

Havant Thicket Reservoir Project

Environmental Statement Volume 4 – Appendices

Appendix 9 Biodiversity

Appendix A9.17: Pipeline Ecological Management and Monitoring Plan

Portsmouth Water Ltd.

23/05/24

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1 Introduction and Background to the Scheme

Purpose of this Report

- 1.1. Havant Thicket Reservoir hybrid planning application was approved by Havant Borough Council and East Hampshire District Council¹ on 15th October 2021, and an outline planning application for the associated pipeline, between the reservoir and Bedhampton springs and pumping station, was approved by Havant Borough Council on 15th October 2021².
- 1.2. A new pipeline route and design have since been identified which needs a new planning approval. A new full planning application has been prepared for the revised pipeline route supported by this Pipeline Ecological Management and Monitoring Plan which forms a new Appendix to the Revised Environmental Statement.
- 1.3. Planning Condition 36 of the outline planning permission for the original pipeline route seeks details of ecological mitigation, compensation and enhancement measures. As the application for the revised pipeline is a full application, this has been prepared to inform and accompany this application:

No phase of the development approved under Condition 4 shall commence until full details of all ecological mitigation, compensation and enhancement measures (to be informed as necessary by up-to-date survey and assessment) and on-going monitoring of mitigation measures required for each reserved matters application (including both ecological works directly related to that Development Phase reserved matters area and any works associated with that area but lying outside of the boundary of that area) shall be submitted for approval to the Local Planning Authority. Such details shall be in accordance with the ecological mitigation, compensation and enhancement measures detailed within the Outline Biodiversity Mitigation and Compensation Strategy (ECOSA, September 2020), the Habitats Regulations Assessment (Atkins/Portsmouth Water, September 2020) and the Implementation Plan for Off Site Biodiversity Mitigation and Compensation (Atkins, April 2021). Any such approved measures shall thereafter be implemented in strict accordance with the agreed details and with all measures maintained in perpetuity, unless otherwise agreed in writing by the Local Planning Authority.

- 1.4. This document provides details of bespoke ecological mitigation, compensation and enhancement to be carried out during and after the construction of the pipeline between Bedhampton and the Havant Thicket Reservoir site (hereafter referred to as the Pipeline Scheme). It supports the Outline Environmental Management Plan (OEMP) and the Register of Environmental Actions and Commitments (REAC) in Appendix A2.1 in Environmental Statement (ES) Volume 4 and should be read in conjunction with the OEMP and the REAC.
- 1.5. This is a live document and will be updated as required i.e. when further ecological survey data is available, and when the final programme of construction is confirmed.

Ecological Context of the Pipeline Scheme

- 1.6. The Pipeline Scheme extends from the Bedhampton pumping station, northwards through the Leigh Park housing estate in Havant under roads and open spaces. It runs north/north-east adjacent to Hermitage Stream and Riders Lane Stream before heading north-west through Staunton Country Park. The pipeline then crosses into the footprint of the reservoir itself.
- 1.7. The Pipeline Scheme comprises seven underground-only work locations (the drilled sections) and ten surface work locations, collectively referred to as 'the Site' in this report. The surface works comprise eight Shafts and two Sections where the pipeline will be

¹ Havant Borough Council Planning ref. APP/20/00990, East Hampshire District Council Planning ref. 51680/001

² Planning ref. APP/20/00991

installed via open-cut methodology. The location of each surface work location is detailed in Table 1-1 and shown in Figure 9.18: Ecological Constraints in Appendix A. The work location ID will be used to reference the specific surface works locations, where required, throughout the management and monitoring plan. A summary of the main habitats and designated sites present, and likely protected species to be encountered is provided below in Table 1-1.

Table 1-1 – Surface work locations along the Pipeline Scheme (numbered from south to north)

Surface work location ID	Central OSNGR ³	Main habitats (within shaft working areas only)	Priority habitats / irreplaceable habitats or designated sites present, and/or protected species likely to be present
Bedhampton site/Shaft 1	SU 70557 06332	Other neutral grassland Trees and scrub	Roosting bats (in trees and buildings) Reptiles (hibernating and foraging/basking) Badger (foraging/commuting) Otter (foraging/ commuting/resting) Birds (breeding) Invasive non-native plant species (butterfly bush, Japanese knotweed, Himalayan Balsam, New Zealand pygmyweed) Veteran/ancient/notable trees Hermitage Stream (adjacent but will receive discharge during construction, and a new footbridge will be constructed across it to support a PROW diversion)
Shaft 2	SU 70700 06893	Modified grassland	Badger (foraging/commuting) Roosting bats (in trees) Birds (breeding)
Shaft 3	SU 70863 07175	Modified grassland	Badger (foraging/ commuting) Roosting bats (in trees) Birds (breeding)
Shaft 4	SU 71123 07331	Modified grassland Scattered trees Small parcel of lowland mixed deciduous woodland (priority habitat)	Badger (foraging/commuting) Roosting bats (in trees) Otter (foraging/commuting) Birds (breeding) Invasive non-native plant species (Montbreita) Veteran/ancient/notable tree Priority habitat ⁴
Emergency Discharge Chamber	SU 71009 07562	Other neutral grassland Lowland mixed deciduous woodland (priority habitat) Other broadleaved woodland River and stream (Hermitage Stream)	Badger (foraging/commuting) Roosting bats (in trees) Otter (foraging/ commuting/resting) Birds, including potentially kingfisher (breeding) Reptiles (hibernating and foraging/ commuting/ basking)

³ Ordnance Survey National Grid Reference

⁴ This includes lowland deciduous woodland and wet woodland priority habitats.

Surface work location ID	Central OSNGR ³	Main habitats (within shaft working areas only)	Priority habitats / irreplaceable habitats or designated sites present, and/or protected species likely to be present
		Aquatic marginal vegetation	Invasive non-native plant species (Himalayan balsam) Priority habitat ⁵
Shaft 5	SU 71183 07793	Other neutral grassland Modified grassland Other broadleaved woodland Dense scrub Tree lines Other broadleaved woodland River and stream (Riders Lane Stream)	Badger (foraging/commuting) Roosting bats (in trees) Otter (foraging/ commuting) Birds, including potentially kingfisher (breeding) Reptiles (hibernating and foraging/ commuting/ basking) Veteran/ancient/notable tree
Shaft 6	SU 71291 08166	Other neutral grassland Modified grassland Dense scrub Wet woodland (priority habitat) River and stream (Riders Lane Stream)	Badger (foraging/commuting) Otter (foraging/ commuting) Birds, including Kingfisher (breeding) Reptiles (foraging/ commuting) Veteran/ancient/notable tree Priority habitat ⁶
Shaft 7	SU 71611 08293	Wet woodland (priority habitat) Modified grassland River and stream (Riders Lane Stream)	Badger (foraging/commuting) Hazel dormice Otter (foraging/ commuting) Birds, including potentially kingfisher (breeding) Reptiles (hibernating and foraging/ commuting/ basking) Priority habitat ⁷

⁵ This includes lowland deciduous woodland and wet woodland priority habitats.

⁶ This includes lowland deciduous woodland priority habitat.

⁷ This includes wet woodland priority habitat.

Surface work location ID	Central OSNGR ³	Main habitats (within shaft working areas only)	Priority habitats / irreplaceable habitats or designated sites present, and/or protected species likely to be present
Shaft 8	SU 71832 08741	Other neutral grassland Modified grassland Lowland mixed deciduous woodland (priority habitat) Dense scrub Wet woodland (priority habitat) Rivers and stream (Riders Lane Stream including the 'Lake Stream')	Badger (setts and foraging/ commuting) Hazel dormice Otter (foraging/ commuting/ resting) Birds (breeding) Reptiles (hibernating and foraging/ commuting/ basking) Veteran/ancient/notable tree Priority habitats ⁸ Sites of Importance for Nature Conservation (SINC)
Section 9	SU 71717 08900	Other neutral grassland Lowland mixed deciduous woodland (priority habitat)	Badger (setts and foraging/ commuting) Hazel dormice Otter (foraging/ commuting/ resting) Birds (breeding) Reptiles (hibernating and foraging/ commuting/ basking) Priority habitats ⁹ Sites of Importance for Nature Conservation (SINC)
Section 10	SU 71123 09746	Other neutral grassland Purple moor grass and rush pasture (priority habitat) Rivers and stream (Riders Lane Stream)	Reptiles (hibernating) Priority habitat ¹⁰

Overlap with Havant Thicket Reservoir Plans and Strategies

- 1.8. The Pipeline Scheme is an integral part of the Havant Thicket Reservoir scheme, providing water from the springs in Bedhampton at the south of the pipeline to fill the new reservoir. As such, there are a number of published documents for the works being carried out at the reservoir site, which are of relevance to the ecological management and monitoring required for the Pipeline Scheme. These are detailed in Table 1-2.

⁸ This includes lowland deciduous woodland and wet woodland priority habitats.

⁹ This includes lowland deciduous woodland and wet woodland priority habitats.

¹⁰ This includes purple moor grass and rush pasture priority habitat.

Table 1-2 – Havant Thicket Reservoir scheme; ecological mitigation, compensation and enhancement plans/documents

Document name/reference	Scope of document	Overlap/relevance to Pipeline Scheme
Outline Biodiversity Mitigation and Compensation Strategy (September 2020)	Includes details of onsite habitat enhancement and creation and additional offsite measures for the Havant Thicket Reservoir scheme. Now superseded by the Detailed Biodiversity Mitigation and Compensation Strategy and Landscape and Ecology Management Plan (LEMP) (Discharged to address a s106 Commitment in August 2022).	Long-term management required for the pipeline route will be delivered via the Havant Thicket Reservoir scheme in accordance with their strategies. Section 10 of the Pipeline Scheme is situated within the reservoir footprint. The onsite habitat creation and enhancement for this area is contained within the Detailed Biodiversity Mitigation and Compensation Strategy and Landscape and Ecology Management Plan (LEMP) for the reservoir, rather than this Ecological Management and Monitoring Plan (EMMP).
Landscape and Ecology Management Plan (LEMP) – latest update March 2024	Includes details of onsite habitat enhancement and creation and additional offsite measures for the Havant Thicket Reservoir scheme and an outline of the long-term ecological management for these areas.	As above.
Implementation Plan for Off Site Biodiversity Mitigation and Compensation (April 2021)	Details all mitigation and compensation to be implemented ‘off-site’ i.e. not within the reservoir or pipeline footprint.	Not directly related to the Pipeline Scheme; however, parts of the compensation package detailed in Section 4 will be delivered via this plan.
European Protected Species Mitigation (EPSM) licence – hazel dormice	Details all mitigation and compensation to be implemented on the reservoir site for hazel dormice, including a long-term monitoring plan for compensatory hazel dormice boxes erected in land adjacent to the reservoir (including in Staunton Country Park).	No areas of vegetation removal overlap with the Pipeline Scheme. The Pipeline Scheme will submit a separate hazel dormouse EPSM licence to Natural England. See Section 3 for further details.
EPSM licence – bats	Details all mitigation and compensation to be implemented on the reservoir site for roosting bats.	No overlap with the Pipeline Scheme currently. However, the precautionary approach being taken for bat trees has been informed by the licence and agreed with the named ecologist.

Overlap with the Pipeline Scheme Outline Environmental Management Plan

- 1.9. Measures to avoid or mitigate impacts on nature conservation resources during the construction phase of the Pipeline Scheme are set out in the REAC as part of the OEMP in Appendix A2.1 in ES Volume 4. The OEMP also includes compensation measures where impacts cannot be avoided or fully mitigated. The OEMP includes measures to be put in place such as best practice pollution prevention and construction measures, the provision of briefings and tool box talks for staff, use of protective fencing to avoid

accidental incursions outside of the agreed working areas, timing of works, protecting animals from harm within the construction area, and precautionary methods of working (PMW). Where relevant, the OEMP will signpost to this document for further details on bespoke ecological management and monitoring required for the Pipeline Scheme.

- 1.10. This Pipeline EMMP is designed to support the OEMP and should be read in conjunction with the OEMP and the REAC.

Structure of the Report

- 1.11. This document is split into the following sections:
- Section 1 introduces the main purpose of the document, gives the ecological context and provides a summary of how the document interacts and overlaps with other Pipeline Scheme documents and/or Havant Thicket Reservoir scheme documents.
 - Section 2 provides an overview of how the design of the Pipeline Scheme has been developed in an environmentally sensitive way.
 - Section 3 outlines the ecological receptors, which require bespoke mitigation and/or compensation to be implemented during the Pipeline Scheme, and the measures that relate to each of them.
 - Section 4 summarises the compensation and enhancement package for the Havant Thicket Reservoir scheme and the Pipeline Scheme.
 - Section 5 details the roles and responsibilities for the Pipeline Scheme project team, both during construction and post-construction.
 - Section 6 gives the predicted program for the Pipeline Scheme.
 - Section 7 contains the REAC for the Pipeline Scheme (also presented in Appendix A2.1 in ES Volume 4).
 - Section 8 outlines the required ecological monitoring for the Pipeline Scheme.
 - Appendix A contains the Ecological Constraints Plan.

2. Environmentally Led Design

- 2.1. The design of the Pipeline Scheme has been developed by a team of environmental specialists and engineers, including landscape architects, ecologists, tree specialists and pipeline and civil engineers. During the design process, avoiding/mitigating the impacts on environmental receptors has been prioritised as much as possible, and the following elements have been committed to:
- Refinement of working areas to protect high value trees, including ancient, veteran and notable trees and trees with potential to support roosting bats;
 - Refinement of working areas to protect ancient woodland, through the implementation of a 15 m buffer in line with guidance from Natural England;
 - Refinement of open cut sections in Staunton Country Park to minimise the temporary breach in vegetation along potential hazel dormouse and bat commuting and foraging routes;
 - Development of a bespoke approach to reinstatement of habitats utilising removal, storage and reinstatement of turves for open cut sections within Staunton Country Park; and
 - Reinstatement of habitat impacted by the Pipeline Scheme to integrate and connect with the existing landscape, and where possible and appropriate, enhance the plant species present for hazel dormouse to encourage a range of food sources.

3. Ecological Mitigation Measures Specific to Pipeline Scheme

- 3.1. Work at above-ground surface works locations will be predominantly temporary and reinstated once construction is complete¹¹. The only permanent footprints are associated with:
- The Emergency Discharge Chamber, where permanent structures comprising a crane pad, access road, security fencing, kiosk, spillway, stilling pond and potential scour protection will remain along Hermitage Stream and within the adjacent woodland;
 - Three culvert upgrades where new culverts will be installed alongside existing culverts along Riders Lane Stream; and
 - The permanent access road required at shaft 1, the surfacing of the permanent PROW diversion at the Bedhampton site and permanent installations scattered across the Bedhampton site such as the valve slab/kiosks/generators/fuel tanks and the bases required to support the Farlington pipeline which is raised above ground throughout the site.
- 3.2. Landscape reinstatement plans, submitted with the planning application for the revised Pipeline Scheme, and specifications have been produced and all habitats will be reinstated to their previous condition or to a better condition at Shaft 7, Shaft 8 and Section 9, where an enhanced shrub and tree mix is proposed for hazel dormouse mitigation as per the hazel dormouse EPSM licence.
- 3.3. No general measures associated with landscape reinstatement are covered in this document. However, bespoke mitigation, management and monitoring of works within High Lawn SINC and Thicket Lawn SINC and the open cut section for the Lake Stream in Staunton County Park (see Figure 9.18: Ecological Constraints for location of both SINC and the Lake Stream) is described within this section, as they have been highlighted as sensitive ecological receptors in the assessment carried out in the ES (Chapter 9: Biodiversity. ES Volume 3).
- 3.4. Mitigation, compensation and enhancement of habitats associated with Section 10 (which includes purple moor-grass and rush pasture priority habitat) is detailed in the reservoir's 'Detailed Biodiversity Mitigation and Compensation Strategy and Landscape and Ecology Management Plan (LEMP)'. This area is currently an active construction site and any protected species/habitat mitigation is either complete or ongoing. A standard pipeline construction method will be used for Section 10 (the Pipeline Scheme will be constructed before the reservoir embankment and any associated habitat restoration/creation) and, therefore, no further information is included in the EMMP for this section of the Pipeline Scheme.
- 3.5. The remaining mitigation, management and monitoring activities detailed in this section are associated with protected species.

Ancient Woodland and Ancient, Veteran and Notable Trees

- 3.6. No works within ancient woodland or within a 15 m buffer from an ancient woodland boundary will occur. No specific mitigation, management or monitoring for Great Copse ancient woodland is proposed. However, the Arboricultural Impact Assessment (AIA) in Appendix A9.18, ES Volume 4 details all tree protection measures to be implemented during construction of the Pipeline Scheme.
- 3.7. There are seven ancient, veteran and notable trees within the surface works locations (the Bedhampton site and shafts 4, 5, 6, 8 and Section 9). Measures will be implemented to ensure these trees are protected from damage during the works. These

¹¹ Manhole covers are the only above-ground permanent installation required at each shaft location.

are detailed in full in the AIA in Appendix A9.18. No further details on ancient, veteran and notable tree mitigation, management or monitoring are provided in this document.

- 3.8. Where specific measures are required to be followed for ancient, veteran and notable trees, a suitably experienced arboriculturist working on behalf of the Principal Contractor will advise on all works, in consultation with the Ecological Clerk of Works (ECoW).

Pre-construction Ecology Surveys

- 3.9. Table 3-1 lists all pre-construction ecology surveys required in association with the Pipeline Scheme, with further details included where relevant.

Table 3-1 – Pre-construction ecology surveys required for Pipeline Scheme

Ecological receptor	Survey type and location	Further details
Nesting birds check excluding kingfisher	Check within 24 hour period prior to vegetation clearance.	Further details provided below.
Kingfisher surveys	Habitat suitability survey (Hermitage Stream and Riders Lane Stream) Activity/breeding surveys (Riders Lane Stream).	Surveys were undertaken between May and July 2023, following a sighting of an individual kingfisher in March 2023. Whilst no breeding kingfisher, or kingfisher activity, was observed, the survey determined that kingfisher may return to the Site. The survey also incidentally recorded courtship behaviour by a male Cetti's warbler, a Schedule 1 bird species. Pre-construction surveys for kingfisher nests, and presence of breeding Cetti's warbler are required if construction is planned within the respective breeding seasons. The main breeding season for kingfisher typically runs from March to early July, whilst the Cetti's warbler breeding season typically runs from April to August.
Hazel Dormouse	Presence/likely absence surveys at Shaft 7.	Hazel Dormouse presence has been assumed at Shaft 7 for the ES addendum however presence/absence surveys will be carried out between May and September 2024 to confirm this assumption.
Otter surveys	Detailed search for holts and/or resting places within works areas adjacent (or within 30 m ¹²) to	Otter surveys can be carried out at any time of year. However, they cannot be carried out during or after prolonged heavy rainfall and/or high water, when spraints and other signs of otter may have been washed away.

¹² This area has been chosen as it is the minimum distance between an otter resting site (non breeding site) and a development site that a derogation license under the Habitat Regulations is required if any disturbance is predicted. Evidence of otter found during surveys (a single spraint only) did not indicate extensive use of these watercourses by otter therefore it is felt to be appropriate for the Pipeline Scheme.

Ecological receptor	Survey type and location	Further details
	Hermitage Stream, Riders Lane Stream and The Lake Stream.	The streams run alongside the Bedhampton site/Shaft 1, 4, 5, 6, 7 and 8, Section 9 and the Emergency Discharge Chamber. Particular focus will be made on the culvert upgrade locations at Shafts 5, 6 and 8 (Purbrook Way, Dunsbury Way and Middle Park Way), the Emergency Discharge Chamber, the temporary crossing of Riders Lane Stream at Shaft 5, the temporary footpath diversion at Shaft 1 and the open cut section along The Lake Stream at Section 9. A single spraint was found near Shaft 5 during the March 2023 surveys (see Figure 9.18: Ecological Constraints for location), however, no holts and/or resting places were found. The pre-construction survey will check for further evidence of otters and ensure that there are no new holts or resting sites within or close to works areas. The pre-construction surveys will be carried out at least six months prior to construction commencing, to determine whether any mitigation or licensing is required for otters.
Badger surveys	Monitoring surveys of three disused setts and a search for any new setts within all surface works areas.	Badger surveys can be carried out at any time of year, although winter can be advantageous as vegetation has died back meaning badger setts can be more obvious if present. The pre-construction surveys, including monitoring, will be carried out at least six months prior to construction commencing to determine whether any mitigation or licensing is required for badgers. A final badger walkover survey will be undertaken immediately prior to works commencing as a precaution, due to the highly mobile nature of the species. Potential fox dens and/or rabbit warrens will also be recorded during this survey to ensure any necessary works are carried out in a sensitive manner and in accordance with the Wild Mammals Act 1996.
Bat surveys (trees)	Presence/likely absence surveys of one moderate and two high potential bat trees (if impacted) at PROW diversion in Bedhampton site. Pre-felling check of trees with potential roosting features (PRFs) for bats (low only).	An outline application for a public right of way (PROW) diversion is being developed at Bedhampton site. The route is in close proximity to three trees with bat roost potential (one moderate and two high) further presence/absence surveys will be carried out to inform the final design and mitigation proposals in this location. Further details provided below.

Ecological receptor	Survey type and location	Further details
Bat surveys (buildings)	Presence/likely absence surveys of Bedhampton 1 and 2.	A Preliminary Roost Assessment (PRA) was undertaken for buildings Bedhampton 1 and Bedhampton 2 on 29th November 2023. Access was restricted during the initial PRA (no internal access) so a repeat PRA survey was carried out with a combined hibernation survey on 30th January 2024. A second hibernation survey was carried out on 28th February 2024 and two static bat detectors were left within Bedhampton 1 between these surveys to record any bat activity between the hibernation surveys. The roof void was inaccessible at Bedhampton 2 so static detectors could not be deployed there. Further surveys will be carried out between May and September 2024.
Small-flowered buttercup and wall bedstraw	Population monitoring survey to ascertain baseline coverage, shaft 1.	Survey during core growing season to map distribution/abundance of both species across shaft 1. These surveys will provide a baseline to monitor reinstatement success against. Further details provided below.
Invasive non-native plant species (INNPS) survey	An updated INNPS survey is required prior to construction, to record the location and extent of INNPS during the core growing season.	The results of this survey should inform the Invasive Species Management Plan, which will be produced by the Principal Contractor. Further details provided below.

Bats

- 3.10. All hedgerows, scattered trees, riparian corridors, scrub and open grassland will be reinstated in the first available planting/seeding season¹³, as sites become available along the pipeline corridor (i.e. once construction activities are complete). A five-year aftercare maintenance period will be implemented to ensure successful establishment of all potential bat foraging, commuting and roosting habitat impacted by the Pipeline Scheme.
- 3.11. All trees previously surveyed with bat roosting potential that are to be removed (currently ten trees with low bat roost potential only), will be checked again immediately prior to felling to ensure that there has been no change in their status (i.e. feature/s have been removed by other parties and/or features have increased in potential for roosting bats due to further decay and/or damage).
- 3.12. They will be subject to a PRF inspection immediately prior to felling. The PRF inspection will involve the use of tree-climbing or access equipment such as ladders or Mobile Elevation Work Platforms (MEWPs) to gain access to PRFs, to allow a detailed assessment of each PRF and to look for evidence indicating the presence of roosting bats. The PRF inspection will be undertaken by a bat licenced ecologist (the holder of a minimum Class 2 Natural England bat licence) using an endoscope.

¹³ For trees and shrubs (bare root plants) the planting season is considered to be 1st November to 31st March inclusive subject to favourable weather conditions, and for grassland seeding the appropriate season is considered to be 1st March to 31st May or 1st September to 31st October.

- 3.13. The trees will be managed in accordance with their updated roost potential category in a proportionate manner. The approach for removal of low potential bat trees is detailed below; this approach is not suitable for moderate to high potential bat trees, which would require further survey. If the roost potential category increases for any of the nine trees currently identified as having low potential, then a revised approach will be agreed with the ECoW and this document updated.
- 3.14. Low potential trees will be felled immediately following completion of the PRF inspection described above. However, in the unlikely event that a low potential feature is actually more extensive than previously assessed and cannot be fully inspected by endoscope, the PRF will be removed intact through sectional felling, with the section with the PRF(s) carefully moved under the guidance of a bat licenced ecologist.
- 3.15. In the unlikely event of a roosting bat(s) (or evidence of their presence) being found during the inspections/sensitive felling, all work in the vicinity will immediately stop and the advice of the licensed bat ecologist will be obtained.
- 3.16. Further bat tree inspections will be carried out for the PROW diversion at the Bedhampton site in the active season (2024) to inform the design of the diversion which is currently submitted in outline.
- 3.17. There are five trees with moderate bat roosting potential within the Bedhampton site and Shafts 2 and 4 and two trees with high bat roosting potential within the Bedhampton site. Any bat trees which will be retained will be protected during construction. Further details on specific tree protection measures to be implemented are provided in the AIA.
- 3.18. These seven trees will be clearly demarcated and contractors will be provided with a toolbox talk by the ECoW to explain their importance and the working restrictions associated with each tree (dependent on position/work activities etc).
- 3.19. Night-time working (taken to be 30 minutes prior to sunset to 30 minutes after sunrise) within all surface work locations should be avoided. If this is not possible, lighting will be kept to a minimum and directed away from PRFs and terrestrial habitats that may be utilised by bats. In accordance with guidance provided in the Bat Conservation Trust (BCT) and Institution of Lighting Professionals (ILP) Guidance Note 08/18¹⁴, lighting associated with the Pipeline Scheme should be the minimum required for the task.
- 3.20. In addition to the seven trees described above, there are moderate and high potential bat trees located adjacent to the works area in Staunton Country Park (Shaft 8 and Section 9). Due to the sensitivity of this site for bats and hazel dormice (for further information refer to the ES Chapter 9: Biodiversity), night-time working should be avoided here also.
- 3.21. One building with moderate roosting potential (Bedhampton 2) and one building with high roosting potential (Bedhampton 1) are located within the Bedhampton site¹⁵. Multiple PRFs were identified across both buildings during the PRAs.. Therefore, in line with best practice guidance¹⁶, where the possibility that bats are present cannot be eliminated (as is the case with both buildings), then further surveys are necessary if impacts on the roosting habitat or the bats using it are predicted. Currently the planned work is understood to be internal modifications only for Bedhampton 1 and external and internal modifications for Bedhampton 2. The results of the further surveys will be used to help determine the potential for impacts from these works on roosting bats and enable a mitigation (and if necessary compensation) strategy to be designed according to the bat species present (if found). The works may require a European Protected Species Mitigation (EPSM) licence from Natural England to be granted before they can proceed. The Bedhampton site offers ample opportunity for compensatory roost

¹⁴ Available for download from [Accessed 14/06/23]: https://cdn.bats.org.uk/uploads/pdf/Resources/ilp-guidance-note-8-bats-and-artificial-lighting-compressed.pdf?v=1542109349&_gl=1*6pcxji*_ga*Mic3OTI4OTMuMTY2NDM2NzAxNQ..*_ga_G28378TB9V*MTY4Njc0MzI0MC4xLjEuMTY4Njc0MzI1OC4wLjAuMA

¹⁵ Portsmouth Water have confirmed that a bat roost was identified in Bedhampton 1 in 2015 with a single common pipistrelle recorded, concluding that the building was likely used as a day roost by pipistrelles.

¹⁶ Collins, J (ed.) (2023). Bat Surveys for Professional Ecologists: Good Practice Guidance (4th edition). The Bat Conservation Trust, London.

provision and therefore the risk of these works impacting the favourable conservation status of local bat populations is low.

Birds excluding Kingfisher

- 3.22. All vegetation removal required within the works areas, including aquatic vegetation associated with works in or adjacent to the Hermitage Stream, Riders Lane Stream and The Lake Stream, will be carried out outside of the core nesting bird period (generally considered to run from March to August, but this can be weather dependent).
- 3.23. If this is not possible for certain areas, vegetation removal within the core bird nesting season will require an inspection of vegetation to be cleared for breeding birds and their occupied nests by a suitably qualified ecologist no more than 24 hours prior to any works being undertaken. If any nesting birds are identified during the survey, they will be left in situ for their entire nesting period and alternative approaches to the work proposed will need to be found. This is likely to include leaving an exclusion zone around the nests to avoid disturbance whilst works continue. The ECoW will then advise on when works can proceed within the exclusion zone (i.e. after chicks have fledged).

Kingfisher

- 3.24. The habitat suitability assessment for protected species conducted between January and March 2023 identified potential habitat suitability for kingfisher within the Site, as well as an individual kingfisher sighting. As a result, kingfisher specific habitat suitability assessments and activity surveys were undertaken.
- 3.25. Habitat suitability for kingfisher was identified along Riders Lane Stream between May and July 2023, between the Emergency Discharge Chamber and Shaft 5. However, the poor water quality along this stretch was assessed as likely to deter prospective kingfisher due to the lack of feeding opportunities. The area is also heavily residential and the habitat is susceptible to regular disturbance.
- 3.26. Habitat at Shaft 8 was also assessed between May and July 2023. However, the habitat was assessed as providing low suitability due to the poor water quality and the presence of multiple rat burrows, which indicates an increased risk of predation. As such, Shaft 8 was scoped out from activity surveys.
- 3.27. Whilst no breeding kingfisher, or kingfisher activity, was observed during the activity surveys undertaken in 2023, the surveys determined that kingfisher may return to the Site if water quality improves and provides adequate feeding opportunities for breeding kingfisher. The surveys also incidentally recorded courtship behaviour by a male Cetti's warbler, also a Schedule 1 bird species.
- 3.28. As a result of the survey findings, a pre-construction check for kingfisher nests, and the presence of breeding Cetti's warbler between the Emergency Discharge Chamber and Shaft 5, is recommended to be undertaken by a suitably experienced ornithologist. As the construction schedule may be subject to change, this will only be relevant where works are planned during the kingfisher breeding season (March to July), and Cetti's warbler breeding season (April to August).
- 3.29. If nesting sites for kingfisher or Cetti's warbler are identified during the pre-construction checks, the same approach as detailed above for all birds will be followed i.e. nests left in situ for the remainder of the nesting period and an appropriate exclusion zone implemented.

Hazel Dormouse

- 3.30. Based on connectivity to areas with known hazel dormouse populations, and the habitats present, it is assumed that suitable habitats present in Shaft 7, Shaft 8 and Section 9 support commuting and foraging hazel dormice.
- 3.31. Presence/likely absence surveys will be carried out for hazel dormouse within vegetation adjacent to Shaft 7 between May and September 2024 to confirm this assumption. Should surveys return a negative result the following mitigation described below will not apply to Shaft 7.

- 3.32. The clearance of the woodland and scrub habitats at Shaft 7, Shaft 8 and Section 9 will be covered under a hazel dormouse EPSM licence. No specific mitigation for hazel dormice is proposed for the remaining pipeline works areas, other than appointing an ECoW to oversee vegetation removal and provide tool box talks outlining the main ecological risks.
- 3.33. Compensatory nest boxes for hazel dormice are to be erected in retained habitat within 100 m of Shaft 7, Shaft 8 and Section 9 as per the mitigation requirements of the draft EPSM hazel dormouse licence for the Pipeline Scheme. The locations of the compensatory nest boxes will be confirmed in early 2024, following a site visit undertaken by the draft EPSM named ecologist, the Principal Contractor and Portsmouth Water's ecologist. Natural England will be consulted on the draft licence via a Pre-submission Screening Service (PSS) and this document will be updated accordingly if any changes are requested through the PSS.
- 3.34. The EPSM method statement will outline the timing and methods to be followed and all vegetation removal in these locations will be supervised by the named ecologist on the EPSM licence (or their appointed agent/s).
- 3.35. Timings are subject to agreement with Natural England and the Principal Contractor. Details on methods for clearance are detailed in the draft EPSM licence, which must be followed during vegetation clearance, and subsequent construction activities, at Shaft 7, Shaft 8 and Section 9.
- 3.36. Connectivity to adjacent hazel dormouse habitat will be maintained during the active season for hazel dormouse (generally considered to run from April through to November), during construction at Shaft 7, Shaft 8 and Section 9 through the use of connectivity features. Further detail on these features is provided in the draft EPSM licence.
- 3.37. A toolbox talk will be provided by the ECoW to all contractors outlining their responsibilities in terms of maintaining the connectivity features during the active season for hazel dormouse. A rota of staff responsible for ensuring this will be implemented and updated as required.
- 3.38. The ECoW, working together with the named ecologist on the EPSM licence, will advise on approaches and responsibilities to ensure that all measures outlined in the EPSM licence are implemented correctly.

Otters

- 3.39. Pre-construction surveys for otters will be undertaken as per Table 3-1. If mitigation is required following completion of the surveys, this document will be updated.

Badgers

- 3.40. Pre-construction surveys for badgers will be undertaken as per Table 3-1. If mitigation is required following completion of the surveys, this document will be updated.

Widespread Species of Reptile and Amphibians

- 3.41. The habitat is varied throughout the length of the Pipeline Scheme in its suitability to support widespread species of reptile. There are areas of higher suitability habitats present at the Bedhampton site/Shafts 1, 4, 5, 7, 8 and Section 9 and at the Emergence Discharge Chamber comprising grassland, dense scrub and woodland.
- 3.42. Great crested newts are considered likely absent from the surface work locations. However, measures put in place to mitigate for widespread species of reptile will provide protection for any amphibians present also and, therefore, amphibians are included within this section of the management plan.
- 3.43. At each surface work location, there is a sufficient expanse of habitat adjacent to the each working area, which has suitability to support any widespread species of reptile or amphibians displaced as a result of the construction activities and to maintain foraging and dispersal opportunities for reptiles and amphibians in the surrounding habitat during the construction period. Therefore, it is not considered necessary to undertake

measures to increase the carrying capacity of adjacent areas or provide temporary connectivity features, and mitigation measures are focused on reducing the risk of reptiles and amphibians being harmed during construction, mainly during site preparation, through the use of habitat manipulation and through the provision of an ECoW including hand searches.

- 3.44. Considering the size of the surface work locations, it is not anticipated that large numbers of reptiles and amphibians would be displaced by habitat manipulation and hand searches and the loss of habitat will be temporary (apart from the small-scale permanent footprints detailed in Section 3.1). After construction works are complete, there will be a short period of time when habitats within each surface work location will remain unsuitable for reptiles and amphibians, until the reinstated habitat has established.
- 3.45. Two approaches will be used for habitat manipulation (outlined below) depending on whether the habitats present within the surface works locations could support hibernating reptiles and amphibians, or not. Habitats assessed as providing suitability for hibernating reptiles and amphibians along the length of the Pipeline Scheme include scrub, woodland parcels and riparian corridors of adjacent streams.
- 3.46. Where there is a risk of hibernating reptiles and amphibians, removal of vegetation will proceed with caution during winter months only under instruction from the ECoW, and no ground excavation (such as de-stumping of felled trees) will be carried out unless the ECoW advises otherwise. Vegetation clearance during the active season for reptiles and amphibians (generally considered to be mid-March through to end of October) will be carried out in two stages, with vegetation removed to approximately 150 mm first and areas then inspected by a suitably experienced ecologist to check for reptiles and amphibians (a 'hand search'), followed by the removal of vegetation to ground level and any subsequent topsoil stripping.
- 3.47. In areas with foraging/basking/commuting potential only, prior to works commencing, the area should be trimmed following two-stage clearance methodology, to a final height of 100 mm to make it unsuitable for reptiles and then left for at least 48 hours to allow reptiles to move out of the area (unless outside of the active season for reptiles/amphibians). The ECoW will hand-search areas immediately prior to topsoil stripping.
- 3.48. In both instances once the vegetation has been removed and hand searches carried out, the areas should be maintained as unsuitable for reptiles and amphibians (i.e. kept mown/free from re-growth) during the construction period until reinstatement is completed.

Invasive Non-native Plant Species

- 3.49. Works will take place within areas where INNPS have been found and, therefore, an updated INNPS survey will be undertaken prior to construction, to record the location and extent of INNPS during the core growing season. Strict measures will be followed to minimise risks of spreading these species during construction. An Invasive Species Management Plan will be produced by the Principal Contractor and will be followed at all times.
- 3.50. An INNPS called parrots feather (*Myriophyllum aquaticum*) has already been found to the north-east and west of the reservoir at SU 72224 10344 and SU 69362 10631, respectively.. Whilst a programme is underway to remove and treat this plant, this will take multiple years and there is a risk that it spreads further in the interim period of which contractors should be aware.
- 3.51. The field surveys undertaken in 2023 identified two montbretia plants at Shaft 4, approximately 1300 m² of New Zealand pygmyweed along Hermitage Stream at Shaft 1, approximately 4000 m² of butterfly bush across Shaft 1 and an approximate 10 m stretch of Himalayan Balsam seedlings 10 m east of the Emergency Discharge Chamber. The presence of Himalayan balsam (one stand/an approximate 100 m stretch) and Japanese knotweed (five stands/an approximate 100 m stretch) was previously recorded by Portsmouth Water's ecologist at Shaft 1, with all six stands

having been confirmed to have undergone treatment in previous years, resulting in no field signs being visible during the field surveys undertaken in 2023.

- 3.52. Figure 9.18: Ecological Constraints (Appendix A) shows the known locations of INNPS from surveys carried out by Atkins between January and November 2023. Surveys for INNPS will be updated prior to construction commencing during the core growing season (April to September inclusive), to ensure growth of most INNPS is evident. The locations/extents shown on Figure 9.18: Ecological Constraints should be treated with caution, as the coverage of INNPS could be more extensive than shown due to the timing of the surveys.
- 3.53. Further details on the control of INNPS is contained within the OEMP and the REAC.

Priority Plants

- 3.54. Small-flowered buttercup and wall bedstraw, both of which are priority plants, are present within an approximate 577 m² grassland parcel within the Bedhampton site (see Ecological Constraints Plan in Appendix A for approximate location). Both plants are listed on the Hampshire Rare Plants Register. Wall bedstraw is also listed as a nationally scarce plant and is listed as vulnerable on the Great British and English Red Lists. Small-flowered buttercup is listed as 'Least Concern' on the Great Britain Red List.
- 3.55. Both are species of disturbed ground and should recolonise any temporary disturbed areas. Soil from areas where the species are present will be stored separately and clearly marked, and after reinstatement of these soils no re-seeding will take place and the areas will be left to naturally regenerate from the seed bank.
- 3.56. The species are also sufficiently widespread at the Bedhampton site that any small permanent installations should not impact on their population size and/or viability in this location. This will be confirmed through post-construction monitoring and (if required) management will be implemented to ensure the population persists.
- 3.57. Pre-construction survey during the core growing season (both species were observed during field surveys in November 2023 when abundance was difficult to estimate accurately) will provide a baseline to compare against.

High Lawn SINC and Thicket Lawn SINC

- 3.58. Baseline botanical surveys were undertaken at High Lawn SINC and Thicket Lawn SINC between July and September 2023.
- 3.59. The approach to be taken in High Lawn SINC and Thicket Lawn SINC during construction and reinstatement is outlined in Table 3-2. The method of working in these areas, and reinstatement of these areas, is currently provided in outline only and will be developed by the Principal Contractor (with input where required from a specialist environmental contractor experienced in turfing schemes such as this) in due course and updated within this document.
- 3.60. Protective fencing (a fence type with high visibility will be used) will be installed along the boundary of the working areas in High Lawn SINC and Thicket Lawn SINC. The fencing will avoid accidental incursions outside of the agreed working areas.
- 3.61. Thicket Lawn SINC and the northern part of High Lawn SINC will have the topsoil removed in large turfs, placing them either side of the main trenching/storage and haul road areas. Turfs will then be replaced once the pipe is laid and subsoil has been backfilled. The remaining area of High Lawn SINC (required for compound/access) will be restored through retention of soil in layers, which will be reinstated in layers and replanted with a locally sourced grassland mix and/or allowed to regenerate naturally via seed dispersal from adjacent habitat.

Table 3-2 – Outline of construction and reinstatement methodology for High Lawn and Thicket Lawn SINCS

Task	Timing	Restrictions/key specifications
Seed mix specification	Prior to construction starting.	Seed mix or seed mixes to be developed based on the findings of the NVC survey undertaken between July and September 2023. The seed mix will be used as an alternative to natural regeneration, subject to consultation response.
Soils survey to determine depth of turfs required, see below.	Prior to construction starting.	Soil inspection pits to be dug across the working area within proposed turfing sections, to determine depth of topsoil and subsequent turf stripping.
Preparing the working areas – fencing and removal of vegetation at access points and the Lake Stream crossing.	January to May 2025	All clearance of trees and scrub to be carried out under an EPSM licence for hazel dormice.
Establishment of compound/access routes	From May 2025 onwards	Connectivity to be maintained for hazel dormice as per the EPSM licence requirements. Appropriate topsoil storage – topsoil to be reinstated once works are complete within the compound, and along access routes, as required. No seeding, covering or mounding of stored topsoil above 3 m in height.
Turf removal within open cut sections of Thicket lawn and High Lawn SINC	Late spring/summer 2025	Turfing will be carried out outside of typically recommended periods ¹⁷ due to the wetness of the Site and risk of impacting soil conditions if works are carried out during wetter months of the year (autumn through to winter). Each turf section will be up to 1.0 m x 1.2 m in area, cut in depths of up to (TBC based on soil surveys) and laid either side of the working width in single layers. Turves will be stored directly on existing grassland rather than on material such as terram, as close as possible to the trench. The turves should be laid out individually in the order that they are removed, preferably adjacent to the spot where they were cut to give the best chance of replacing them in approximately the same position as they were lifted from. A contractor experienced in turfing will carry out these works.
Reinstatement of open-cut sections	Autumn 2025	Turfs will be reinstated in approximately the same position they were lifted from, once pipe

¹⁷ Anderson, P. Habitat translocation a best practice guide. CIRIA C600 (2003)

Task	Timing	Restrictions/key specifications
of Thicket Lawn and High Lawn SINC (i.e. turf replacement) and initial aftercare		laying is complete and subsoil has been replaced. A contractor experienced in turfing will carry out these works. The turf storage areas (existing grassland) may require aftercare such as chain harrowing and/or ripping (de-compaction), to be determined by the contractor and ECoW. No watering of the turfs to be carried out unless advised otherwise by the ECoW in combination with the specialist contractor, as this will encourage growth of competitive species. Fencing to remain in place until turfs have had a chance to 'bed down', which is to be confirmed by the ECoW and/or the landscape contractor. Mowing to resume after this. Initial aftercare will be focused on minimising any early weed growth. Pulling by hand will be carried out, as required.
Reinstatement of compound/access routes and initial aftercare	TBC	Reinstatement of these areas will utilise a bespoke seed mix of native species present within High Lawn SINC and sourced locally based on the findings of the NVC surveys undertaken between July and September 2023. Or, alternatively, natural regeneration will be used, relying on seed sources from the remaining adjacent grassland to colonise reinstated topsoil. In this scenario, a 'nurse' crop may be used to initially stabilise the soil and prevent erosion due to the proximity of Riders Lane Stream. Fencing is to remain in place until the habitats are sufficiently established to withstand grazing pressure (High Lawn SINC is subject to grazing by cattle and sheep currently). It is unlikely that mowing will be required in the first year (year 1 after autumn sowing), so initial aftercare will be focused on minimising any early weed growth. Pulling by hand will be carried out, as required. It is anticipated that grazing will be able to re-commence from year 2.

- 3.62. The results of the habitat monitoring proposed may alter the suggested approaches above. Maintenance and management needs to be reactive and based on the response of the area to the reinstatement activities.

The Lake Stream Reinstatement

- 3.63. Construction of the Pipeline Scheme requires the adoption of an open cut trench across The Lake Stream, which is a tributary of Riders Lane Stream. Following construction, reinstatement of the channel bed and banks will be required to ensure no long-term effects to aquatic habitats and associated species. Detailed design of the channel reinstatement shall be informed by an ecologist and hydromorphologist and shall incorporate the following:

- Shallow bank profiles (<45 degrees), avoiding over-steep bank faces to promote the growth of marginal vegetation and channel access for fauna.
 - Appropriate channel bed level, set to tie in with the existing channel form.
 - Addition of gravels to the channel bed¹⁸.
 - Reinstatement of riparian vegetation (as shown on the landscape reinstatement plans for the Pipeline Scheme).
- 3.64. During construction, flows from the channel will be over-pumped using appropriately screened pumping equipment. Following construction, flows shall be reinstated fully with no change in bed level from the original state.
- 3.65. In addition to reinstatement of The Lake Stream, there are various locations across the length of the Pipeline Scheme that may require minor riparian vegetation loss during construction. Following construction, riparian vegetation will be reinstated as shown on the landscape reinstatement plans.

¹⁸ Quantities of gravel to be confirmed at detailed design stage. Gravels to comprise a mixture of coarse gravel 16-64mm in diameter and fine gravel 2-16mm in diameter.

4. Compensation and Enhancement Package

4.1. A comprehensive compensation package has been designed and agreed for the Havant Thicket Reservoir scheme, which is directly adjacent to the Pipeline Scheme. In summary, the compensation package includes the following measures:

- A mosaic of new and restored high-quality habitats, including 52 ha of habitat creation and restoration within Havant Thicket woodland, Bell's Copse and Staunton Country Park;
- A new wetland with a variety of habitats, water depths and vegetation types;
- Management for biodiversity through collaboration with Forestry England and Hampshire County Council, including a long-term LEMP;
- On-site and off-site aquatic habitat mitigation, compensation and enhancements to ponds and watercourses as part of a catchment-wide approach;
- Up to 72 ha of habitat restoration and creation will be undertaken within Southleigh Forest in partnership with Hampshire and Isle of Wight Wildlife Trust (HIWWT);
- Creation of up to 80 ha of new wood pasture and grassland through partnerships between Portsmouth Water and local landowners; and
- A Capital Grants Scheme will be set up to provide funding to study and enhance biodiversity locally and to improve ecological networks and corridors off-site. The Capital Grants Scheme will commence in 2029 and will run for a minimum 30-year period.

4.2. As part of the compensation package described above, habitats adjacent to the Pipeline Scheme in Staunton Country Park will be enhanced for hazel dormice, bats and widespread species of reptile.

4.3. Furthermore, ecological improvements to Hermitage Stream and Riders Lane Stream, which run adjacent to the Pipeline Scheme, will be delivered as part of the catchment-wide approach.

Pipeline Scheme

4.4. The habitat reinstatement for Shaft 7, Shaft 8 and Section 9 will incorporate an enhanced selection of tree and shrub species than is currently present in these areas. These species, which are native and locally present in Hampshire, have been selected for their value as a food source for hazel dormice.

4.5. Compensatory nest boxes for hazel dormice are to be erected in retained habitat within 100 m of Shaft 7, Shaft 8 and Section 9 as per the mitigation requirements of the draft EPSM hazel dormouse licence for the Pipeline Scheme.

4.6. Additional offsite compensation areas will be sought to ensure that the pipeline delivers the mandatory 10% net gain as the Biodiversity Net Gain (BNG) assessment has concluded that it cannot be delivered on-site only. The maintenance and monitoring of any offsite BNG areas will need to be secured for a minimum of 30 years¹⁹.

¹⁹ Gov.uk guidance: <https://www.gov.uk/guidance/make-on-site-biodiversity-gains-as-a-developer#significant-on-site-enhancements> [Accessed 14/05/2024]

5. Project Team Roles and Responsibilities

Roles and Organisations Involved in the Delivery of the Environmental Management Plan

- 5.1. The OEMP has been developed into a full Construction Environment Management Plan (CEMP), by the Principal Contractor for the Pipeline Scheme.
- 5.2. The CEMP will be a live document and will be maintained by the Principal Contractor and updated as required throughout the life of the Pipeline Scheme.
- 5.3. The CEMP will be developed into the Handover Environmental Management Plan (HEMP) upon completion of the Pipeline Scheme, to pass crucial environmental information to those bodies responsible for future maintenance and operation of the asset (Portsmouth Water). The Principal Contractor will also be responsible for preparing the Construction Phase Health and Safety Plan alongside the HEMP, for handover to the managing agent.
- 5.4. An ECoW shall be appointed, to be full time on site during site preparation and clearance and during any works in sensitive areas, and to undertake regular monitoring visits throughout the duration of the Pipeline Scheme. Additional relevant roles and responsibilities are provided in Table 5-1.

Table 5-1 – Role and responsibilities for the Pipeline Scheme

Owner	Responsibilities
Principal Contractor	Accountable for legal and contractual compliance. Responsible for the provision of adequate resources to maintain legal compliance.
Principal Contractor's Environmental Manager	Responsible for programming and managing activities, e.g. obtaining and maintaining environmental consents and licences. Advising Construction Manager, Site Engineers, Site Supervisors and Site Operatives on requirements of undertaking specialist environmental works and remedial action where necessary.
Principal Contractor's ECoW	Provide support to the Environmental Manager. Provide site induction for other ecologists, tool box talks, organise specialist ecological surveys. Monitor Principal Contractor site ecological compliance, supervising works and construction activities on site, auditing/reviewing works and procedures including method statements as required. Record and report the progress of ecological works. Report any product or service ecological non-conformances
Principal Contractor's Landscape Consultants	Deliver the reinstatement of all habitats impacted by the Pipeline Scheme. Provide aftercare for reinstated areas over a five-year period. Monitoring newly reinstated areas during the aftercare period and deal with any issues or defects arising, including removal and replacement of any tree and shrub planting failures.
Principal Contractors Arboricultural Consultant	The arboricultural consultant will check that all measures detailed within the AIA (such as tree fencing/ground protection for root zones) have been installed correctly and works are being carried out as required. For full details of the responsibilities of this role refer to the AIA in Appendix A9.18

Post-construction environmental management responsibilities

- 5.5. The Principal Contractor's Landscape Consultant will be responsible for all aftercare, including monitoring, of reinstated areas (seeded areas and new tree/shrub planting) for a five-year period.
- 5.6. The Principal Contractor (or alternatively Portsmouth Water) will appoint an ecological consultant to carry out post-reinstatement monitoring of the habitats in Staunton Country Park for a period of five years. See Section 8 for further details.
- 5.7. As per BNG guidance 'significant' on-site enhancements must be supported by a 30 year habitat management and monitoring plan (HMMP)²⁰. A HMMP will be developed and agreed with all interested parties and the scheme is committed to securing the on-site post-development habitats for 30 years.
- 5.8. Portsmouth Water will maintain the pipeline for its lifetime as part of the infrastructure associated with the new Havant Thicket Reservoir.

²⁰ Government guidance 'Make on-site biodiversity gains as a developer' found at <https://www.gov.uk/guidance/make-on-site-biodiversity-gains-as-a-developer#significant-on-site-enhancements> [accessed 21/05/24]

6. Timescales

- 6.1. The indicative construction programme for the Pipeline Scheme, including elements of the Havant Thicket Reservoir scheme for context, is provided below in Table 6-1.

Table 6-1 – Indicative program of construction activities for the Pipeline Scheme

Dates	Key activity/milestone
March 2024	Shaft 1 reserved matter application submitted (under original planning permission).
June to September 2024	Construction period for Shaft 1.
Q2 2024	Planning application for the revised pipeline (the Pipeline Scheme) expected to be submitted.
March 2024 – September 2026	Havant Thicket Reservoir scheme activity - Construction of reservoir embankment, control house, culverts and connections to the Pipeline Scheme.
Summer 2025 – Summer 2027	Pipeline construction.
Autumn 2026 – Spring 2031	Havant Thicket Reservoir scheme activity – Construction of visitor facilities for the reservoir. Filling of reservoir in stages with pumped water from Bedhampton Springs on completion of the Pipeline Scheme. Testing and commissioning.

7. Record of Environmental Actions and Commitments (REAC)

- 7.1. The REAC (ES Volume 4, Appendix 2) identifies environmental actions and commitments made during the outline design to mitigate the potential environmental effects of the Pipeline Scheme.
- 7.2. Ecological actions identified in the REAC that are directly relevant to the Pipeline Scheme are provided in Table 7-1 below.

Table 7-1 – REAC: Ecological actions directly relevant to for the Pipeline Scheme

Ref	ES ref	Objective	Actions/commitments (incl. specific location and any monitoring required)	Assumptions (on which the action is based)	Achievement criteria and reporting requirements	When P - Pre-construction C - Construction O - Operation A - All
Biodiversity						
Pipeline B1	CH9	To set out mitigation and compensation for the Pipeline	Develop a detailed EMMP, to include strategy, responsibility and timing of actions to deliver onsite mitigation and compensation measures for the pipeline.	Stakeholder comments will be obtained from LPA, Natural England, and Environment Agency.	Agreement of EMMP by LPA. Quarterly ECoW progress reports to be provided to LPA during construction.	P, C
Pipeline B2	CH9	To assist appointed construction contractor in meeting biodiversity requirements	ECoW to be appointed, to be full time on site during site preparation and clearance and during any works in sensitive areas, and to undertake regular monitoring visits throughout construction programme.	ECoW to be appointed by contractor will be suitably qualified and experienced ecologist.	Quarterly ECoW progress reports to be provided to the LPA.	C
Pipeline B3	CH9	To protect areas of SINC and ancient woodland outside the working areas from accidental incursion	Install protective fencing (a fence type with high visibility will be used) at the edge of the working area, including protecting a 15 m buffer zone around all ancient woodlands where practicable (no fencing required around the ancient woodland), and with expert arboricultural advice where work is required within 15 m, and maintain throughout construction.	N/A	Integrity of adjacent areas to be monitored on weekly basis by ECoW. Updates to be included in quarterly ECoW progress report to LPA.	C

Ref	ES ref	Objective	Actions/commitments (incl. specific location and any monitoring required)	Assumptions (on which the action is based)	Achievement criteria and reporting requirements	When P - Pre-construction C - Construction O - Operation A - All
Pipeline B4	CH9	To protect retained trees, including veteran trees, from harm	The Tree Protection Plans (refs HTR-ATK-PZ-BR-DR-L-0001-0011) show all the recorded trees within the Scheme extents. These include those that require removal to facilitate the Scheme. All trees identified for retention, including veterans, will be protected in line with mitigation measures detailed within Arboricultural Impact Assessment. Protection of retained trees is to follow standard practice (i.e. BS 5837:2012 Trees in relation to design, demolition and construction – recommendations). A construction exclusion zone will be established using steel mesh panel fencing, or similar, around retained trees where works are not limited by the existing roads or other associated hard infrastructure that could be protecting underlying tree roots. The TPPs show where incursions are required into root protection areas and the mitigation measures required to facilitate these works, notably the requirements for any root pruning and arboricultural supervision during excavations.	Stakeholder comments will be obtained from LPA and Natural England.	Agreement of tree protection strategy by LPA. Quarterly ECoW progress reports to be provided to LPA during construction.	P, C

Ref	ES ref	Objective	Actions/commitments (incl. specific location and any monitoring required)	Assumptions (on which the action is based)	Achievement criteria and reporting requirements	When P - Pre-construction C - Construction O - Operation A - All
			The retained veteran trees shall be assessed by an arboriculturist prior to construction to inform on any potential remedial works that maybe required to manage any structural or physiological defect(s) that increase the likelihood of full or partial failure of the tree or tree part within falling distance of the works. This forms part of a duty of care to both people and property laid down in the Occupiers Liability Acts 1957 and 1984, the Highways Act 1980 and Health and Safety at Work Act 1974. Veteran habitat features are often defects, meaning any potential works will be sympathetic, whilst being reasonable in order to manage the risk of harm to people or property.			
Pipeline B5	CH9	To ensure habitat is protected and restored within High Lawn and Thicket Lawn SINCS	Create and follow a detailed methodology for turf and soil removal, storage and restoration for pipeline installation within the SINCS.	Measures to be set out in EMMP.	Agreement of EMMP by LPA. Updates to be included in quarterly ECoW progress report to LPA.	P, C
Pipeline B6	CH9	To protect Great Copse ancient woodland and SINC	During detailed design, set out working area and methods to minimise incursion into the Great Copse SINC and avoid any incursion within the ancient woodland area of the SINC and include	Detailed design will protect all mature trees	Agreement of EMMP by LPA. Quarterly ECoW progress reports to be provided	C

Ref	ES ref	Objective	Actions/commitments (incl. specific location and any monitoring required)	Assumptions (on which the action is based)	Achievement criteria and reporting requirements	When P - Pre-construction C - Construction O - Operation A - All
			measures to protect all mature trees throughout construction and to restore vegetation after works.		to LPA during construction.	
Pipeline B7	CH9, CH15	To protect watercourses from construction related pollution risk	The Principal Contractor will adopt best practice to avoid pollution of watercourses. This is to include, but is not limited to, adherence to Guidelines for Pollution Prevention (GPP), latest Environment Agency pollution guidance available from data.gov, and Construction Industry Research and Information Associated (CIRIA) guidance on the control of water pollution from construction sites.	Contractual responsibilities between Portsmouth Water and Principal Contractor. Pollution prevention measures will be detailed in a CEMP. The PC will have access to relevant guidance material.	No reportable incidents of construction related watercourse pollution above thresholds set within the water quality monitoring strategy.	P, C
Pipeline B8	CH9	Protection of existing fish populations	During watercourse de-watering activities (specifically to facilitate the open cut pipeline crossing of the Lake Stream, the three culvert upgrades on Riders Lane Stream and if required for the construction of the Emergency Discharge spillway on the Hermitage Stream, appropriately screened pumping equipment will be deployed to reduce risk of fish entrainment. Particular care should be taken to remove European eel (a critically endangered species) from soft sediments and culverts.	Construction of the open cut pipeline crossing of the Lake Stream, three culvert upgrades on the Riders Lane Stream and construction of the Emergency Discharge Chamber may require dewatering and over pumping of existing watercourse lengths. Approaches to	No harm to fish during dewatering activities. Quarterly ECoW progress reports to be provided to LPA during construction.	P, C

Ref	ES ref	Objective	Actions/commitments (incl. specific location and any monitoring required)	Assumptions (on which the action is based)	Achievement criteria and reporting requirements	When P - Pre-construction C - Construction O - Operation A - All
				prevent harm to fish will be required as part of the Flood Risk Activity Permits / best practice.		
Pipeline B9	CH9	Protection of existing fish populations	Development of a fish management plan to cover appropriate methods for the removal of fish from any sections of channel requiring de-watering. To include the use of appropriately screened pumping equipment to reduce the risk of fish entrainment/impingement.	Construction of the open cut pipeline crossing of the Lake Stream, three culvert upgrades on the Riders Lane Stream and construction of the Emergency Discharge Chamber may will require de-watering and over pumping of existing watercourse lengths. Approaches to prevent harm to fish will be required as part of the Flood Risk Activity Permits / best practice. Any fish removal will need to be undertaken with regard to	No harm to fish during any removal process. Quarterly ECoW progress reports to be provided to LPA during construction. Detail of fish removal/translocation reported within Environment Agency FR2 consenting process.	P, C

Ref	ES ref	Objective	Actions/commitments (incl. specific location and any monitoring required)	Assumptions (on which the action is based)	Achievement criteria and reporting requirements	When P - Pre-construction C - Construction O - Operation A - All
				Environment Agency FR2 consenting requirements.		
B10	CH9, CH15	Protection of retained watercourses and associated flora and fauna	Development of specific pollution management plans for the construction of the open cut pipeline crossing of the Lake Stream, three culvert upgrades on the Riders Lane Stream and construction of the Emergency Discharge Chamber which shall include fine sediment control measures e.g. in channel silt fences to avoid detrimental effects on aquatic habitats and species associated with fine sediment release from the construction area. Discharges to surface water drainage or watercourses associated with shaft construction, and non-emergency washout valve testing will require environmental permitting. A management plan will be implemented to ensure appropriate treatment prior to discharge to any existing surface water drainage or watercourses.	There will be a requirement to manage potential of pollution and silt propagation within watercourse channels associated with in-channel working. Required as part of Flood Risk Activity Permits.	No reportable incidents of construction related watercourse pollution above thresholds set within the water quality monitoring strategy. Quarterly ECoW progress reports to be provided to LPA during construction.	P, C

Ref	ES ref	Objective	Actions/commitments (incl. specific location and any monitoring required)	Assumptions (on which the action is based)	Achievement criteria and reporting requirements	When P - Pre-construction C - Construction O - Operation A - All
B11	CH9, CH15	Watercourse mitigation and compensation	Reinstatement of riparian zones (e.g. bank profiles and/or vegetation cover) following disturbance from construction associated with construction compounds, pipeline crossings and culvert upgrades and the open cut pipeline crossing under the Lake Stream. Ecologically sensitive reinstatement of channel (e.g. bank profiles, channel bed profile and sediments and riparian vegetation cover) following temporary channel loss associated with construction of the pipeline crossing of the Lake Stream following advice from an ecologist.	Stakeholder comments will be obtained from LPA and Environment Agency.	Agreement of Watercourse Mitigation and Compensation Strategy by statutory authorities. Mitigations and compensation meet objectives within the timescales set out within the Watercourse Mitigation and Compensation Strategy.	A
B12	CH9, CH15	Protection of existing fish populations and watercourse connectivity	A culvert design configuration will be developed that avoids detrimental effects on fish passage through appropriate positioning of the new culvert pipes at a level that maintains suitable depths and velocities to facilitate fish passage through the retained existing structures.	Requirement to maintain ecological connectivity within the system.	Implemented as designed.	P, C

Ref	ES ref	Objective	Actions/commitments (incl. specific location and any monitoring required)	Assumptions (on which the action is based)	Achievement criteria and reporting requirements	When P - Pre-construction C - Construction O - Operation A - All
B13	CH9	Protection of bats from indirect harm	Mitigation will be provided for lighting during construction. Any temporary lighting required during construction will be designed to minimise light spill, and to avoid light spill of more than 0.5 Lux on retained woodland areas and on trees and buildings assessed as providing suitability for roosting bats. Pre-felling check of low potential bat trees required to confirm status of tree has not changed. Licensed bat ecologist to be present during felling. Further mitigation to be agreed in the unlikely event a roost found within trees. Further emergence surveys of Bedhampton 1 and 2 and moderate and high potential trees at Bedhampton site PROW diversion will be carried out to determine if roosting bats are present. Necessary mitigation to avoid impacting any known roosts or compensate for any necessary loss of a known roost/s will be implemented.	Further mitigation to be agreed with Natural England if roosting bats are found and there is potential for roosting bats to be impacted by the works on Bedhampton 1 and 2 and/or the PROW diversion.	If temporary lighting is required, updates will be included in ECoW's quarterly progress reports to be provided to LPA during construction. Bat report to be provided to LPA and Natural England (if bat roosts are found) European Protected Species Mitigation (EPSM) licence to be obtained from Natural England if roosts are found and cannot be avoided.	P, C

Ref	ES ref	Objective	Actions/commitments (incl. specific location and any monitoring required)	Assumptions (on which the action is based)	Achievement criteria and reporting requirements	When P - Pre-construction C - Construction O - Operation A - All
B14	CH9	Protection of otters	Precautionary pre-clearance survey will be undertaken at watercourses and areas of scrub and woodland linked to watercourses. Vegetation clearance in these areas will follow Precautionary Method of Working. Light spill on watercourses will be avoided.	Further mitigation to be agreed with LPA if evidence of otters is found.	Quarterly ECoW progress reports to be provided to LPA during construction.	P, C
B15	CH9	Protection of badgers	Precautionary pre-clearance survey will be undertaken at areas of suitable habitat. Vegetation clearance in these areas will follow Precautionary Method of Working.	A licence will be obtained if badgers colonise the site and a sett requires closure.	Quarterly ECoW progress reports to be provided to LPA during construction.	P, C
B16	CH9	Protection of nesting birds	Precautionary pre-clearance survey will be undertaken at areas of suitable habitat if clearance is required in the nesting season (typically March to August). Vegetation clearance in these areas will follow Precautionary Method of Working. Pre-construction check for kingfisher nests and breeding Cetti's warbler to be undertaken where works are planned during the kingfisher breeding season (March to July) and Cetti's warbler breeding season (April to August). Mitigation to reduce disturbance such as fencing and/or timing of works in	Further mitigation to be agreed with LPA if evidence of nesting kingfisher or cetti's warbler is found.	Quarterly ECoW progress reports to be provided to LPA during construction.	P, C

Ref	ES ref	Objective	Actions/commitments (incl. specific location and any monitoring required)	Assumptions (on which the action is based)	Achievement criteria and reporting requirements	When P - Pre-construction C - Construction O - Operation A - All
			suitable areas outside of core breeding season may be required.			
B17	CH9	Protection of reptiles	Retained vegetation will be protected for use as receptor sites. Clearance of suitable habitat will follow the method of habitat manipulation and displacement outlined in the EMMP.	N/A	Quarterly ECoW progress reports to be provided to LPA during construction.	C
B18	CH9	Avoid spread of invasive non-native species (construction)	CEMP (which will contain the invasive species management plan) will include detailed methods to minimise risks of spreading invasive non-native species by managing risks and removing them, including the adoption of Check Clean Dry procedures to be followed before and after any in channel works and pre-construction checks to avoid spread of invasive aquatic invertebrate and plant species (including Himalayan balsam).	N/A	Agreement of CEMP by LPA.	P, C
B19	CH9	Monitor works to inform adaptive management	EMMP will set out monitoring requirements. These will include habitat monitoring to inform management decisions for the restored grassland in the High Lawn and Thicket Lawn SINCS during the maintenance period.	N/A	Agreement of EMMP by LPA.	P, C, O

Ref	ES ref	Objective	Actions/commitments (incl. specific location and any monitoring required)	Assumptions (on which the action is based)	Achievement criteria and reporting requirements	When P - Pre-construction C - Construction O - Operation A - All
B20	CH9	Protection of hazel dormice	Works at Shaft 7, Shaft 8 and Section 9 to be undertaken under the scheme-specific EPSM licence for hazel dormice. Compensatory nest boxes for hazel dormice to be erected in retained habitat within 100 m of Shaft 7, Shaft 8 and Section 9 as per the mitigation requirements of the draft EPSM hazel dormouse licence for the Pipeline Scheme (locations to be confirmed in early 2024).	Mitigation to be followed as per EPSM licence/as agreed with Natural England.	Quarterly ECoW progress reports to be provided to LPA during construction	P, C, O
B21	CH9	To report as required under licences.	Monitoring requirements will be met, as set out in the hazel dormouse licence.	N/A	Monitoring reports to be provided to Natural England and copied to LPA.	P, C, O
B22	CH9	To ensure small-flowered buttercup and wall bedstraw are reinstated	Create and follow a detailed methodology for topsoil removal and reinstatement of soil following works completion and carry out monitoring as set out in the EMMP.	Measures to be set out in EMMP.	Agreement of EMMP by LPA. Updates to be included in quarterly ECoW progress report to LPA.	P, C

Ref	ES ref	Objective	Actions/commitments (incl. specific location and any monitoring required)	Assumptions (on which the action is based)	Achievement criteria and reporting requirements	When P - Pre-construction C - Construction O - Operation A - All
Pipeline B21	CH9	Avoid spread of invasive non-native species (operational)	An INNS Risk Assessment needs to be completed to understand if proposed pipeline connections carry a risk of spreading invasive non-native species within the Hermitage Stream catchment; or to other hydrological catchments. An options appraisal should be undertaken to review what (if any) mitigation measures are available that can limit or prevent the risk of INNS spreading as a result of scheme operation. These mitigation measures may well change certain aspects of the scheme design.	INNS Biosecurity Plan will provide context and areas of focus for mitigation. Mitigation needs to be agreed with the EA	INNS Risk Assessment Report INNS Mitigation Measures options appraisal	P

8. Monitoring

During Construction

- 8.1. The ECoW will monitor all activities outlined in this document including, but not restricted to: bat tree mitigation; bat building mitigation; nesting bird checks (if required); hazel dormouse mitigation (in conjunction with the named ecologist on the hazel dormouse EPSM licence); widespread species of reptile and common amphibian habitat manipulation; works within areas where rabbit and fox are present; works to/within a 30 m buffer of active badger setts (if present); and works within High Lawn SINC, Thicket Lawn SINC and at The Lake Stream.
- 8.2. The ECoW will also liaise with other specialists carrying out monitoring duties during construction, such as any invasive non-native species management specialists, arboricultural consultants and others where necessary.

Hazel Dormouse

- 8.3. Compensatory nest boxes for hazel dormice are to be erected in retained habitat within 100 m of Shaft 7, Shaft 8 and Section 9 as per the mitigation requirements of the draft EPSM hazel dormouse licence for the Pipeline Scheme. The compensatory nest boxes will be monitored for a minimum of two years, with specific details on the monitoring requirements to be confirmed following consultation on the draft licence via a PSS with Natural England. This document will be updated accordingly if any changes are requested through the PSS.
- 8.4. The separate granted EPSM licence for hazel dormice for the Havant Thicket Reservoir scheme has an existing long-term monitoring strategy in place for the local hazel dormouse population.

Priority Plants

- 8.5. Small-flowered buttercup and wall bedstraw within the Bedhampton site are expected to recolonise any temporarily impacted areas. Permanent loss of grassland will be minimal at this site and post-construction monitoring (to be carried out annually over a five year period) and, if required, adaptive management will be carried out to encourage the conditions the species prefer (short grassland with some disturbance) to ensure the population persists.

High Lawn SINC and Thicket Lawn SINC

- 8.6. Habitat monitoring will be required to ensure reinstatement and aftercare of habitats within Shaft 8 and Section 9 (High Lawn SINC and Thicket Lawn SINC) are successful. 'Measures of Success' are outlined below. As there will be different impacts on the shaft compound sites (Shaft 8) and the open cut section (Section 9), two separate objectives have been created, and are tailored to each area and associated works.
- 8.7. Monitoring will commence in year 1, which is the first year after turfs have been replaced or autumn sowing of the site. Initial habitat monitoring will focus on identifying any signs of compaction and/or excessive growth of undesirable species. This will help inform initial aftercare and maintenance activities, which will be carried out by the Principal Contractor's landscape contractor.
- 8.8. Once the grassland within both areas has had a chance to establish, which is anticipated to be by year 2, habitat monitoring will be undertaken in years 2, 3 and 5 to determine whether habitat reinstatement and aftercare has been 'successful'. Monitoring will be undertaken by a suitably qualified and experienced ecologist (FISC level 4 or above) on behalf of the Principal Contractor or Portsmouth Water.
- 8.9. It should be noted that the BNG requirement for 30 years of habitat management and monitoring has not been applied to the open cut section of High Lawn and Thicket Lawn SINC as the habitat has been considered to be 'retained' in BNG terms as per the

guidance on temporary impacts outlined in the metric user guide (due to the embedded mitigation associated with the turf translocation approach).

- 8.10. The methodology for monitoring will be loosely based on the NVC survey system, as recommended by Common Standard Monitoring Guidance for Lowland Grassland²¹. Re-surveying fixed quadrats will enable some quantified comparison between the baseline NVC survey. However, it is recognised that the vegetation placed back in a fixed quadrat location may be a slightly different group of turfs from those moved from it, and also that shaft compound sites may take longer (5-10 years is expected) to align with a baseline NVC community type and, therefore, the focus of the monitoring and the measures of success outlined in the next section will be the presence of target species and the likely absence of non-target species across the whole affected area where grassland has been restored after the works, rather than aiming for a specific NVC community type.
- 8.11. Following each monitoring survey, a report will be produced, with three reports produced in total. Each report will detail the results of the monitoring survey, which will be compared against the baseline and be used to determine whether the objectives and measures of success are being met. Depending on the progression of the habitat reinstatement and aftercare, further recommendations may be made.
- 8.12. The monitoring targets proposed below in Table 8-1, attempt to give broad measures of success to restore and maintain the habitats within both the turfed area and the shaft compound sites. Targets are set for the affected areas in general and species do not have to solely occur within the fixed quadrats to be counted towards the targets. The fixed quadrat locations are used to allow for comparison and to focus surveyor effort to collect data in a quantifiable and replicable way.
- 8.13. A list of target/non-target species is provided in Table 8-2. Target species can be revised yearly, if necessary, to ensure that the final list takes account of the conditions then prevailing at the site.

Table 8-1 – Measures of Success (High Lawn SINC and Thicket Lawn SINC habitat monitoring – Section 9)

Objective	Targets/Measures of Success (MoS) Year 2 and 3	Targets/MoS Year 5
Objective 1: Restore the turfed area of High Lawn SINC, Thicket Lawn SINC and adjacent turf storage areas, to previous habitat type/condition.	Target species present in area (5-10). Non-target species coverage in area less than 20%. Grass to herb ratio of area = (40-90%). Extent of bare ground in area less than 10%. No signs of soil compaction observed in area.	Target species present in area (5-10). Non-target species coverage in area less than 10%. Grass to herb ratio of area = (40-90%). Extent of bare ground in area less than 10%. No signs of long-term damage to the area.
Objective 2: Restore the site/access route within High Lawn SINC and Thicket Lawn SINC to	Target species present in area (number 5 - 10). Non-target species coverage in area less than 20%.	Target species present in area (number 5 - 10). Non-target species coverage in area less than 10%.

²¹ JNCC (2004) Common Standards Monitoring Guidance for Lowland Grassland, Version February 2004, JNCC, Peterborough, ISSN 1743-8160. Accessed 14/06/23: <https://hub.jncc.gov.uk/assets/15a03fed-f306-4f01-9139-4933e814b9ec#:~:text=The%20guidance%20given%20here%20deals%20with%20common%20standards,interest%20features%2C%20attributes%2C%20targets%20and%20methods%20of%20assessment.>

Objective	Targets/Measures of Success (MoS) Year 2 and 3	Targets/MoS Year 5
previous habitat type/condition ²² .	Grass to herb ratio of area = (40-90%). Extent of bare ground in area less than 10%. No signs of soil compaction observed in area.	Grass to herb ratio of area = (40-90%). Extent of bare ground in area less than 10%. No signs of long-term damage to the area.

Table 8-2 - Target species for monitoring

High Lawn target species	Thicket Lawn target species	Non-target species (High Lawn and Thicket Lawn)
Sharp-flowered rush Meadow foxtail Meadow barley Oval sedge Bog stitchwort Crested dog's-tail Greater bird's-foot-trefoil Sweet vernal-grass Corky-fruited water-dropwort	Corky-fruited water-dropwort Sharp-flowered rush Common knapweed Meadow barley Meadow foxtail Meadow fescue Meadowsweet Pepper saxifrage Glaucous sedge Common bird's-foot-trefoil Sweet vernal-grass Tufted hair-grass Sneezewort Common sorrel Oval sedge Meadow vetchling Hoary ragwort	Creeping thistle Curled dock Creeping buttercup Bramble Oak or willow saplings Blackthorn suckers

BNG Compliance Monitoring

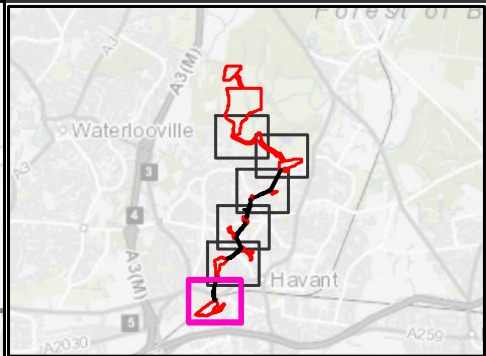
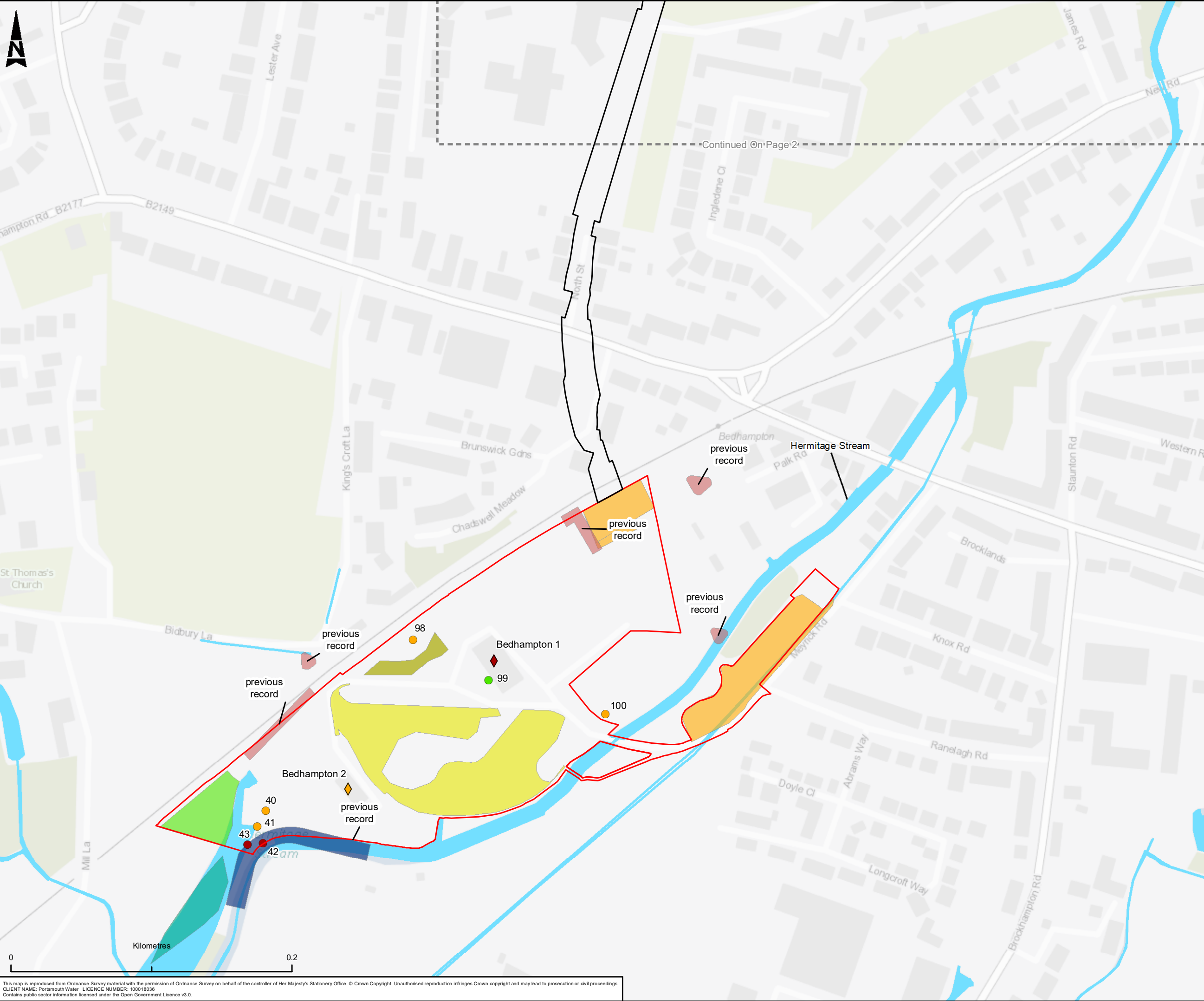
- 8.14. All reinstated habitats within the above-ground works areas are considered to be 'significant' on-site gains in BNG terms and will therefore require a 30-year habitat management and monitoring plan to ensure delivery of the committed on-site post-development BNG units.

²² Targets/Measures of success for shaft 8 have focused on the first 5 years post-construction however there will be a requirement to implement a BNG habitat management and monitoring plan (HMMP) for the habitats reinstated by the scheme as they are considered to be 'significant' on-site gains in BNG terms.

Appendices



Appendix A. Ecological Constraints Plan



Pipeline Scheme Red Line Boundary

- Surface and Underground Works
- Underground Works Only
- Adjacent Map Sheets
- Priority Plants

Ground Level Tree Assessment for Bats

- High Suitability
- Moderate Suitability
- Low Suitability

Building Preliminary Roost Assessment for Bats

- High Suitability
- Moderate Suitability

Aquatic habitat

- Aquatic Feature

Habitat Suitability Assessment for Widespread Species of Reptile

- Optimal Suitability
- Sub-Optimal Suitability

Invasive Non-native Plant Species

- Butterfly Bush
- Himalayan Balsam
- Japanese Knotweed
- New Zealand Pygmyweed

NOTE: Only ecological constraints within or immediately adjacent to the surface works locations are shown. Please refer to ES Volume 4 for further information on environmental constraints. Badger setts have not been included to protect the species from persecution. 'Previous record' annotations relate to records of invasive non-native plant species previously recorded and treated by Portsmouth Water. Please refer to Appendix 9.16 Pipeline Ecological Update for further information.

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Aztec West
500 Park Avenue
Almondsbury
Bristol
BS32 4RZ

Tel: +44 (0) 1454 6620000
Fax: +44 (0) 1454 663333
www.atkinsrealis.com

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Project | Originator | Volume | Location | Type | Role | Number

Telephone: Havant (023) 9249 9888
Fax: Havant (023) 9245 3632
Website: www.portsmouthwater.co.uk
Registered Office: PO Box 8 West Street
Havant Hampshire PO9 1LG
REGISTERED IN ENGLAND No. 2536455

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5169117	1 of 6	1:2,500	A3

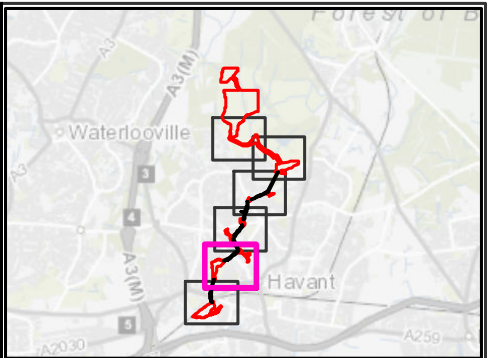
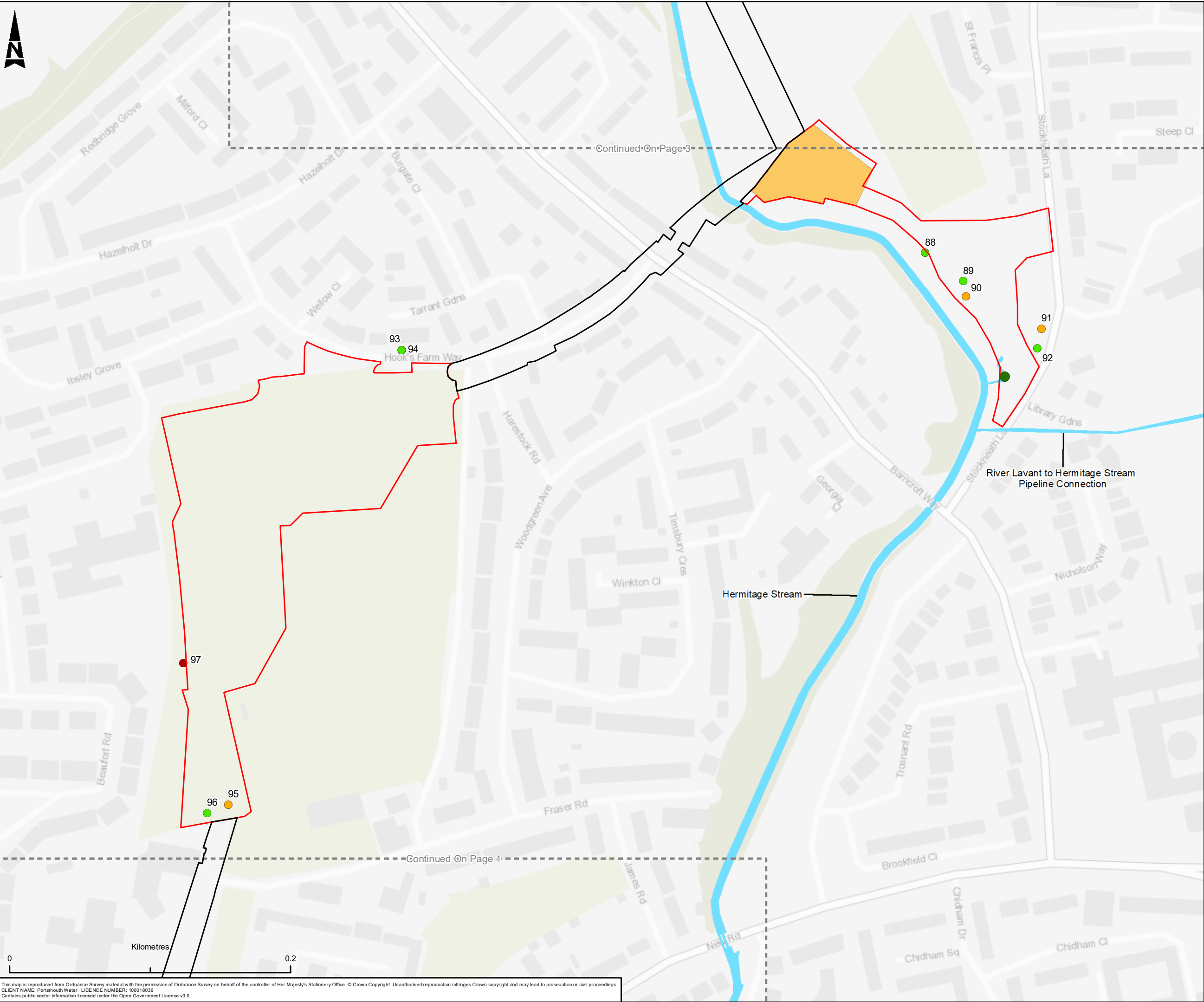
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HAVANT THICKET RESERVOIR

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**FIGURE 9.18
ECOLOGICAL CONSTRAINTS
PAGE 1 OF 6**

Portsmouth Water Drawing Number	Rev
	C02



- Pipeline Scheme Red Line Boundary**
- Surface and Underground Works
 - Underground Works Only
 - Adjacent Map Sheets
- Ground Level Tree Assessment for Bats**
- High Suitability
 - Moderate Suitability
 - Low Suitability
- Invasive Non-native Plant Species**
- Montbretia
- Aquatic habitat**
- Aquatic Feature
- Habitat Suitability Assessment for Widespread Species of Reptile**
- Sub-Optimal Suitability

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Aztec West
500 Park Avenue
Almondsbury
Bristol
BS32 4RZ

Tel: +44 (0) 1454 6620000
Fax: +44 (0) 1454 663333
www.atkinsrealis.com

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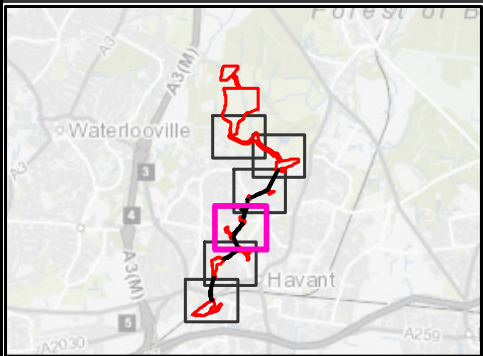
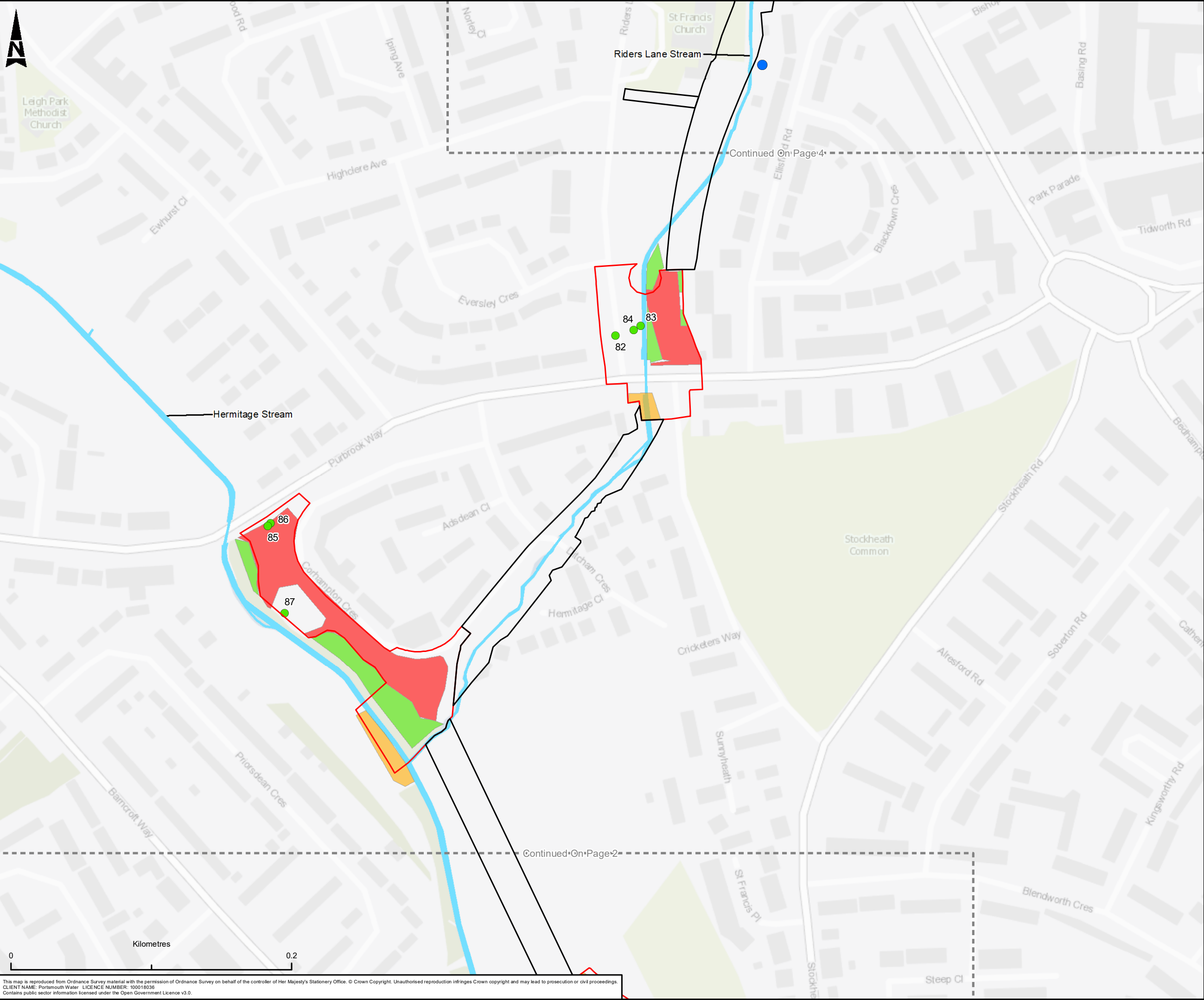
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FIGURE 9.18
ECOLOGICAL CONSTRAINTS
PAGE 2 OF 6

Portsmouth Water Drawing Number	Rev
	C02



Pipeline Scheme Red Line Boundary

- Surface and Underground Works
- Underground Works Only
- Adjacent Map Sheets

Ground Level Tree Assessment for Bats

- Low Suitability

Otter Field Signs

- Otter Spraint (Old)

Aquatic habitat

- Aquatic Feature

Habitat Suitability Assessment for Widespread Species of Reptile

- Optimal Suitability
- Sub-Optimal Suitability
- Poor Suitability

NOTE: Only ecological constraints within or immediately adjacent to the surface works locations are shown. Please refer to ES Volume 4 for further information on environmental constraints. Badger setts have not been included to protect the species from persecution. 'Previous record' annotations relate to records of invasive non-native plant species previously recorded and treated by Portsmouth Water. Please refer to Appendix 9.16 Pipeline Ecological Update for further information.

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Almondsbury
Bristol
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Tel: +44 (0) 1454 6620000
Fax: +44 (0) 1454 663333
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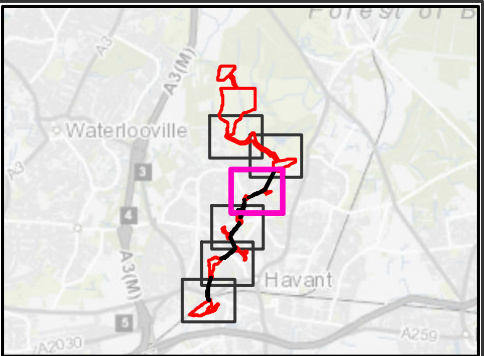
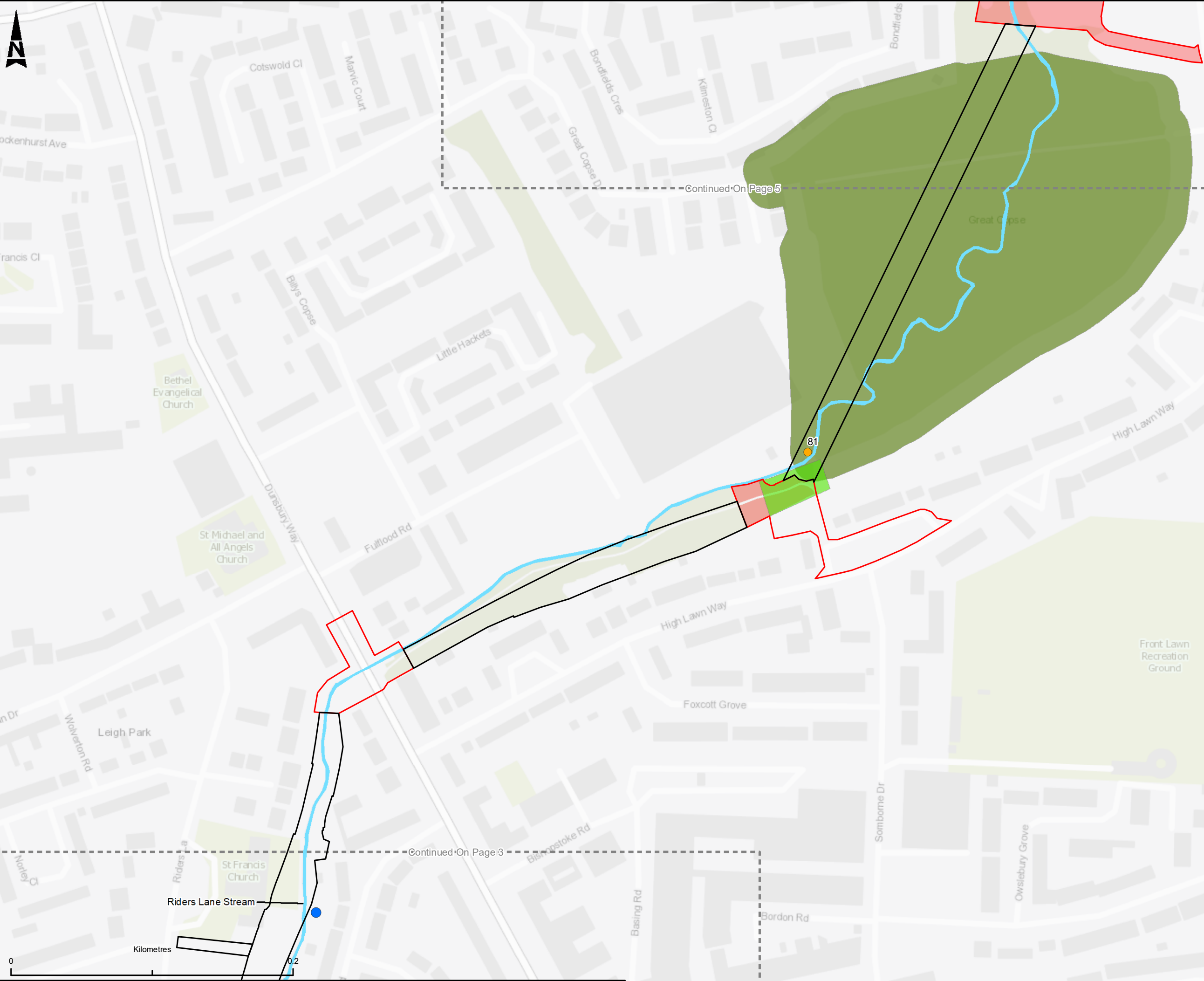


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**FIGURE 9.18
ECOLOGICAL CONSTRAINTS
PAGE 3 OF 6**

Portsmouth Water Drawing Number	Rev
	C02



- Pipeline Scheme Red Line Boundary**
- Surface and Underground Works
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 - Adjacent Map Sheets
- Ground Level Tree Assessment for Bats**
- Moderate Suitability
- Otter Field Signs**
- Otter Spraint (Old)
- Aquatic habitat**
- Aquatic Feature
- Ancient Woodland**
- Ancient Woodland
- Hazel Dormouse EPSM Licence**
- Works to be undertaken under site-specific hazel dormouse EPSM licence
- Habitat Suitability Assessment for Widespread Species of Reptile**
- Optimal Suitability

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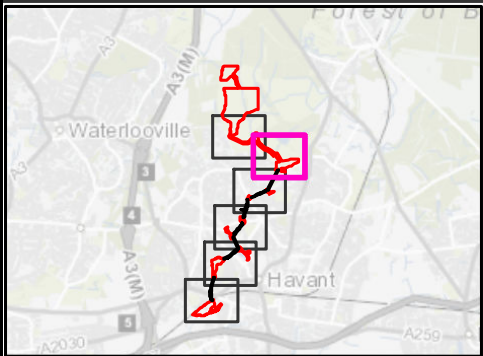
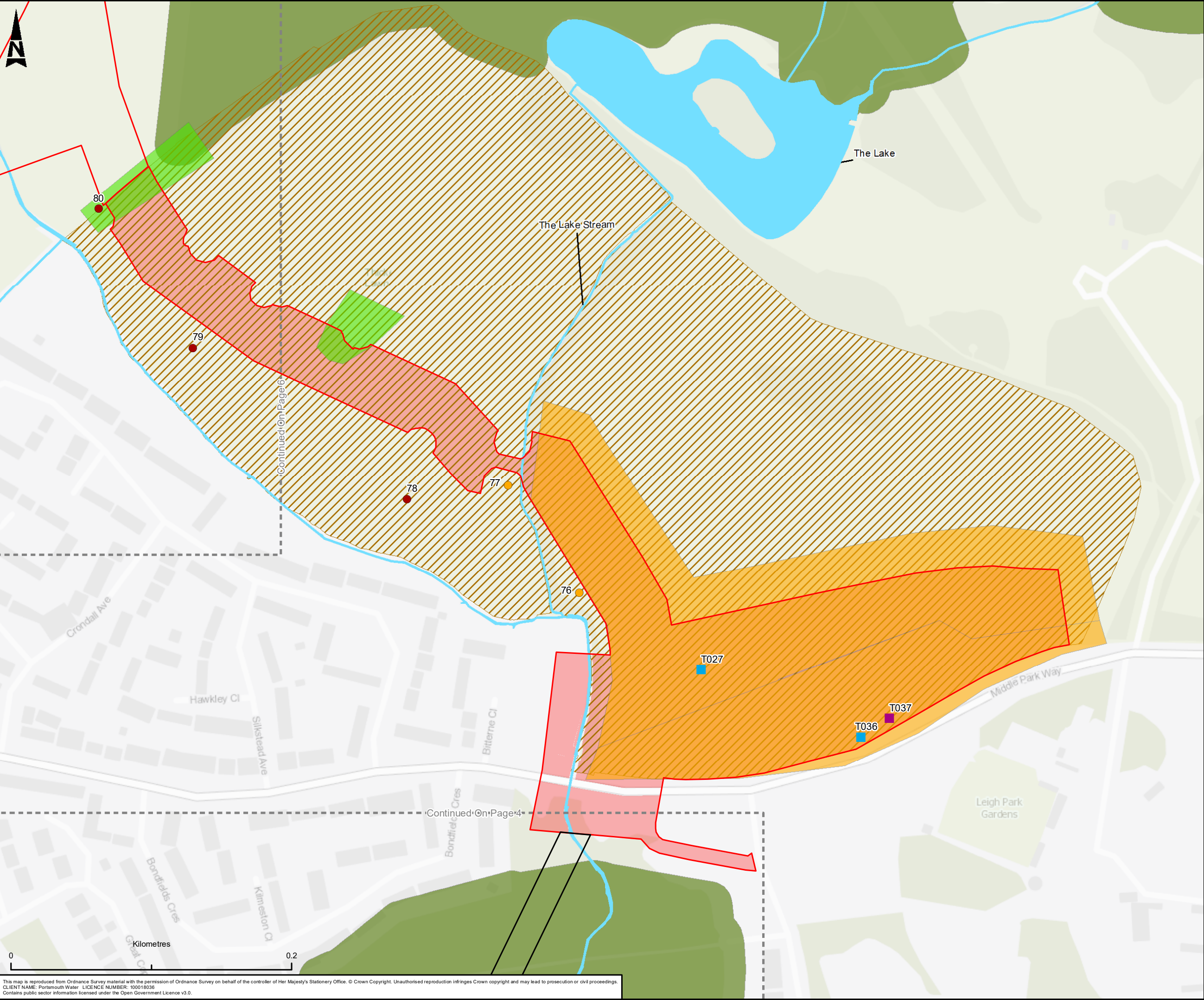


Project Ref. No	Sheet	Scale	Sheet Size
5169117	4 of 6	1:2,500	A3

Project Title
HAVANT THICKET RESERVOIR

Drawing Title
FIGURE 9.18 ECOLOGICAL CONSTRAINTS PAGE 4 OF 6

Portsmouth Water Drawing Number	Rev
	C02



- Pipeline Scheme Red Line Boundary**
- Surface and Underground Works
 - Underground Works Only
 - Adjacent Map Sheets
- Non-statutory Designated Sites**
- High Lawn SINC and Thicket Lawn SINC
- Ground Level Tree Assessment for Bats**
- High Suitability
 - Moderate Suitability
- Veteran/Notable/Ancient Tree Classification**
- Veteran/Notable
 - Locally Notable
- Aquatic habitat**
- Aquatic Feature
- Ancient Woodland**
- Ancient Woodland
- Hazel Dormouse EPSM Licence**
- Works to be undertaken under site-specific hazel dormouse EPSM licence
- Habitat Suitability Assessment for Widespread Species of Reptile**
- Optimal Suitability
 - Sub-Optimal Suitability

NOTE: Only ecological constraints within or immediately adjacent to the surface works locations are shown. Please refer to ES Volume 4 for further information on environmental constraints. Badger setts have not been included to protect the species from persecution. Previous record annotations relate to records of invasive non-native plant species previously recorded and treated by Portsmouth Water. Please refer to Appendix 9.16 Pipeline Ecological Update for further information.

C02	MMN	NW	AR	JF	PUBLISHED	03/04/2024
C01	FD	DE	AR	JF	PUBLISHED	27/06/2023
Rev	Dm By	Cld By	Rev By	Auth By	Description	Date



Aztec West
500 Park Avenue
Almondsbury
Bristol
BS32 4RZ
Tel: +44 (0) 1454 6620000
Fax: +44 (0) 1454 663333
www.atkinsrealis.com

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Drawing Suitability	Status
PUBLISHED	A1

Contractors Drawing Number:
HTR - ATK - ZZ - ZZ - GS - Z - 0183
Project Originator Volume Location Type Role Number

Telephone: Havant (023) 9249 9888
Fax: Havant (023) 9245 3632
Website: www.portsmouthwater.co.uk
Registered Office: PO Box 8 West Street
Havant Hampshire PO9 1LG
REGISTERED IN ENGLAND No. 2536455

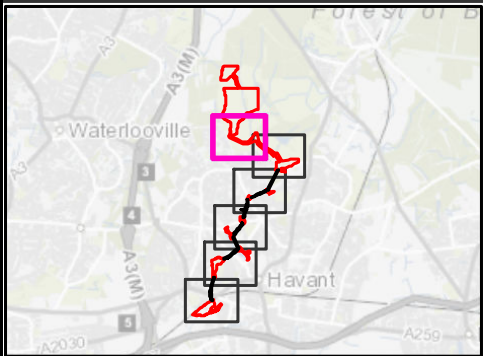
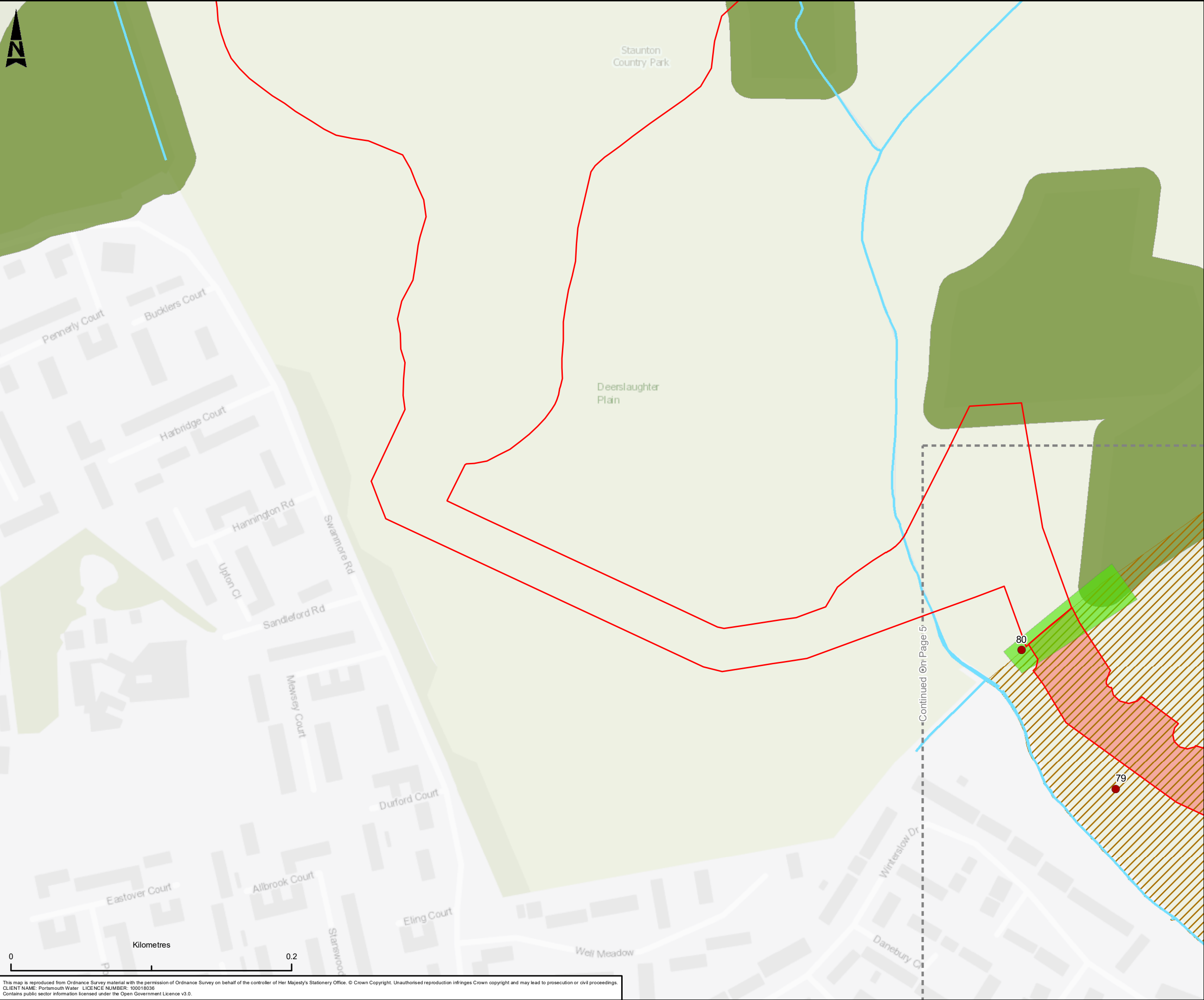


Project Ref. No	Sheet	Scale	Sheet Size
5169117	5 of 6	1:2,500	A3

Project Title
HAVANT THICKET RESERVOIR

Drawing Title
FIGURE 9.18 ECOLOGICAL CONSTRAINTS PAGE 5 OF 6

Portsmouth Water Drawing Number	Rev
	C02



- Pipeline Scheme Red Line Boundary**
- Surface and Underground Works
 - Adjacent Map Sheets
- Non-statutory Designated Sites**
- High Lawn SINC and Thicket Lawn SINC
- Ground Level Tree Assessment for Bats**
- High Suitability
- Ancient Woodland**
- Ancient Woodland
- Hazel Dormouse EPSM Licence**
- Works to be undertaken under site-specific hazel dormouse EPSM licence
- Habitat Suitability Assessment for Widespread Species of Reptile**
- Optimal Suitability

NOTE: Only ecological constraints within or immediately adjacent to the surface works locations are shown. Please refer to ES Volume 4 for further information on environmental constraints. Badger setts have not been included to protect the species from persecution. 'Previous record' annotations relate to records of invasive non-native plant species previously recorded and treated by Portsmouth Water. Please refer to Appendix 9.16 Pipeline Ecological Update for further information.

C02	MMN	NW	AR	JF	PUBLISHED	03/04/2024
C01	FD	DE	AR	JF	PUBLISHED	27/06/2023
Rev	Dm By	Cld By	Rev By	Auth By	Description	Date



Aztec West
500 Park Avenue
Almondsbury
Bristol
BS32 4RZ

Tel: +44 (0) 1454 6620000
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www.atkinsrealis.com

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Drawing Suitability	Status
PUBLISHED	A1

Contractors Drawing Number:
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Telephone: Havant (023) 9249 9888
Fax: Havant (023) 9245 3632
Website: www.portsmouthwater.co.uk
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Project Ref. No	Sheet	Scale	Sheet Size
5169117	6 of 6	1:2,500	A3

Project Title
HAVANT THICKET RESERVOIR

Drawing Title
**FIGURE 9.18
ECOLOGICAL CONSTRAINTS
PAGE 6 OF 6**

Portsmouth Water Drawing Number	Rev
	C02