHODS

2.1 Introduction

This section details the methods employed during the Preliminary Ecological Appraisal. Any significant limitations to the survey methods are also considered.

2.2 Zone of Influence

To define the total extent of the study area for this appraisal (Zone of Influence²), the proposed scheme was reviewed to establish the spatial scale at which ecological features could be affected. The appropriate survey radii for the various elements of the appraisal (i.e. desktop study and field survey) have been defined in the relevant sections below. These distances are determined based on the professional judgement of the ecologist leading the appraisal, taking into account the characteristics of the proposed route subject to appraisal, its surroundings and the nature and scope of the proposals. Determination of the Zone of Influence is an iterative process and will be regularly reviewed and amended as the project evolves.

2.3 Scoping

Protected species considered within this appraisal are those species/species groups considered likely to be encountered given the geographical location and context of the proposed route. These are discussed within the results section (Section 3.0) of the current report. Where such a species is unlikely to be present along the proposed route a justification for likely absence is provided. Species considered likely absent are not then considered in the potential ecological constraints and mitigation measures section (Section 4.0) of this report.

2.4 Desk Study³

2.4.1 Biological Records Centre

Hampshire Biodiversity Information Centre (HBIC) was consulted on 9th May 2018 for the following data within a two kilometre radius of the pipeline route:

- Records of non-statutory designated sites (Sites of Importance for Nature Conservation (SINCs) within two kilometres of the pipeline route; and
- Records of legally protected and notable species (flora and fauna) within two kilometres of the pipeline route, including Species of Principal Importance for the Conservation of diversity in England notified under Section 41 of the Natural

² The Zone of Influence, as defined by CIEEM, is the area over which ecological features may be subject to significant effects as a result of the proposed project and associated activities.

³ Due to the age of this data an updated desk study has been undertaken in 2020 and details are included in Appendix 9.1.

Environment and Rural Communities (NERC) Act 2006 and as listed in the England Biodiversity List (**Appendix M7**).

2.4.2 Multi-Agency Geographic Information for the Countryside

The Multi-Agency Geographic Information for the Countryside (MAGIC) database (DEFRA, 2019) was reviewed on 24th July 2019 to establish the location of statutory designated sites located within the vicinity of the pipeline route. This included a search for all internationally and nationally designated sites such as Special Protection Areas (SPAs), Special Areas of Conservation (SACs), Wetlands of International Importance (Ramsar sites), Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNRs) and Local Nature Reserves (LNRs) within two kilometres of the pipeline route. Where appropriate, the desk study search area has been extended to take account of any appropriate statutory designated sites which need consideration in terms of potential in-direct effects and which support particularly mobile species, particularly those specifically mentioned in local planning policy. The Impact Risk Zones (IRZ) were also obtained from MAGIC, which are used to help guide and assess planning applications for likely effects on SSSIs.

Sites within two kilometres of the pipeline route where European Protected Species Mitigation (EPSM) licences have been granted were reviewed. This information allows a greater understanding of the potential for European Protected Species to be present in the local area.

2.4.3 Other Sources of Information

Online mapping resources, at an appropriate scale, were used to identify the presence of habitats such as woodland blocks, ponds, watercourses and hedgerows, in the vicinity of the pipeline route. These habitats may offer resources and connectivity between the route and suitable habitat in the local area, which may be exploited by local species populations.

The presence of ponds or other waterbodies within a 500 metre radius of the pipeline route in particular are noted in relation to great crested newt. The 500 metre radius is a standardised search radius to assist in the assessment of the suitability of a site and its surrounding habitat to support this species, based on current Natural England guidance (English Nature, 2001).

Findings of the previous pipeline route extended Phase 1 ecological assessments undertaken in 2007 (ECOSA, 2007) and ARUP in 2009 (ARUP, 2009) are drawn upon where necessary. In addition, bat activity surveys of the Hermitage Stream were undertaken by the Environment Agency (EA) in 2012, the results of these surveys have been discussed where relevant (Environment Agency, 2012).

Where relevant survey work undertaken as part of the reservoir site and detailed other Chapters is referenced.

Portsmouth Water carried out a more detailed otter and water vole survey on sections of stream likely to be affected by the pipeline proposals (Hermitage Stream between SU 71062 06794 and Middle Park Way SU 70535 07980 and the Riders Lane Streams between SU 71009 07507 in the south and SU 71764 08717). The survey was carried out by Trevor Codlin, Portsmouth Water's Biodiversity and Environmental Specialist on 26th June 2019 (see **Appendix M2**).

2.5 Field Survey

The field survey broadly followed standard Phase 1 habitat survey methodology (JNCC, 2010) and comprised/included a search for evidence of, and an assessment of the pipeline route's suitability to support, protected and notable species as recommended by CIEEM (CIEEM, 2017). The field survey covered all accessible areas of the route, including boundary features, as well as contiguous habitat surrounding the proposed route where relevant. Habitats described in Section 3.0, have been mapped (**Map M7**) and photographs provided, where relevant.

2.5.1 Phase 1 Habitat Survey

An assessment was made of all areas of vegetation that intersect with the proposed route based on the standardised Phase 1 habitat survey methodology (JNCC, 2010). This involved identification of broad vegetation types, which were then classified against Phase 1 habitat types, where appropriate. A list of characteristic plant species for each vegetation type was compiled and any invasive species⁴ encountered as an incidental result of the survey recorded.

Given the linear form of the proposed pipeline route it has been divided in to nine sections labelled from A to I in **Map M2**. These sections are used to aid descriptions of habitats in Paragraph 3.3.2 and the protected species baseline in Paragraph 3.4.

2.5.2 Protected and Notable Species Appraisal

A preliminary appraisal of the suitability of the proposed route to support legally protected and notable species was carried out. The following species/species groups were considered during the appraisal.

Bats

The survey conformed to current Bat Conservation Trust guidelines (Collins, 2016). An assessment was made of the suitability of buildings and trees either intersecting or abutting the proposed pipeline route, to support roosting bats based on the presence

⁴ Plant species included on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended). The survey was not specifically aimed at assessing the presence of these species and further specialist advice may need to be sought.

of Potential Roosting Features such as loose or missing roof tiles or lifted lead flashing for buildings and holes, cracks, splits, loose bark and ivy cladding for trees.

An assessment was made of the suitability of the proposed route and the surrounding landscape to support foraging and/or commuting bat species. The assessment of the suitability of the proposed route to support roosting, foraging and commuting bats is based on a four-point scale as detailed in **Appendix M5**.

Otter

The otter appraisal was based on an assessment of the suitability of the habitat present along the proposed route to support otter by reference to habitat type (such as rivers, streams, ditches, wetlands, reed beds, lakes, ponds and reservoirs), proximity of the pipeline route to freshwater and potential important feeding resources (such as fisheries), presence of habitat features which could provide opportunities for resting places and/or holts (such as tunnels, hollows at the base of trees and presence of dense, undisturbed habitat). During the survey attention was paid to the presence of evidence such as spraints, feeding remains, footprints and slides.

Badger

The survey involved an assessment of the suitability of habitats along the proposed route to support badger. Evidence of the species was recorded as an incidental result of the Phase 1 habitat survey and included locating badger setts, paths, and signs of territorial activity such as latrine sites.

Hazel Dormouse

The appraisal for the suitability of habitats along the proposed route to support hazel dormouse was based on an assessment of habitat features that may indicate that the species is present. This includes the presence of key food sources such as hazel and bramble, or plants used as nesting material such as honeysuckle and clematis. Additionally, the species requires a continuum of food supply so that habitat structure, diversity and connectivity to adjacent areas of woodland/scrub are important features in determining the suitability of habitats along the proposed route for hazel dormouse.

Water Vole

The water vole appraisal was based on an assessment of the suitability of the habitat present along the proposed route to support water vole by reference to habitat type (such as rivers, streams, ditches, wetlands, reed beds, lakes, ponds and reservoirs), bank structure and the bank side vegetation. Water voles generally require sloping banks in which to burrow and well-developed bank side vegetation to provide shelter and food. During the survey attention was paid to the presence of burrows, latrines, feeding remains, trails and footprints.

Birds

The appraisal of breeding birds on the pipeline route was based on the suitability of habitat present to support nesting bird communities, the presence of bird species that may potentially nest within the available habitat and evidence of nesting such as old or currently active nests.

The assessment of wintering birds was based on an assessment of the suitability of the habitat to support important wintering bird species and populations. Particular attention was paid to the suitability of habitats to support wintering farmland bird species, waders and wildfowl.

Reptiles

The reptile appraisal was based on an assessment of the suitability of the habitat present along the proposed route to support a population of reptiles. Reptiles particularly favour scrub and rough grassland interfaces and the presence of these is a good indication that reptiles may be present along the route. In addition, reptiles may utilise features such as bare ground for basking, tussocky grassland for shelter and compost heaps and rubble piles for breeding and/or hibernating.

Great Crested Newt

The appraisal of the route to support great crested newt included establishing the presence of suitable aquatic habitats such as ponds, lakes or other waterbodies that intersect or are adjacent to the proposed route, and the presence of suitable terrestrial habitat. Waterbodies that are densely shaded, highly eutrophic or that contain fish are likely to be less suitable for this species. The suitability of intersecting or abutting ponds and terrestrial habitat is considered in relation to the presence of ponds within the wider area, as identified within the desktop study (Paragraph 2.4.3), and their suitability to be used as a network.

Invertebrates

An assessment was made of the suitability of the proposed route to support diverse communities of invertebrates. The assessment was based on the presence of habitat features which may support important invertebrate communities. These features include, for example, an abundance of dead wood, the presence of diverse plant communities, varied woodland structure, sunny woodland edges with a diverse flora, waterbodies and water courses and areas of free draining soil exposures. During the field survey there was no attempt made to identify species present as this is a more specialist area of ecological assessment reserved for targeted surveys.

Other Relevant Species

An assessment was made of the suitability of habitats along the route to support other notable species such as more rarely encountered protected species, Species of

Principal Importance for the Conservation of diversity in England notified under Section 41 of the NERC Act 2006 and as listed in the England Biodiversity List, and Local Biodiversity Action Plan (LBAP) species⁵, specific to the study region.

Invasive Species

During the field survey any incidental records of invasive species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) were recorded. However, it should be considered that the survey was not specifically aimed at assessing the presence of these species and further specialist advice may need to be sought.

2.6 Field Survey Details

The field survey was carried out by Simon Boswell, Principal Ecologist of ECOSA on 16th November 2018. The weather conditions were overcast and mild with approximately 100% cloud cover, an ambient temperature of 14 °C and a light southerly wind.

During the survey, the surveyor was equipped with 10x40 binoculars and a digital camera.

2.7 Limitations

Ecological surveys are limited by factors which affect the presence of plants and animals such as the time of year, migration patterns and behaviour. The field survey has therefore not produced a complete list of plants and animals and in the absence of evidence of any particular species should not be taken as conclusive proof that the species is absent or that it will not occur in the future.

Online mapping resources provide an indication of habitat features present in the wider area, but do not provide a detailed assessment of habitat types.

⁵ LBAPs identify local priorities for biodiversity conservation by translating national targets for species into effective action at the local level and identifying targets for species important to the local area.

3.0 BASELINE ECOLOGICAL CONDITIONS

3.1 Introduction

This section details the results of the Preliminary Ecological Appraisal undertaken for the proposed pipeline route. It assesses the baseline ecological conditions at the time the desktop study was completed and based on the ecological features recorded during the field survey.

3.2 Statutory and Non-statutory Designated Sites

Details of designated sites are provided in the paragraphs below.

3.2.1 Statutory Designated Sites

There are six statutory designated sites of nature conservation interest situated within two kilometres of the proposed route (see **Map M3**). These are:

- Chichester and Langstone Harbours (Ramsar Site) – Located approximately one kilometre south of the pipeline route at its nearest point, and designated for supporting wetland habitats including intertidal mudflats, saltmarsh, sand and shingle spits and sand dunes, as well as important assemblages of waterfowl;
- Chichester and Langstone Harbours (SPA) – Located approximately one kilometre south of the pipeline route at its nearest point, and designated for supporting populations of breeding little tern *Sterna albifrons* and sandwich tern *Sterna sandvicensis*, as well as a large number of overwintering species including dark-bellied brent goose *Branta bernicla bernicla*, grey plover *Pluvialis squatarola* and dunlin *Calidris alpina*;
- Solent Maritime (SAC) – Located approximately one kilometre south of the pipeline route at its nearest point, and designated for supporting a range of wetland habitats including estuaries, spartina swards *Spartinion maritimae* and Atlantic salt meadows *Glauco-Puccinellietalia maritimae*;
- Langstone Harbour (SSSI) – Located approximately one kilometre south of the pipeline route at its nearest point, and designated for supporting internationally important intertidal habitats, invertebrates and large populations of migrant and overwintering waders and wildfowl;
- Farlington Marshes (LNR) – Located approximately 1.8 kilometres south-west of the pipeline route at its nearest point and designated for supporting a flower-rich grazing marsh, internationally important for the bird populations it supports.
- Chichester Harbour (SSSI) – Located approximately two kilometres south-east of the pipeline route at its nearest point and designated for supporting extensive

intertidal mudflats with particular significance for wintering wildfowl and waders and also breeding birds. Ringed plover *Charadrius hiaticula*, black-tailed godwit *Limosa limosa* and curlew *Numenius arquata* are among these.

The Riders Lane Stream flows into the Hermitage Stream south of Purbrook Way, and the Hermitage Stream drains directly into Langstone Harbour. There is therefore a hydrological link between the watercourses within the site and the SPA, SAC, Ramsar site and SSSI associated with Langstone Harbour.

Further details of the statutory designations listed above are provided in **Table M4** (located in **Appendix M3**).

3.2.2 **Non-Statutory Designated Sites**

There are also 69 non-statutory designated sites of nature conservation situated within two kilometres of the pipeline route. The SINC's within or less than 100 metres from the pipeline route comprise:

- Thicket Lawn (SINC) – Intersected by the pipeline route at the northern end, and designated for supporting agriculturally unimproved grassland and the presence of smooth brome *Bromus racemosus* (**Map M4**)
- High Lawn (SINC) – Intersected by the pipeline route at the northern end, and designated for supporting semi-improved grasslands which retain a significant element of unimproved grassland (**Map M4**);
- Great Copse, Havant (SINC) – Situated immediately adjacent and partially within the pipeline route at the northern end and designated for supporting ancient semi-natural woodland (**Map M4**);
- Thicket Bottom Woods and Lake (SINC) – Located approximately 100 metres north-east of the pipeline route at its northern-most end, and designated for supporting ancient semi-natural woodland;

There are also 32 Solent Wader and Brent Goose Strategy Sites within two kilometres of the pipeline route. One of these sites, H10B, was identified in the 2010 Wader and Brent Goose Strategy (King, 2010) located at the southern end of the pipeline route within Bedhampton Sewage Treatment Works. The 2010 Strategy showed this site as being 'uncertain' use for brent goose and no recorded use for waders. During survey work undertaken in 2017 H10B had no recorded usage by waders or brent geese and therefore this site has been removed from the 2018 interim strategy mapping (Solent Wader and Brent Goose Strategy, 2019).

Further information on sites designated for nature conservation are provided in **Appendix M4**.

3.3 Habitats

3.3.1 Desktop Study Results

A small number of plant species records returned from HBIC have been recorded using detailed grid references (100 square metres or less) which intersect or are entirely within the pipeline route (**Table M1**). The criteria for the notable statuses of the species in **Table M1** is provided in **Appendix M6**.

Table M1: HBIC desktop study notable plant records from within or intersecting with the pipeline route

Site Name	Grid Reference	Common Name	Scientific Name	Recorded	Number of Records
Gammon's Hill, SCP	SU714091	Lesser Spearwort	<i>Ranunculus flammula</i>	2009	1
Great Copse, Havant	SU717084	Common valerian	<i>Valeriana officinalis</i>	2000	1
	SU717084	Wood-sorrel	<i>Oxalis acetosella</i>	2000	1
Bedhampton	SU706065	Parsley Water-dropwort	<i>Oenanthe lachenalii</i>	1997	1
St Chads Well Meadow	SU70560645	Crosswort	<i>Cruciata laevipes</i>	1997	1

HBIC invasive non-native species data includes a record of Japanese knotweed *Fallopia japonica* which intersects with the southern edge of the pipeline (see **Map M5**). ARUP recorded Japanese knotweed 'to the south of the pipeline route' it is unclear whether this record was from within or outside of the pipeline route boundary (ARUP, 2009). Himalayan Balsam *Impatiens glandulifera* is present on the Hermitage Stream (Community First, 2018).

HBIC data identified three Priority Habitats within the boundary of the pipeline route. The extent of these habitats is presented in **Map M6**, further details are presented below:

- Lowland mixed deciduous woodland – Eastern edge of Great Copse;
- Wood pasture and parkland – Thicket lawn grassland area; and
- Coastal and Floodplain Grazing Marsh – Grassland either side of Barncroft Way, Havant and within Thicket Lawn SINC.

A single Ancient Woodland Inventory (AWI) site (Thomas, 1994) is present adjacent to the site comprising Great Copse located in Section H. Great Copse is classed as Ancient Semi-Natural Woodland.

3.3.2 Field Survey Results

Habitats that are intersected by the pipeline route, or located adjacent to the proposed route are shown on the Phase 1 Habitat Map (**Map M7**), photographs have been provided as appropriate. The pipeline route has been divided into sections (A-I) which are cross referenced in **Map M7**. Habitats are described in general terms using standard Phase 1 habitat survey terminology.

The main habitats recorded along the pipeline route during the Phase 1 habitat survey are described below. The habitat and associated ecological constraints of each section are also summarised in **Appendix M7**.

Scrub

Scattered scrub is present in a number of locations along the proposed pipeline route. A mown path through dense bramble *Rubus fruticosus* scrub extends east of Fraser Road, running parallel to the Hermitage Stream in a northerly direction (Section D). Other species recorded here include blackthorn *Prunus spinosa*, field maple *Acer campestre* and hawthorn *Crataegus monogyna* (**Figure 1**). Scrub continues to flank the footpath / cycle path north of Barncroft Way along its eastern edge, predominantly consisting of bramble, with blackthorn, ash *Fraxinus excelsior* and elder *Sambucus nigra* (Section D).

Post the public consultation in 2008 a mown track between the SE side of Great Copse and the housing was selected as a preferred route to avoid the mature woodland. However, dense scrub, has grown up extensively since the previous ecological surveys along the mown path east of Great Copse (Section H). This scrub mainly comprises blackthorn, and hazel *Corylus avellana* with associated bramble (**Figure 2**).



Figure 1: Mown path flanked by dense bramble scrub (Section D)



Figure 2: Scrub bounding the mown path east of Great Copse (Section H)

Scattered Trees

A number of scattered trees are present along the proposed pipeline route, some of which are mature. At the southern end of the route, a small number of silver birch *Betula pendula*, Norway maple *Acer platanoides*, field maple and ash, along with other predominantly ornamental species, are scattered along the railway line at the southern end of the route (Sections A and B). The majority of trees are semi-mature (**Figure 3**) although older specimens are also present including a candidate veteran pedunculate oak located at SU 7113 0726 within amenity grassland in Section D (**Figure 4**).



Figure 3: Scattered trees at Bedhampton Springs (Section A)



Figure 4: Candidate veteran pedunculate oak (Section D)

Dense scrub in Section D is interspersed by a number of scattered species including mature oaks *Quercus* species. As the route extends northwards (Section E), planted trees abut residential gardens north of Priorsdean Crescent. Species recorded here include hazel, guelder rose *Viburnum opulus* and willow *Salix* species, while poplar trees *Populus* species and further willows are present along Hermitage Stream and bound the route to the north. Some of these specimens are semi-mature. One semi-mature oak in Section E lies within the buffer zone of the pipeline route, immediately south of Purbrook Way. Further north, a number of mature oaks lie between Hermitage Stream and Botley Drive (Section E, **Figure 4**).



Figure 5: Mature oaks west of Botley Drive (Section G)

Scrub habitat bounding Great Copse in Section H is interspersed with numerous mature ash and oak, while various species of varying maturity are scattered across SCP at the northern end of the route (Section I).

Semi-Improved Neutral Grassland

Part of SCP at the northern end of the route comprises a large expanse of semi-improved neutral grassland covering Thicket Lawn to the west and High Lawn to the east, some of these areas are tussocky (**Figure 6**, Section I). The grassland is interspersed with areas of isolated blackthorn scrub, with willow, oak and hawthorn scattered throughout.

A variety of common meadow species were recorded in the grassland included common bird's-foot trefoil *Lotus corniculatus*, crested dog-tail *Cynosurus cristatus*. Where the grassland slopes towards a stream on High Lawn it becomes damper with clumps of soft rush *Juncus effusus* and hard rush *Juncus inflexus*, especially towards Middle Park Way (**Figure 7**).



Figure 6: Tussocky grassland at Thicket Lawn (Section I)



Figure 7: Grassland at High Lawn (Section I)

Amenity Grassland

The pipeline route passes through various areas of amenity grassland used as Public Open Space which is highly managed and have low species diversity. These include the area managed grassland flanking residential development in Section D (**Figure 8**). Mown pathways bounded by scrub in Sections D and H are relatively well managed but are more tussocky in places (**Figure 9**).

Species recorded mainly comprises coarse grasses such as perennial rye-grass *Lolium perenne* and Yorkshire fog *Holcus lanatus*. Herbaceous species were recorded at low density comprising mainly ragwort *Jacobaea vulgaris*, germander speedwell *Veronica chamaedrys*, creeping cinquefoil *Potentilla reptans*, creeping buttercup *Ranunculus repens*, daisy *Bellis perennis*, selfheal *Prunella vulgaris*, dandelion *Taraxacum*

officinale, yarrow *Achillea millefolium*, spear thistle *Cirsium vulgare*, broad-leaved dock *Rumex obtusifolius* and nettle *Urtica dioica*.



Figure 8: Amenity grassland with poor species diversity flanking footpath in Section D



Figure 9: Tussocky grassland along mown pathway (Section D)

Poor Semi-improved Grassland

An area of poor-semi improved grassland is located in the small triangular field south of Middle Park Way (Section H, **Figure 10**) and between the pumping station at Bedhampton Springs and railway line (Section A, **Figure 11**). The grassland is mainly comprised of coarse grass species such as perennial rye grass, Yorkshire fog and cock's-foot, interspersed with herbaceous species including broad-leaved dock, creeping buttercup, ragwort and selfheal.



Figure 10: Poor semi-improved grassland located in field south of Middle Park Way (Section H)



Figure 11: Poor semi-improved grassland within Bedhampton Springs (Section A)

Running Water

The Hermitage Stream runs parallel to the proposed pipeline within Sections D and E. The stream measures approximately two metres in width and between 0.4 and 0.7 metres in depth. In Section D where the EA have partially restored the stream channel by removing the concrete sides the banks of the stream are dominated by willow, with bramble, common reed *Phragmites australis*, yellow flag iris *Iris pseudacorus* and nettle (**Figure 12**). This habitat has developed from an EA partial river restoration which

removed previously present concrete banks and narrowed the channel. The concrete bed remains in situ with oak weirs / edging (**Figure 12** and **Figure 13**).



Figure 12: Typical section of Hermitage Stream with in Section D



Figure 13: Hermitage Stream within Section D with concrete bed and oak weirs / edging

South-west of Corhampton Crescent, the stream bed and banks are concrete, as such there is very little riparian vegetation (**Figure 14**).

In Section G, where the pipeline crosses the Riders Lane Stream water depth is approximately 0.1 – 0.2 metres. The substrate is gravel, with no aquatic vegetation present. The banks of the stream are dominated by oak and dense willow with false brome *Brachypodium sylvaticum*, pendulous sedge *Carex pendula*, ivy *Hedera helix* and bramble also present (**Figure 15**).

A drainage ditch bounded by a treeline crosses the proposed pipeline within SCP at the northern end of the route (Section I, within tree line shown in **Figure 24**).



Figure 14: Hermitage Stream south of Corhampton Crescent showing concrete stream bed and banks



Figure 15: Riders Lane Stream where the pipeline crosses this watercourse (Section G)

Introduced Shrub

Ornamental planting associated with residential roads and parks is scattered along the route in a number of locations, particularly along Chadswell Meadow and Brunswick Gardens at the southern end of the route (Section B, **Figure 16** and **Figure 17**), as well

as around the grounds of Bidbury Junior School (Section C, **Figure 18**). Species recorded include cherry laurel *Prunus laurocerasus*, yew *Taxus baccata*, *Cotoneaster* species and various other introduced species.



Figure 16: Planted cherry laurel at Brunswick Gardens (Section B)



Figure 17: Ornamental planting bounding Chadswell Meadow (Section B)

Hedgerow

A small section of defunct hedgerow bounds the sports fields at Bidbury Junior School (Section C). Species include ivy, cotoneaster, hawthorn, field maple and holly *Ilex aquifolium* (**Figure 18**). At the northern end of the route, a species-poor intact hedgerow, predominantly comprising hawthorn, bounds Middle Park Way and High Lawn Way enclosing a small field (**Figure 19**) (Section H). This hedgerow connects with Great Copse at its southern and western end.



Figure 18: Defunct hedgerow bounding Bidbury Junior School grounds (Section C)



Figure 19: Species-poor intact hedgerow flanking Middle Park Way (Section H)

Hardstanding

Various sections of the proposed route follow residential roads of tarmac hardstanding. These include Chadswell Meadow and Brunswick Gardens (Section B, **Figure 16** and **Figure 17**), Fraser Road (Section C), Highclere Avenue (Section F, **Figure 22**) as well as Ellisfield Road and High Lawn Way (between Sections G and H, **Figure 23**). Much of the route also follows a gravel and tarmac footpath / cycle path (**Figure 21**).



Figure 20: Community Centre car park at the southern end of the route (Section B)



Figure 21: Tarmac footpath / cycle path Typical of Sections D and E



Figure 22: Facing north-east along Highclere Avenue (Section F)



Figure 23: Facing east along High Lawn Way (Section H)

Tree Line

Three tree lines are present with Section I in association with Thicket Lawn and High Lawn. The first is located situated on a steep slope on the northern side of Middle Park Way and comprises a sparse broadleaved canopy with pedunculate oak and ash. Limited understorey is present which mainly comprises patchy bramble.

The second tree line includes an associated drainage ditch, and separates High Lawn from Thicket Lawn. The canopy contains willow and pedunculate oak and a dense understorey of bramble is present (**Figure 24**).

The third tree line is also located in Section I and separates Thicket Lawn from the proposed reservoir site. Species present in this feature included pedunculate oak and willows with an understorey mainly comprises of blackthorn and bramble (**Figure 25**).



Figure 24: Section I, Tree line separating High Lawn from Thicket Lawn (Section I)



Figure 25: Section I, Tree line separating Thicket Lawn from the proposed reservoir site (section I)

Invasive Species

Non-native invasive species were not recorded as part of the ECOSA 2018 survey, although given the winter timing of the survey identification of invasive plants would be less likely. Himalayan balsam is known to be present within the Hermitage Stream (Community First, 2018) and has been more recently recorded by Portsmouth Water in June 2019 (per comms.)

Other Habitats

Within the pipeline route there are a number of other small or man-made habitats/features comprising tall ruderal vegetation, a railway line, paths and gardens.

Summary

The features of greatest ecological value are the Hermitage Stream corridor, where semi-improved neutral grassland and scattered trees occur. The proximity of the proposed pipeline route to ancient woodland associated with Great Copse is also of particular importance. Habitats of relatively less intrinsic value are the amenity grassland, poor semi-improved grassland, scrub, introduced shrub and hardstanding.

The Coastal and Floodplain Grazing Marsh Priority Habitat identified either side of Bancroft Way in Section D mainly comprised poor semi-improved grassland and associated scrub used for amenity purposes. Coastal and Floodplain Grazing Marsh relies on '*periodic inundation and high water levels*' (Natural England, 2015). Given the proximity of the Hermitage Stream to residential properties and the stream modifications to prevent flooding in this area the habitat either side of Bancroft Way is not considered to support Coastal and Floodplain Grazing Marsh Priority Habitat.

3.4 Notable and Legally Protected Species

3.4.1 Bats

Desktop Study Results

A review of MAGIC revealed the presence of one EPSM licence within two kilometres of the pipeline route. The licence was granted in 2014 and covers the destruction of a resting place of common pipistrelle *Pipistrellus pipistrellus* located approximately 290 metres south-east of the pipeline route at its southern end, in a residential area.

Consultation with HBIC produced records of 13 species of bat within the desk study area, common pipistrelle, soprano pipistrelle *Pipistrellus pygmaeus*, serotine *Eptesicus serotinus*, noctule *Nyctalus noctula*, Leisler's bat *Nyctalus leisleri*, brown long-eared bat *Plecotus auritus*, Nathusius' pipistrelle *Pipistrellus nathusii*, Natterer's bat *Myotis nattereri*, whiskered bat *Myotis mystacinus*, whiskered/Brandt's bat *Myotis mystacinus/brandtii*, Daubenton's bat *Myotis daubentonii*, Brandt's bat *Myotis brandtii* and Bechstein's bat *Myotis bechsteinii*.

Common pipistrelle, soprano pipistrelle and *Myotis* bat species⁶ have also been recorded within or in close proximity to the pipeline route during bat detector surveys along the Hermitage Stream undertaken by the Environment Agency (Environment Agency, 2012) (see **Map M5**).

Hampshire Bat Group data included records of three bat roosts within close proximity to the pipeline route, all were from residential properties (**Table M2**).

Table M2: Bat roost desktop study data within close proximity to pipeline route

Species	Location	Roost Type	Year Recorded	Approximate Distance Direction Pipeline route and from
Pipistrelle species	SU716082	Hibernation	2002	25 metres, south
Soprano pipistrelle	SU713073	Day	2011	125 metres, east
Serotine	SU713073	Maternity	2011	125 metres, east

The EA survey undertaken along the Hermitage Stream in 2012 (Environment Agency, 2012) covered a small section of watercourse within the pipeline route in the stretches around Bancroft Way. Surveys were undertaken over three nights comprising a

⁶ There are seven species of *Myotis* bats in Britain. *Myotis* bats are very difficult to identify specifically, this can generally only be done by examination of physical features and Phylogenetic Analysis Identification of bat droppings. Many of these bats are common and will utilise buildings for roosting often occupying small and inaccessible voids.

combination of evening and dawn transects on 29th August 2012, 31st August 2012 and 5th September 2012. A generally low level of bat activity was recorded during the EA survey and only three species were recorded foraging within the pipeline route comprising; common pipistrelle, soprano pipistrelle and *Myotis* bat species. The EA report indicated that the *Myotis* bat species were likely to be Daubenton's bat. This assessment was based on the bat's behaviour and analysis of echolocation calls.

Tree Assessment

In general, the proposed pipeline route is considered to offer very limited roosting habitat for bats, with a small number of trees containing suitable roosting features. In particular, a number of mature oaks which lie between the Hermitage Stream and Botley Drive are assessed as having high suitability for roosting bats. These contain features such as callous rolls, holes and loose bark (**Figure 26**). An additional oak south of Hermitage stream in Section D is assessed as having high suitability for roosting bats. This tree contains various features including callous rolls, holes and limb scars (**Figure 27**). The location of high suitability bat roost trees is identified on **Map M8**.



Figure 26: Mature oaks with high suitability for roosting bats west of Botley Drive (Section E)



Figure 27: Oak with high suitability for roosting bats (Section D)

The Ancient Semi Natural Woodland known as Great Copse located adjacent to the route contains many mature specimens likely to support features suitable for roosting bats. Due to the large number of trees within the woodland, these trees were not assessed individually for their suitability for roosting bats.

Foraging and Commuting Habitat

Parts of the pipeline route provide highly suitable foraging and commuting habitat for bats. Where the route follows the Hermitage stream, corridors of hedgerow and scrub are present and the Hermitage Stream is known to support a small number of bat

species (Environment Agency, 2012). Further north Great Copse and the tree lines within SCP habitat are suitable for foraging and commuting bats. Therefore, habitat bounding the route is likely to form part of a wider commuting network for bats in the local area, while Great Copse itself provides highly suitable foraging habitat for the species group.

3.4.2 Otter

Desktop Study Results

Consultation with HBIC produced no records of otter *Lutra lutra* within the desktop study area, however, this does not confirm the absence of the species in the local area.

The nearest population is likely to be those otter present in Langstone Harbour approximately one kilometre south of the site. Langstone Harbour is linked to the site by the Hermitage Stream.

During June 2019 Portsmouth Water undertook a detailed otter survey along stretches of the Hermitage Stream between SU 71062 06794 and Middle Park Way SU 70535 07980 and the Riders Lane Streams between SU 71009 07507 in the south and SU 71764 08717 in the north, to search for any evidence of otter (**Appendix M2**). No evidence of otter was recorded.

Field Survey Results

No evidence of otter was recorded during the survey. However, the Hermitage Stream which runs parallel to the proposed pipeline for part of the route does offer some suitability for otter where the concrete edges have been removed. Given the short sections of suitable habitat it is possible that the species is transient within this watercourse. Where the pipeline crosses the Riders Lane Stream an investigation of the bankside did not reveal evidence of otter, and this watercourse is narrow and shaded resulting in suboptimal habitat for otter.

3.4.3 Badger

Desktop Study Results

Consultation with HBIC produced two records of badger *Meles meles* within the desktop study area. Both are from 2006 and are located at Southleigh Road, Havant; approximately two kilometres east of the route at its southern end.

During 2009 ARUP recorded evidence of foraging badger within Great Copse indicating that the species is resident in this area (ARUP, 2009). Surveys undertaken by ECOSA on the proposed reservoir site and in SCP have recorded both main and subsidiary badger setts (Chapter D).

Field Survey Results

No signs or direct evidence of badger activity (including setts) were recorded during the survey. The habitat present along the pipeline route is suitable for badger in the form of open grassland, scrub and woodland, particularly at the northern end of the route. Given the habitats present along the pipeline route, it is considered likely that badger would use the area for foraging and commuting and possibly sett construction.

3.4.4 Hazel Dormouse

Desktop Study Results

A review of MAGIC revealed the presence of three EPSM licences in respect of hazel dormouse *Muscardinus avellanarius* within two kilometres of the proposed route. The first was granted in 2014 and covers the destruction of habitat located approximately one kilometre west of the route just north of Purbrook Way. The second and third were granted in 2014 and 2016 respectively and both cover the destruction of habitat located approximately 1.7 kilometres west of the pipeline route, north of Bushy Lease woodland.

Consultation with HBIC produced numerous records of hazel dormouse within the desk study area. The most recent record is from 2015, associated with SCP at the northern end of the route.

Survey work undertaken in 2013 by ECOSA recorded hazel dormouse within the proposed reservoir site, SCP and Forestry England's Havant Thicket woodland to the north of the proposed pipeline route (see Chapter H).

Field Survey Results

No evidence of hazel dormouse was recorded during the survey. Sections A-G of the pipeline route mainly comprise habitat with limited suitability for hazel dormouse including hardstanding and improved grassland. There are small areas of scrub in Section A-G but these are mostly isolated and considered unsuitable to support hazel dormouse. Within Section H and I there is suitable habitat for hazel dormouse which is either connected to more extensive suitable habitat (Great Copse) or woodland where the species is known to be present (SCP).

The scrub, hedgerow and treeline habitats within Section H and I are considered to be suitable for hazel dormouse. The remainder of the pipeline route (Sections A-G) are unlikely to support hazel dormouse.

3.4.5 Water Vole

Desktop Study Results

Consultation with HBIC produced records for water vole *Arvicola amphibius* within the desk study area. The closest records were associated with Langbrook Stream located approximately one kilometre south-east of the proposed route just north of the A27, with the most recent record from 2017. There are no records of water vole associated with Hermitage Stream or Riders Lane Stream, however this does not confirm the absence of the species within the watercourse.

During June 2019 Portsmouth Water undertook a detailed otter survey along stretches of the Hermitage Stream between SU 71062 06794 and Middle Park Way SU 70535 07980 and the Riders Lane Streams between SU 71009 07507 in the south and SU 71764 08717 in the north, to search for any evidence of otter (**Appendix M2**). No evidence of water vole was recorded.

Field Survey Results

No evidence of water vole was recorded during the survey. However, Hermitage Stream which runs parallel to the proposed pipeline does offer suitability for water vole, and it is possible that the species is present within this stream where the concrete banks have been removed.

3.4.6 Birds

Desktop Study Results

Consultation with HBIC produced records of 137 bird species within the desk study area. Based on the habitat present the following notable species are most likely to breed along the pipeline route: the red listed⁷ grey wagtail *Motacilla cinerea*, song thrush *Turdus philomelos* and mistle thrush *Turdus viscivorus*, and the amber listed⁸ bullfinch *Pyrrhula pyrrhula*. No detailed bird records (100 metres squared resolution or less) from the HBIC data search intersected with the pipeline route.

HBIC also returned records of sites that are designated for supporting brent goose and species of waders by the Solent Waders and Brent Goose Strategy (Whitfield, 2017) Strategy site 'H10B' located to the south of the route in association with Bedhampton

⁷ The UK's birds are split in to three categories of conservation importance - red, amber and green. Red is the highest conservation priority, with species needing urgent action. Amber is the next most critical group, followed by green. Red List criteria include species which are: globally threatened; have been subject to historical population decline in UK during 1800–1995; are in severe (at least 50%) decline in UK breeding population over last 25 years, or longer-term period, or; subject to severe (at least 50%) contraction of UK breeding range over last 25 years, or longer-term period.
⁸ Amber list criteria include species which are: in unfavourable conservation status in Europe; subject to historical population decline during 1800–1995, but recovering; subject to moderate (25–49%) decline in UK breeding population or contraction of UK breeding range over last 25 years, or the longer-term period; subject to moderate (25–49%) decline in UK non-breeding population over last 25 years, or the longer-term period; rare breeders (1–300 breeding pairs in UK); rare non-breeders (less than 900 individuals), or; internationally important species with at least 20% of European breeding or non-breeding population in UK.

Sewage Treatment Works. The 2010 Solent Wader and Brent Goose Strategy (King, 2010) showed this site as being 'uncertain' use for brent goose and no recorded use for waders. During survey work undertaken in 2017 H10B had no recorded usage by waders or brent geese and therefore this site has been removed from the 2018 interim strategy mapping (Solent Wader and Brent Goose Strategy, 2019).

Field Survey Results

The following species were recorded along the pipeline route during the survey: green woodpecker *Picus viridis*, long-tailed tit *Aegithalos caudatus*, goldcrest *Regulus regulus*, dunnock *Prunella modularis*, chaffinch *Fringilla coelebs*, great tit *Parus major*, blue tit *Cyanistes caeruleus*, robin *Erithacus rubecula*, the red listed house sparrow, the red listed starling *Sturnus vulgaris*, the red listed song thrush, moorhen *Gallinula Chloropus* and little egret *Egretta garzetta*.

The habitat present along the pipeline route provides suitability for a range of bird species both for nesting and foraging. Suitable nesting habitat is present in the form of scattered trees, woodland associated with Great Copse, dense scrub and hedgerow. The grassland in SCP at the northern end of the site is suitable for skylark, a ground nesting species.

The pipeline route comprises habitats unsuitable for wintering brent geese and waders such as scrub and hardstanding, however there are also areas of grassland which are superficially suitable for these species. However, the grassland habitats are narrow and enclosed by housing or scrub/woodland habitats significantly reducing the suitability of these areas for brent geese and waders. As a result, the site is considered unsuitable for supporting brent geese and waders, including the former Wader and Brent Goose Strategy site H10B.

3.4.7 Reptiles

Desktop Study Results

Consultation with HBIC produced records of slow-worm *Anguis fragilis*, common lizard *Zootoca vivipara*, grass snake *Natrix helvetica* and adder *Vipera berus*.

A large number of slow-worm records were produced from within the desk study area, many of which are located along the A3 motorway approximately 1.5 kilometres west. Similarly, many of the records for common lizard, grass snake and adder are associated with this location. There are also records for all four species from the reservoir site (see Chapter J).

Field Survey Results

The areas along the route comprising semi-improved grassland and scrub along mown pathways, woodland edges associated with Great Copse and tussocky grassland within SCP at the northern end of the route provide the necessary habitat required by common species of reptiles for basking, shelter and foraging. In places where not mown as amenity grassland, the proposed route supports habitat which is considered to have suitability for widespread reptiles.

3.4.8 Great Crested Newt

Desktop Study Results

A review of MAGIC revealed the presence of one EPSM licence in respect of great crested newt *Triturus cristatus* within two kilometres of the pipeline route. The licence was granted in 2015 and covers the destruction of terrestrial habitat located approximately 1.9 kilometres north-east of the route at its northern end.

Consultation with HBIC produced one record for great crested newt within the desk study area. This record is from 2013 and is located at the Former Brickworks in Rowland Castle, approximately 1.9 kilometres north-east of the route at its northern end; in the same location as the EPSM licence described above. Survey work undertaken by ECOSA in 2018 recorded a low population of great crested newt from three waterbodies in Havant Thicket woodland approximately 1.4 kilometres north-east of the pipeline route. No other populations of great crested newt were recorded within 500 metres of the reservoir site (Chapter K).

Field Survey Results

Habitats present along the route provide some suitability for the species in its terrestrial phase in the form of scrub, tussocky grassland and woodland. Although, due to the proximity of the Hermitage Stream, great crested newt may be deterred from entering the pipeline route where it lies to the east or west of existing off-site waterbodies (see **Table M3**).

Investigation of aerial photography and OS mapping revealed the presence of various standing waterbodies within 500 metres of the pipeline route (**Table M3**).

Table M3: Waterbodies located within 500 metres of the pipeline route

Location	Description	Approximate Location in Relation to Pipeline Route	Suitability
SU 70578 07466	Two small ponds in the grounds of Bancroft Primary School	320 metres, west	Unknown

Location	Description	Approximate Location in Relation to Pipeline Route	Suitability
SU 71341 07257	Outdoor swimming pool associated with Trosnants Federation of Schools	140 metres, east	Unsuitable – swimming pool
SU 70245 06338	Large pond within a system of running watercourses	320 metres, south-west	Unknown
SU 70925 06128	Pond within close proximity to industrial buildings and roundabout along Brockhampton Road.	430 metres, south-east	Unknown
SU 71134 08323	A small pond in the grounds of Riders Infant School	480 metres, west	Unknown
SU 71828 09153	SCP Lake	330 metres, east	Unsuitable – fishing lake

All but one of these waterbodies are 250 metres or more from the pipeline route, separated by significant barriers to great crested newt movements, such as large expanses of housing and roads. The single waterbody located within 250 metres comprises an open-air swimming pool which is unsuitable for the species. As a result of these factors the pipeline route is considered unsuitable for great crested newt and the species is not considered further in this Chapter.

3.4.9 Invertebrates

Desktop Study Results

Consultation with HBIC produced numerous records of invertebrate species within the desk study area, predominantly comprising *Lepidoptera* species (butterflies and moths). Most notable are the purple emperor butterfly *Apatura iris*, the small heath butterfly *Coenonympha pamphilus*, the dingy skipper butterfly *Erynnis tages*, the white admiral butterfly *Limenitis Camilla* and the chalk hill blue butterfly *Polyommatus coridon*. Records were also produced of stag beetle *Lucanus cervus* with the closest record located approximately 1.5 kilometres east of the route at its southern end.

Field Survey Results

Great Copse, located adjacent to the route, contains a large amount of dead wood which is considered to offer suitable habitat for a range of invertebrate species and assemblages, including stag beetle, as returned by the desk study data search. The majority of habitat present along the route, however, only provides suitability for

common and widespread invertebrate species, and rare or notable species are unlikely to be present.

3.4.10 Other Protected Species

Desktop Study Results

A number of records of the Species of Principal Importance⁹ European hedgehog *Erinaceus europaeus*, were returned from within the desktop study area.

Field Survey Results

The site has suitability for supporting European hedgehog in the form of grassland, woodland and scrub. The site is well connected to similar habitats in the surrounds and it is assumed that the species is present within the Pipeline Route.

The site also contains suitable habitat for common toad, a Species of Principal Importance, in the form of tussocky grassland within the northern fields and wetter habitats along the Hermitage Stream.

3.5 Summary of Key Ecological Features

The ecological constraints currently identified as a result of the Preliminary Ecological Appraisal are shown on **Map M8**. In the absence of further, more detailed surveys, the following features are those with greatest ecological value that lie within the pipeline route's Zone of Influence are listed below:

- There are six statutory designated sites within two kilometres of the pipeline route including Chichester and Langstone Harbours (Ramsar Site and SPA), Solent Maritime (SAC), Langstone Harbour (SSSI), Chichester Harbour (SSSI) and Farlington Marshes (LNR);
- There are three SINC's within the boundary of the pipeline route comprising two designated for their grassland; Thicket Lawn SINC, High Lawn SINC and one designated for woodland; Great Copse SINC.
- Habitats of particular ecological value comprise semi-improved neutral grassland, the Hermitage Stream corridor and scattered trees.

The habitats located along or adjacent to the pipeline route provides suitability for roosting, foraging and commuting bats, otter, badger, hazel dormouse, water vole, breeding and wintering birds, reptiles, European hedgehog, common toad and some species of notable invertebrates such as stag beetle.

⁹ As listed on NERC Act 2006

4.0 POTENTIAL ECOLOGICAL CONSTRAINTS AND RECOMMENDATIONS

4.1 Introduction

This section identifies potential constraints to the proposed development scheme based on the key ecological features as identified in Section 3.0 and summarised in Paragraph 3.5. Recommendations are included for mitigation and compensation based on the identified ecological constraints, and opportunities for enhancement are discussed. An ecological constraints plan has been prepared that should be consulted when reading Section 4.0 (see **Map M8**).

As outlined in Paragraph 1.4 the route has been selected to minimise the environmental impact by avoiding features of ecological interest, this process has significantly reduced the constraints associated with the scheme.

4.2 Further Survey

Further ecological survey work will need to be undertaken prior to commencement of construction to assess the potential effects of the proposals on protected species. At this stage, it is therefore not possible to confirm that the proposals for the pipeline route meet the requirements of NPPF and Local Planning Policy (refer to Chapter A). The full detail of mitigation measures cannot be established without the results of more detailed survey work. These survey recommendations are based on the following assumptions:

- The pipeline will be routed along the eastern edge of Great Copse using an open trench rather than trenchless drilling; and
- Where the pipeline route crosses the Hermitage Stream and Riders Lane Stream it will be installed using an open trench rather than trenchless drilling.

Should the scheme design allow for trenchless drilling in these locations then the scope of further survey works is likely to be reduced.

The results of the additional survey work will be incorporated into an Ecological Impact Assessment (EclA) report, which will provide an updated assessment of the ecological effects of the proposal and detailed mitigation, compensation and enhancement recommendations in light of the survey findings. The detailed survey work recommended for the pipeline route are:

- Ground Level Tree Assessment of any trees proposed for removal (when this is known);

- A detailed water vole and otter survey where the spillways impact the Hermitage Stream and other stream crossings if directional drilling cannot be undertaken (see **Appendix M2**); and
- If trenching through the eastern edge of Great Copse and connected hedgerow cannot be avoided then it is recommended that a hazel dormouse survey is undertaken to assess the presence / absence of this species.

Further details of the survey requirements are provided in the relevant sections below. Given the five year lead in time for construction of the pipeline and associated detailed planning the further survey work is recommended to be undertaken when the route and design proposals have been developed, which is likely to be after planning permission has been obtained.

4.3 Designated Sites

4.3.1 Potential Constraints

In exceptional circumstances it may be necessary to undertake an emergency draw down of the reservoir. In this event, additional water flow scouring action along the Hermitage Stream may increase sediment input into Langstone Harbour. In the absence of mitigation there is potential for this to have a detrimental impact on Chichester and Langstone Harbour SPA and Ramsar site or Solent Maritime SAC, either alone or in combination with other plans or projects. Periodic testing of the valves used during emergency drawdown will be required but this will be at a much lower flow rate.

Natura 2000 reporting for Chichester and Langstone Harbours SPA and Solent Maritime SAC includes '*changes in abiotic¹⁰ conditions*' as a threat to the integrity of these sites. Changes in abiotic conditions includes increased nitrate input into these systems. Recent guidance published by Natural England (Natural England, 2019) has provided additional information on methods to quantify and mitigate for additional nitrate input into the Solent SPAs / SACs as a result of developments. A water quality report (Atkins, 2019) prepared to assess the reservoir proposals has shown that the scheme will deliver a reduction in nitrate discharge in the Solent, delivering an environmental benefit to the European sites associated with Langstone Harbour.

The site does not provide suitable habitat for qualifying bird species supported by Chichester and Langstone Harbours SPA and Ramsar site. Therefore, the construction of the pipeline route will not indirectly impact bird species which are part of the SPA/Ramsar site citation.

¹⁰ physical rather than biological; not derived from living organisms (Dictionary.com, 2019)

There will be a direct impact on non-statutory sites as a result of the proposals resulting in the temporary disturbance to small sections of Thicket Lawn SINC, Great Copse SINC and High Lawn SINC. In the long-term there will no loss of areas designated as SINC.

During construction there is potential for damage from heavy machinery via accidental incursions into additional habitat along the pipeline route designated as SINC. Habitats in these areas comprise either broadleaved woodland or grassland.

4.3.2 Potential Mitigation and Compensation Measures

To mitigate for the potential for a temporary increase in erosion of the stream bed and increased sediment input into Langstone Harbour during an emergency drawdown event a flow reduction chamber(s) will be installed along the pipeline route prior to discharge into the Hermitage Stream. These will facilitate energy reduction and prevent additional sediment discharge into Langstone Harbour.

A Construction Environment Management Plan (CEMP), agreed with the LPA and Environment Agency (EA), will be prepared which details methods to prevent pollution events and accidental incursions into habitat around the pipeline route construction zone associated with the Hermitage Stream and the on-site or adjacent SINC.

Further details of mitigation for any identified likely significant effects on European / internationally designated sites will be included in the shadow Habitat Regulations Assessment.

The temporary impacts associated with the SINC along the pipeline route will be mitigated by avoidance of accidental incursions into areas outside of the construction zone through the use of protection fencing. Post construction the grassland and woodland habitat affected by construction will be re-instated. The methods for re-instatement will be details in an Ecological Mitigation and Management Plan (EMMP) for the pipeline route.

4.4 Habitats

4.4.1 Potential Constraints

Most potential habitat constraints have been avoided during the design process by routing the pipeline along roads, or through areas of low value habitat. However, there are a small number of residual constraints along the route.

The features of greatest ecological value are the restored sections of The Hermitage Stream, semi-improved neutral grassland and scattered trees. The proximity of the proposed pipeline route to ancient woodland associated with Great Copse is also of

particular importance. Habitats of relatively less intrinsic value are the low quality grassland, scrub, introduced shrub and hardstanding which occur along most of the route.

Where the spillways are proposed either side of Purbrook Way this will result in permanent impacts to the bankside structure, and in the absence of mitigation may detrimentally impact the associated riparian habitats. These areas should be carefully designed to minimise impacts and maximise biodiversity benefits. In association with the spillways there will be underground structure(s) designed to reduce the potential energy of flowing water during emergency drawdown events. To reduce the impact of these structures to a negligible level they will be constructed in amenity grassland and set back from the Hermitage Stream.

Himalayan Balsam is known to be present in the Hermitage Stream and may also be present in the Riders Lane Stream (Community First, 2018). Previous surveys have recorded Japanese knotweed, but the species has not been recorded recently. Construction works, particularly in relation to the streams has the potential to spread Himalayan balsam. Japanese knotweed and Himalayan Balsam are listed under Schedule 9 of the Wildlife and Countryside Act 1981 which makes it illegal to plant or otherwise cause the species to grow in the wild. Refer to **Appendix M7** for details.

4.4.2 Potential Mitigation and Compensation Measures

Where possible construction works in close proximity to the ancient woodland associated with Great Copse should be avoided. A route option has been shown around the edge of the copse to minimise the impact on the woodland, or along High Lawn Way south and east of Great Copse. It may be possible to identify trenchless technology for the installation of the pipeline in this area. If this is not possible then this assessment should be updated to include additional mitigation measures.

An engineering solution should be sought to allow trenchless drilling where the pipeline crosses the Hermitage Stream and Riders Lane Stream. If trenchless drilling is not possible then this assessment should be updated to include additional mitigation measures to reduce impacts on the watercourse. If open cut trenching of streams is necessary there are potential benefits associated with the works particularly in relation to the removal of concrete river beds and replacement with a substrate with higher suitability for biological diversity.

Temporary loss of semi-natural habitats along the route should be off-set by the re-instatement of replacement habitats through native species planting. Species utilised should comprise species present in the local area.

The scattered trees, especially more mature specimens should be avoided. Where these specimens cannot be avoided replacement planting should be designed to offset the impacts. In order to adequately protect the retained vegetation all retained hedgerows and mature trees will be subject to root protection fencing in line with current best practice guidelines BS 5837:2012.

Where new spillways enter the Hermitage Stream these should be designed with the capacity for the banksides to colonise with native emergent vegetation. If an open cut technique is used to cross the on-site streams suitable seeding and planting should be included to mitigate for the associated impacts. The design of construction and restoration associated with the stream crossings and spillways should be agreed with an ecologist.

Where works are undertaken in association with streams a pre-construction checks should be undertaken and Himalayan balsam plants 'pulled' from within five metres of the construction zone. A detailed mitigation strategy to prevent further spread of this species should be included within the CEMP.

4.4.3 Enhancement Opportunities

Where the pipeline route impacts with poor-semi improved grassland areas with limited ecological value there is potential to enhance these areas through management to encourage a more diverse sward to develop, for instance by using cut and collect methods and plug planting native species within the grassland.

4.5 Bats

4.5.1 Potential Constraints

The proposals have the potential for direct impacts on bats through the loss of suitable tree roosting habitat dependent on the final route identified and method of construction. There is also the potential for a minor temporary loss in foraging and commuting habitat and temporary fragmentation of existing habitats, including the severance of treelines which bats are likely to forage and / or commute along within SCP.

In England, bats and their habitat are fully protected under the Wildlife and Countryside Act 1981 (as amended) through inclusion in Schedule 5. In addition, all bat species are protected under the Conservation of Habitats and Species Regulations 2017 (as amended). Refer to **Appendix M7** for details.

4.5.2 Further Survey

Ground Level Tree Assessments (GLTA) in respect of bats will need to be undertaken once the route and method for pipeline construction are known and any impacts on mature trees with roost potential are known. Dependent on the findings of the GLTA

further climbing inspections or emergence/re-entry surveys may be required. This survey work should be undertaken at the earliest opportunity in advance of construction. Further impact assessment of potential impacts on tree roosts can then be undertaken if necessary.

Given the temporary nature of works it is not considered necessary to undertake transect / activity surveys for bats.

4.5.3 Potential Mitigation and Compensation Measures

Where unavoidable losses of bat roosts occur a Natural England European Protected Species Mitigation (EPSM) license will be required in order to allow the works to proceed without contravening current legislation. If any trees with bat roosts are identified for removal, the loss of roosts will need to be compensated through the provision of replacement roosting features within retained trees.

In order to avoid any direct harm during the construction phase any trees supporting roosts will need to be subject to a destructive search under the supervision of a suitably qualified ecologist. Any bats encountered as part of this work will be relocated to previously established replacement roosting features.

As part of the CEMP if any lighting is required during construction this will be detailed to ensure that there is no light spill from construction activities on the retained areas of suitable foraging and commuting habitat such as woodlands and hedgerows.

The pipeline route will not require post-construction lighting and therefore long-term impacts on foraging or roosting bats through additional light spill will not occur.

Recommendations have already been made to avoid the habitats of greater ecological importance such as woodland which would provide continued foraging, commuting and roosting habitat for bats. Where any unavoidable losses in scattered trees replacement planting should occur as soon as possible after the pipeline has been installed. Where the pipeline route will sever the tree lines in SCP, this temporary loss of commuting and / or foraging habitat will need to be compensated through the provision of replacement habitat. The construction in this area should be designed to create the narrowest area of tree removal possible.

4.5.4 Enhancement Opportunities

As an enhancement measure a variety of new bat roosting opportunities could be created throughout the site in the form of new bat boxes.

4.6 Otter

4.6.1 Potential Constraints

Where the pipeline route crosses the Hermitage Stream and Riders Lane Stream there is potential for temporary impacts on otter if the pipeline route is trenched in this section. Where the spillways are installed there may be long-term loss of bankside habitat for otter and, if present at the time of works, direct impact on otter holts. Survey work undertaken by Portsmouth Water in 2019 did not record evidence of otter during a detailed survey of the area where the pipeline route crosses the stream corridors (see **Appendix M2**).

In England, otter and their habitat are fully protected under the Wildlife and Countryside Act 1981 through inclusion in Schedule 5. In addition, this species is protected under the Conservation of Habitats and Species Regulations 2017. Refer to **Appendix M7** for details.

4.6.2 Potential Mitigation and Compensation Measures

To avoid temporary impacts where the pipeline crosses the Hermitage Stream and Riders Lane Stream trenchless techniques should be considered. Mitigation for the loss of bankside habitat is presented in Paragraph 4.4.2, which includes design that allows these areas to colonise with native vegetation with suitability for commuting / foraging otter.

An updating otter survey should be undertaken by a suitably qualified ecologist in advance of construction works commencing in the spillway or Hermitage Stream / Riders Lane Stream crossing points.

4.7 Badger

4.7.1 Potential Constraints

The construction works associated with the pipeline will result in a minor temporary loss of suitable foraging habitat. Whilst unlikely it is possible that a badger sett may become active along the pipeline route in the interim between the 2018 survey and construction commencing. Badgers may also become trapped in excavations if left uncovered overnight.

Badger are protected from killing and injury, and their setts protected from damage and interference, under the Protection of Badgers Act 1992. Refer to **Appendix M7** for details.

4.7.2 Potential Mitigation and Compensation Measures

In the unlikely event that a badger becomes trapped in excavations during construction works, a timber ramp should be inserted to allow the animal to escape of its own accord, or the end of the trench should be battered.

An updating check for evidence of resident badger should be undertaken by an ecologist prior to construction works beginning. If badger setts are located that will be impacted by the scheme then further ecological advice should be provided.

4.8 Hazel Dormouse

4.8.1 Potential Constraints

Hazel dormouse may be present in Great Copse and impacts on this woodland contiguous scrub habitats may affect hazel dormouse. There are five sections of treeline and hedgerow in the north of the pipeline route which have the potential for hazel dormouse that will be temporarily severed resulting in a loss of habitat connectivity. The two tree lines within SCP are contiguous with areas where hazel dormouse has been recorded previously and therefore it is assumed that the species is present within these features. Hazel dormouse is considered to be absent from the remainder of the pipeline route.

In England, hazel dormouse and their habitat are fully protected under the Wildlife and Countryside Act 1981 through inclusion in Schedule 5. In addition, this species is protected under the Conservation of Habitats and Species Regulations 2017. Refer to **Appendix M7** for details.

4.8.2 Further Survey

If trenchless techniques in the Great Copse area or hedgerows linked to this woodland is not viable it will be necessary to understand whether the scheme will impact on hazel dormouse in this area. This would be achieved by undertaking a hazel dormouse survey.

4.8.3 Potential Mitigation and Compensation Measures

Where possible the scheme should avoid direct impacts on the area adjacent to Great Copse through the use of trenchless techniques. If this isn't possible and hazel dormouse is confirmed as present within Great Copse it may be necessary to mitigate and / or compensate for the associated impacts.

Where the pipeline route will sever the tree lines in SCP, this temporary loss of suitable hazel dormouse habitat will need to be compensated through the provision of replacement habitat. The construction in this area should be designed to create the narrowest area of tree removal possible. Timings for these works will be guided by the

build programme, however small-scale clearance in relation to hazel dormouse is best undertaken in the autumn period (September to October). Clearance of suitable hazel dormouse habitat in SCP should be covered under the hazel dormouse EPSM licence prepared for the main HTWSR site (see Chapter H).

4.8.4 Enhancement Opportunities

As an enhancement opportunity hazel dormouse boxes could be installed within suitable retained habitat, especially along the tree lines/hedgerows in the north of the pipeline route.

4.9 Water Vole

4.9.1 Potential Constraints

The majority of pipeline route will be set back >5m from stream bank, so will have no impact on water vole. Where the pipeline route crosses the Hermitage Stream and Riders Lane Stream there is potential for temporary impacts on water vole if the pipeline route is trenched in this section. Where the spillways are installed there may be long-term loss of bankside habitat for water vole and, if present at the time of works, direct impact on water vole burrows. Survey work undertaken by Portsmouth Water in 2019 did not record evidence of water vole during a detailed survey of the area where the pipeline route crosses the stream corridors (see **Appendix M2**).

In England, water vole and their habitat are fully protected under the Wildlife and Countryside Act 1981 through inclusion in Schedule 5. Refer to **Appendix M7** for details.

4.9.2 Potential Mitigation and Compensation Measures

To avoid temporary impacts where the pipeline crosses the Hermitage Stream and Riders Lane Stream trenchless drilling is recommended. Mitigation for the loss of bankside habitat is presented in Paragraph 4.4.2, which includes design that allows these areas to colonise with native vegetation with suitability for foraging water vole.

An updating water vole survey should be undertaken by a suitably qualified ecologist in advance of construction works commencing in the spillway or Hermitage Stream and Riders Lane Stream crossing points.

4.10 Birds

4.10.1 Potential Constraints

There is also the potential for direct impacts on nesting individuals during vegetation clearance works if undertaken in the nesting bird season (March to August).

All birds, their nests, eggs and young are legally protected, with certain exceptions, under the Wildlife and Countryside Act 1981. Refer to **Appendix M7** for details.

4.10.2 Potential Mitigation and Compensation Measures

The creation of appropriately designed new landscaping within the site would provide new nesting and foraging opportunities for breeding birds.

Where areas of vegetation, such as scrub, are to be removed including suitable ground nesting habitat and removal or alteration of trees and shrubs should be undertaken outside of the main bird nesting season which extends from March to August, inclusive. Should such works be necessary within this time period, then the site should be inspected by a suitably qualified ecologist immediately prior to works commencing. Any active nests identified will require a suitable buffer to be left undisturbed until the nesting cycle has concluded naturally.

4.11 Reptiles

4.11.1 Potential Constraints

Where the habitat is suitable to support reptiles, the development has the potential to result in direct impacts on reptiles through harm to individuals during the construction phase.

Widespread reptile species (slow-worm *Anguis fragilis*, common lizard *Zootoca vivipara*, grass snake *Natrix natrix* and adder *Vipera berus*) are protected under the Wildlife and Countryside Act 1981 against harm, see **Appendix M7** for details.

4.11.2 Potential Mitigation and Compensation Measures

A suitable reptile mitigation strategy will require implementation at the site in order to offset impacts on reptile populations. In advance of construction the grassland habitat will be heavily mown to reduce the height of the sward and make it less suitable for reptiles. Any suitable reptile hibernacula features (e.g. tussocky vegetation within SCP grassland) will also be removed from the working area during the main reptile active season (April-October). Given the relatively narrow corridor of works and limited associated reptile habitat an ecological watching brief of section of the pipeline route with suitability for reptiles will be undertaken during construction. Where individuals are located these will be moved away from the construction area and placed in nearby suitable habitat. Such work would be time restricted to the active reptile season (April to October).

4.11.3 Enhancement Opportunities

The inclusion of new habitats such as set out in Paragraph 4.4.4 has the potential to deliver enhanced reptile habitat along the pipeline route.

4.12 Invertebrates

4.12.1 Potential Constraints

The proposals will likely result in the temporary loss of areas of suitable habitat. However, recommendations have been made for the avoidance of areas of greater ecological importance such as woodland.

4.12.2 Potential Mitigation and Compensation Measures

The majority of the mitigation outlined above will provide mitigation for terrestrial invertebrates. The avoidance of ancient woodland will provide continuing high-quality habitat for terrestrial invertebrates. The inclusion of mitigation for impacts on spillways will create mitigation for loss of bankside vegetation.

4.12.3 Enhancement Opportunities

The inclusion of new habitats such as set out in Paragraph 4.4.2 and 4.4.3 has the potential to deliver enhanced invertebrate habitat along the pipeline route.

4.13 Other Relevant Species

4.13.1 Potential Constraints

The proposals have the potential to result in direct harm and temporary habitat loss and fragmentation effects to European hedgehog and common toad.

4.13.2 Potential Mitigation and Compensation Measures

These species should be considered when construction works are occurring. If either species is located during construction works then an ecologist should be consulted on how to proceed.

4.13.3 Enhancement Opportunities

No specific enhancements for these species are recommended, however, additional measures may be included as the landscaping plans progress.

5.0 CONCLUSION

The route has been carefully selected to avoid the most sensitive habitats/impacts, particularly Great Copse and the areas within proximity to streams. As a result, most of the route is through habitat with very low ecological value, roads, hardstanding, amenity grassland. Where higher value habitat is present, wherever engineering constraints allow, the pipeline has been set back five metres to minimise impacts on more sensitive habitats, such as the stream corridors.

The proposals will impact on a variety of habitats and species, the majority of which are common and widespread. The Hermitage Stream corridor, semi-improved neutral grassland, some of which are designated as SINC's comprise the habitats with the highest ecological value.

Parts of the site is suitable for a number of protected species including foraging and commuting bats, otter, badger, hazel dormouse, water vole, breeding and wintering birds and common species of reptile.

Impacts on all species and habitats will be temporary and restricted to a narrow corridor. In the absence of a detailed pipeline design and finalised route this report details impacts, mitigation and compensation on a worst-case scenario.

The requirements for further survey work will need to be considered once a detailed and finalised design is available to assess potential impacts at a finer scale. However, once mitigation / compensation is considered the pipeline proposals are considered to accord with all relevant national and local planning policy (See Chapter B).

6.0 REFERENCES

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Map M1 Pipeline Route Site Location

Map M2 Key Pipeline Route Features and Survey Sections

Map M3 Statutory Designated Sites within Two Kilometres of the Pipeline Route

Map M4 Non-statutory Designated Sites within or Adjacent to the Pipeline Route

Map M5 Pipeline Route Desktop Study: Notable, Protected and Non-native Invasive
Species Records

Map M6

Pipeline Route Desktop Study: Priority Habitats and Ancient Woodland

Map M7 Pipeline Route Phase 1 Habitat Map

Map M8 Ecological Constraints

Appendix M1 Pipeline Route Proposals Plan

Appendix M2 Portsmouth Water Otter and Water Vole Survey along Havant Thicket Reservoir Pipeline Route

Appendix M3 Statutory Designated Sites within the Desktop Study Area

Details of statutory designated sites within the desktop study area, as listed in Paragraph 3.2, are provided in **Table M4**.

Table M4: Statutory designated sites located within the desktop study area

Designation	Name	Approximate Relative Location	Reason for Designation
SPA	Chichester and Langstone Harbours	One kilometre south	The site qualifies for supporting the following Annex I species: Breeding - Little Tern <i>Sterna albifrons</i>, 100 pairs representing up to 4.2% of the breeding population in Great Britain; and - Sandwich Tern <i>Sterna sandvicensis</i>, 158 pairs representing up to 1.1% of the breeding population in Great Britain. On passage - Little Egret <i>Egretta garzetta</i>, 137 individuals representing up to 17.1% of the population in Great Britain. Over winter - Bar-tailed Godwit <i>Limosa lapponica</i>, 1,692 individuals representing up to 3.2% of the wintering population in Great Britain; and - Little Egret, 100 individuals representing up to 20.0% of the wintering population in Great Britain. This site also qualifies by supporting populations of European importance of the following migratory species: On passage - Ringed Plover <i>Charadrius hiaticula</i>, 2,471 individuals representing up to 4.9% of the Europe/Northern Africa - wintering population.

Designation	Name	Approximate Relative Location	Reason for Designation
			Over winter ▪ Black-tailed Godwit <i>Limosa limosa islandica</i>, 1,003 individuals representing up to 1.4% of the wintering Iceland - breeding population; ▪ Dark-bellied Brent Goose <i>Branta bernicla bernicla</i>, 17,119 individuals representing up to 5.7% of the wintering Western Siberia/Western Europe population; ▪ Dunlin <i>Calidris alpina alpina</i>, 44,294 individuals representing up to 3.2% of the wintering Northern Siberia/Europe/Western Africa population; ▪ Grey Plover <i>Pluvialis squatarola</i>, 3,825 individuals representing up to 2.5% of the wintering Eastern Atlantic - wintering population; ▪ Redshank <i>Tringa totanus</i>, 1,788 individuals representing up to 1.2% of the wintering Eastern Atlantic - wintering population; and ▪ Ringed Plover, 846 individuals representing up to 1.7% of the wintering Europe/Northern Africa - wintering population. The site qualifies by regularly supporting in excess of 20,000 individual waterfowl over winter.
Ramsar Site	Chichester and Langstone Harbours	One kilometres south	The site is designated under Ramsar Criterion 1, 5 and 6. Criterion 1 – Two large estuarine basins linked by the channel which divides Hayling Island from the main Hampshire coastline. The site includes intertidal mudflats, saltmarsh, sand and shingle spits and sand dunes. Criterion 5 – Assemblages of international importance: ▪ 76,480 waterfowl, count in winter (5 year peak mean 1998/99 - 2002/2003) Criterion 6 – species/populations occurring at levels of international importance. Qualifying species/populations (as identified at designation) Species with peak counts in spring/autumn: ▪ Ringed plover; ▪ Black-tailed godwit; and

Designation	Name	Approximate Relative Location	Reason for Designation
			- Common redshank. Species with peak counts in winter: - Dark-bellied brent goose; - Common shelduck <i>Tadorna tadorna</i>; - Grey plover; - Dunlin. Species/populations identified subsequent to designation for possible future consideration under criterion 6: - Little tern
SAC	Solent Maritime	One kilometre south	Annex I habitats that are a primary reason for selection of this site: - Estuaries; - Spartina swards (<i>Spartinion maritimae</i>); and - Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>). Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: - Sandbanks which are slightly covered by sea water all the time; - Mudflats and sandflats not covered by seawater at low tide; - Coastal lagoons; - Annual vegetation of drift lines; - Perennial vegetation of stony banks; - Salicornia and other annuals colonizing mud and sand; and - Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes). Annex II species present as a qualifying feature, but not a primary reason for site selection: - Desmoulin's whorl snail <i>Vertigo moulinsiana</i>.

Designation	Name	Approximate Relative Location	Reason for Designation
SSSI	Langstone Harbour	One kilometre south	Langstone Harbour SSSI is designated for supporting internationally important intertidal habitats, notable invertebrates and large populations of migrant and overwintering waders and wildfowl, particularly brent goose. The harbour mainly comprises an extensive area of saltmarsh with associated cord grass <i>Spartina angelica</i> marsh.
SSSI	Chichester Harbour	Two kilometres south-east	Chichester Harbour SSSI is designated for supporting extensive intertidal mud and sandflats with associated drainage channels. The site is particularly significant for wintering wildfowl and waders, including ~5% of the world population of dark-bellied brent geese. The site also supports notable concentrations of ringed plover, black-headed gull and three species of tern.

Appendix M4 Sites Designated for Nature Conservation

Statutory Sites

Internationally Designated Sites - Ramsar Sites, Special Areas of Conservation and Special Protection Areas

Special Protection Areas (SPAs) and Special Areas of Conservation (SACs) form a network of protected sites across the European Union called Natura 2000 sites. In the United Kingdom the primary legislative protection is afforded to these sites under the Conservation of Habitats and Species Regulations 2017 (as amended).

Ramsar sites are designated as wetlands of international importance which are afforded similar legislative protection to Natura 2000 sites.

SACs are sites which support internationally important habitats or internationally important assemblages or populations of species. SPAs are designated for supporting internationally important populations of birds listed in the annexes of the Birds Directive. SACs, SPAs and Ramsar sites are also designated as Sites of Special Scientific Interest.

Under Regulation 63 of the Conservation of Habitats and Species Regulations 2017 (as amended) there is a legal requirement that competent authorities, such as local planning authorities, need to consider whether plans or projects are likely to have a significant adverse effect on Natura 2000 sites or Ramsar sites, either alone, or in combination with other plans or projects. In the event that a likely significant effect cannot be ruled out, on the basis of objective information, then the competent authority must undertake an "Appropriate Assessment" to fully assess the plan or project against the site's conservation objectives. Unless certain defined derogation tests can be met, the competent authority may not authorise nor undertake any plan or project which adversely affects the integrity of a Natura 2000 site or Ramsar site.

Nationally Designated Sites – Sites of Special Scientific Interest and National Nature Reserves

Sites of Special Scientific Interest (SSSIs) receive legal protection under the Wildlife and Countryside Act 1981 (as amended). Such sites are designated to protect specific areas of biological or geological interest of national importance. Such sites also generally receive strict protection through the planning system.

National Nature Reserves (NNRs) are also usually designated as SSSIs and are specifically managed for their wildlife value. They receive legal protection through the National Parks and Access to the Countryside Act 1949 and the Wildlife and Countryside Act 1981 (as amended). As with SSSIs, these sites generally receive strict protection through the planning system.

Locally Designated Sites – Local Nature Reserves

Local Nature Reserves (LNRs) are designated by local authorities under the National Park and Access to the Countryside Act 1949. These are generally designated not only for their local wildlife value but also for education, scientific and recreational purposes. These sites generally receive protection from development through the planning system.

Non-Statutory Sites

Locally Designated Sites

In addition to statutory designations, local authorities often designate sites of nature conservation importance at the local level. Such designations are named differently by each local authority and may be referred to as Local Wildlife Sites (LWSs), Sites of Importance for Nature Conservation (SINCs) or Sites of Nature Conservation Importance (SNCIs), amongst others. The exact level of protection afforded to these sites varies and is normally defined through local planning policy.

Appendix M5 Appraisal Criteria for Bats

The criteria used to assess the suitability of roosting and foraging/commuting habitat for bats is based on industry guidelines and outlined in **Table M5**¹¹.

Table M5: Criteria used to Assess Suitability of Roosting and Foraging/Commuting Habitat for Bats

Suitability	Description of roosting habitats	Commuting and foraging habitats
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.	Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland. Pipeline route is close to and connected to known roosts.
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status.	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically/structure that does not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation). A tree of sufficient size and age to contain potential roost features but with none seen from the ground or features seen with only very limited roosting potential.	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerows or un-vegetated stream, but isolated (i.e. not very well connected to the surrounding landscape by other habitat). Suitable, but isolated, habitat that could be used by small numbers of foraging bats such as a lone tree or a patch of scrub.
Negligible	Negligible habitat features within the pipeline route likely to be used by roosting bats.	Negligible habitat features within the pipeline route likely to be used by commuting or foraging bats.

¹¹ Table adapted from (Collins, 2016)

Appendix M6 Notable Plant Species Criteria for those Relevant Species from the Desktop
Study

Table M6: Noteworthy/notable plant species status criteria¹²

Species	Scientific Name	Red List: Endangered	Red List: Vulnerable	Red List: Near Threatened	Red List: Least Concern	County Scarce
Wood-sorrel	<i>Oxalis acetosella</i>			X		
Lesser spearwort	<i>Ranunculus flammula</i>		X			
Common valerian	<i>Valeriana officinalis</i>			X		
Parsley Water-dropwort	<i>Oenanthe lachenalii</i>			X		X
Crosswort	<i>Cruciata laevipes</i>			X		

¹² See **Table M1** for further details on location / dates of these records. Species listed are those which have been recorded in the HBIC data search using a detailed grid reference (100 square metres or less) which intersect or are entirely within the pipeline route.

Appendix M7 Summary Table of Habitats and Constraints by Survey Section

Table 7: Summary Table of Habitats and Constraints by Survey Section

Survey Section	Habitat Description	Constraints/Actions
A	Mostly poor semi improved grassland, amenity grassland, hardstanding/road north of railway line	- Align pipeline route to avoid isolated trees. - No significant constraints identified
B	Road or car park hardstanding	No significant constraints identified. Route to avoid any mature trees.
C	School field comprising amenity grassland, road or hardstanding	No significant constraints identified.
D	Mown path through bramble dominated scrub in south, then through mown amenity grassland with scrub pinch points and tarmac path. Small number of oak standards in close proximity to route.	- Cut back scrub edges in winter to provide working width required and avoid any impact on reptiles, nesting birds, or dormice (latter assessed as unlikely). - Keep route mown short in advance of construction to minimise habitat suitability for reptiles. - Ensure route avoids root zone of small number of mature oaks north of Barncroft Way.
E	Mown amenity grassland, tarmac path with some oak standards. Includes Hermitage Stream crossing.	- Ensure pipeline route and underground chambers set well back from restored river edge in the mown amenity grassland areas. - Keep construction area mown short in advance of works to ensure habitat not suitable for reptiles. - Ensure route is set as far back as practical from root zone of mature oak trees. Arboricultural assessment to be undertaken where route zone may be impacted - Select river crossing to minimise impact on bankside vegetation and scrub. Consider trenchless crossing techniques. If open cut proposed, complete preconstruction water vole and otter survey and develop a more detailed mitigation strategy. - Spillways from underground chambers to be sensitively designed to minimise impacts on the stream banks, while optimising opportunity to create a new habitat/enable vegetation to colonise. - Check for and remove any Himalayan Balsam before excavation five metres either side of construction zone at stream crossing.
F	Tarmac road with parking bays. Oak standards in mowed grass area to south	Ensure route is set back as far as practical from the root zone of mature oak trees. Arboricultural assessment to be undertaken where route zone may be impacted.
G	Initially through amenity verge/open space grassland with scattered mature oaks. Then over an open area of the Riders Lane stream. Then tarmac roads with parking bays.	- Ensure route is set back as far as practical from the root zone of mature oak trees. - Select route across stream to minimise impact on bankside vegetation/scrub. Consider practicality of a trenchless construction technique. If open cut proposed complete pre-construction water vole and otter survey and develop a more detailed mitigation strategy. - Check for and remove any Himalayan Balsam before excavation 5m either side of construction zone at stream crossing.

Survey Section	Habitat Description	Constraints/Actions
H1 (Option 1)	Mown path along SE side of Great Copse. Grass with young scrub (<10 years) dominated by bramble with hazel and blackthorn. Small number of mature oaks may need to be removed depending on the construction technique.	- Arboricultural assessment will be necessary for mature oaks once more information is available on the construction techniques available. Investigate trenchless technologies. - Consider the potential for any trees to be removed to contain bat roosts (survey as appropriate). - Consider the need for a dormouse survey if significant scrub is to be removed. - Cut back scrub edges in winter to provide working width and avoid any impact on reptiles, dormouse or resting birds. - Keep route mown short in advance of construction to minimise habitat suitability for reptiles.
H2 (Option 2)	Along tarmac road with some scattered trees and a hedgerow alongside the school.	Root zone of roadside trees will be impacted due to utility services avoidance and the need for a very deep trench due to hydraulic engineering constraints. Arboricultural assessment will be necessary.
H3	Grazed poor semi-improved neutral grassland field south of Middle Park Way. A species poor intact hedgerow comprising predominantly hawthorn bounds Middle Park Way and High Lawn Way.	- Investigate trenchless technique below hedgerow and road. If not practical, minimise construction width through hedge and replant any gap created with same species removed. - Keep route mown short in advance of construction to minimise habitat suitability for reptiles.
I	Semi-improved neutral grassland (Thicket Lawn and High Lawn). Three tree lines with some scrub cross the route. Stream crossing on to reservoir site.	- Select route through the three tree lines to cross natural gaps between mature trees or old gateways to minimise the scrub to be removed. - Select route through grassland to avoid mature oaks and small thickets of scrub vegetation. - Remove minimal amount of scrub needed in winter to minimise the impact on dormice habitat. Replant on completion with the same species. - Consider if arboricultural assessment or bat survey needed depending on maturity of trees to be impacted. - Keep route mown short in advance of construction to minimise habitat suitability for reptiles. - Select stream crossing route on to reservoir site to minimise the need for scrub removal. Remove any willow scrub in winter.