



West Winch Housing Access Road

Environmental Statement Chapter 8: Biodiversity Annex 8.14 Otter and Water Vole Survey Report

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1 Introduction

1.1 Methodology

Overview

1.1.1 Otter *Lutra lutra* and Water Vole *Arvicola amphibius* surveys were undertaken for the Proposed Scheme for watercourses within the (previous) Scheme Boundary (all maps have been updated with the latest Scheme Boundary (October 2023)). The watercourses surveyed are those that are likely to be directly impacted by the Proposed Scheme.

1.1.2 Two Otter and Water Vole surveys were 2021 in the appropriate season. Otter surveys can be carried out year-round, but spring is preferable and Water Vole March to October in south-east England). The surveys were undertaken across multiple days due to the size of the survey area.

Field Survey

1.1.3 All watercourses identified as suitable habitat were subject to detailed Otter and Water Vole survey. All of the watercourses were ditches and are labelled D1-D16. The ditches are located throughout the Proposed Scheme. The locations of the ditches are shown in Appendix A.

Otter survey

1.1.4 The Survey Area in relation to Otter comprised 300m sections watercourse within the Scheme Boundary extending up and downstream from the Scheme Boundary, that were likely to be impacted by the Proposed Scheme. This also included all directly connected watercourses and associated riparian/holt building habitat.

1.1.5 The Survey Area was selected to focus on the immediate area impacted by the Proposed Scheme, particularly focussing on the discovery of holts, couches or evidence of features of importance to Otters. All suitable habitat identified as having potential to support Otter populations was surveyed within the Survey Area. The Survey Area extents are shown in Appendix A.



1.1.6 The survey for Otter was carried out with reference to good practice guidance (Chanin P. , 2003B) and other standard guidance documents (Chanin, P, 2003A) (Liles, 2003) and comprised two visits to each surveyed watercourse within the appropriate season to look for evidence of Otters. The surveys incorporated a walked survey of each watercourse and associated riparian/holt building habitat, accessing the channel where possible, to search for field signs of Otter. Field signs for Otter include spraints, footprints, feeding remains, Otter slides, holts and couches.

Water Vole survey

1.1.7 The Survey Area in relation to Water Vole comprised 300m sections of watercourse within the Scheme Boundary and up and downstream.

1.1.8 The Survey Area was informed by guidance in The Water Vole Mitigation Handbook (Dean, Strachan, Gow, & Andrews, 2016) which recommends a field survey area of between 200m and 500m upstream and downstream for a scheme with the potential for permanent impacts affecting more than 50m of watercourse. All suitable habitat identified as having potential to support Water Vole populations was surveyed within the Survey Area. The Survey Area extents are shown in Appendix A.

1.1.9 The survey for Water Vole was carried out with reference to good practice guidance (Dean, Strachan, Gow, & Andrews, 2016) and comprised two visits to each surveyed watercourse within the appropriate season, incorporating the following elements:

- The recording of habitat variables and features relevant to Water Voles (for example general habitat type, shore/bank substrate, bordering land use, vegetation, disturbance level, bank profile, water depth);
- A walked survey of each watercourse, accessing the channel where possible, to search for field signs of Water Vole, Field signs for Water Vole include faeces, latrines, feeding stations, burrows, 'lawns', nests, footprints and runways in vegetation; and



- The recording of any field signs or evidence relating to other relevant wildlife (for example American Mink *Neovison vison* or other rodent species).

Dates of survey and personnel

1.1.10 The Otter and Water Vole surveys were led by ecologists with extensive Otter and Water Vole survey experience with a strong understanding of their ecology and the ability to identify their field signs. All lead surveyors met the criteria within the CIEEM Competencies for Species Survey for Otter (CIEEM, 2013A) and Water Vole (CIEEM, 2013B).

1.1.11 Surveys were completed on the dates shown in Table 1-1 for both Otter and Water Vole between 27 April 2021 and 22 October 2021. The early surveying season for Water Vole in south-east England is between March and the end of June and the late surveying season is between July and October

Table 1-1 Otter and Water Vole Survey Results

Date	Watercourse surveyed	Water vole surveying season (early/late)
27 April 2021	D1-D5, D10	Early
28 April 2021	D6-D9, D11, D12, D15	Early
18 May 2021	D14	Early
22 June 2021	D13 (southern half)	Early
29 June 2021	D13 (northern half), D16	Early
21 October 2021	D7, D11-D16	Late
22 October 2021	D1-D6, D8-D10	Late

Notes and Limitations

1.1.12 The only record of Water Vole returned in the Desk Study appears to be outside of 2km of the Study Area, however the grid reference provided is only four figures so it is possible that the Water Vole was recorded within 2km of the Study Area.



- 1.1.13 D4 and D13-D16 had been mown, and the vegetation removed in the preceding weeks before the late surveys. This could have disturbed field signs and reduced the number of field signs observed.
- 1.1.14 All ditches, apart from D1 and D2, were surveyed from within the channel where access allowed. D1 and D2 comprised steep banks which allowed sufficient visibility for surveying from the bank.
- 1.1.15 The extent of dense vegetation present within D14 and D15 in the first survey and D7 and D11 in the second survey meant that access to the full length of their channels was not possible. Spot checks were carried out along the water channel wherever safe access was possible. During these surveys, for D14, D15 and D7, it was possible to undertake spot checks every couple of metres for the majority of the ditch, so this is not considered a limitation. D11 was only accessed for spot checks occasionally along its length, however this isn't considered a limitation as the ditch contains dense scrub and in both surveys, it was dry so is considered to have poor suitability for Water Vole.
- 1.1.16 D17 (as shown in Appendix A) had previously been a shallow linear depression in the ground so was not included in the Survey Area as it did not provide suitable Otter and Water Vole habitat. D17 had since been dredged, making it a deeper ditch, however, is still unsuitable for Otter and Water Vole given that it contains no water or bankside vegetation and so was not surveyed.

Overview

- 1.1.17 A summary of potential field signs recorded during the 2021 surveys is presented in Table 1-2.



Table 1-2 Summary of Field Sign Recorded During 2021 Surveys

Species	Watercourse
Water Vole	D1-D10, D13-D15
Brown Rat	D1, D3, D10
Small mammals, such as Bank Vole <i>Myodes glareolus</i>	D1, D3-D10, D13-D16

1.1.18 Of the field signs recorded, latrines (and confirmed presence) was only recorded in watercourses D14 and D15. Confirmed presence of Water Vole was not recorded in any other watercourse.

1.1.19 The results of the Otter and Water Vole surveys are shown in Appendices B, C and D.

Habitat descriptions

1.1.20 The watercourses surveyed comprised 16 drainage ditches set within a combination of fallow arable and intensive arable/crops. The locations of the ditches are shown in Appendix A.

Ditch 1

1.1.21 A ditch with steep earth banks that were predominantly covered in short grass. Herbs such as Nettle *Urtica dioica*, Ground Ivy *Glechoma hederacea* and Creeping Thistle *Cirsium arvense* were also present on the banks and there was a small amount of Common Reed *Phragmites australis* along the edge of the channel. The ditch was neighboured by arable crop on both sides. Additionally, the channel was approximately 3m wide and 1m deep with slow moving water. Overall, steep banks offered optimal habitat for burrowing, however there were limited opportunities for foraging and cover due to the lack of vegetation.

Ditch 2

1.1.22 A ditch with steep earth banks that were predominantly covered in short grass including species such as False Oat-grass *Arrhenatherum elatius*. Herbs such as Nettle, White Dead Nettle *Lamium album*, Bristly Oxtongue *Helminthotheca*



echioides and Bramble *Rubus fruticosus* were also frequent and there was a small amount of Common Reed along the edge of the channel. Some Common Duckweed *Lemna minor* was also present. The ditch was neighboured by arable crop on both sides. Additionally, the channel was approximately 3m wide and 1m deep with slow moving water. Overall, steep banks offered optimal habitat for burrowing, however there were limited opportunities for foraging and cover due to the lack of vegetation.

Ditch 3

1.1.23 A ditch with steep earth banks that were predominantly covered in short grass. Herbs such as Nettle were frequent, with reeds and Great Reedmace *Typha latifoli* abundant and Common Duckweed present over approximately half of the channel. There were also occasional submerged weeds. The ditch was neighboured by arable crop on both sides. Additionally, the channel was approximately 1.5m wide and 30cm deep with static water. Overall, steep banks offered optimal habitat for burrowing, however there was sub-optimal vegetation for foraging and cover.

Ditch 4

Northern section

1.1.24 A ditch with steep earth banks that were predominantly covered in short grass. Herbs such as Nettle were frequent, with occasional Common Reed and Soft Rush *Juncus effusus* present along the edge of the channel. Willowherb *Chamerion sp.*, Hemlock Water Dropwort *Oenanthe crocata* and submerged weeds were also frequent in the channel. When the late survey was undertaken, the banks had recently been mown. The ditch was neighboured by arable crop on both sides. Additionally, the channel was approximately 1m wide and 10cm deep with sluggish water. Overall, steep banks offered optimal habitat for burrowing, however there was sub-optimal vegetation for foraging and cover, which became more limited in the autumn once the banks had been mown.



Southern section next to the A47

1.1.25 A ditch with steep earth banks that were predominantly covered in herbs such as Nettle, with multiple areas of bank bare. Common Reed was abundant, with some small trees present and abundant bushes such as Bramble. There was arable to the east of the ditch and a hedge west of the ditch. Additionally, the channel was approximately 0.5m wide and 10cm deep with sluggish water. Towards the southern end of the ditch the water dried up and the channel became sludgy. Overall, steep banks offered optimal habitat for burrowing, however there was sub-optimal vegetation for foraging and cover, particularly in areas with bare earth.

Ditch 5

1.1.26 A ditch with steep earth banks that were predominantly covered in short grass. Herbs such as Nettle and Docks *Rumex spp.* were abundant on the banks and herbs such as Willowherb were abundant in the channel. There was also some Soft Rush and Common Duckweed present. The ditch was neighboured by arable crop on both sides. Additionally, the channel was approximately 0.5m wide and 0.5m deep with static water. Overall, steep banks offered optimal habitat for burrowing, however there were limited opportunities for foraging and cover due to the lack of vegetation.

Ditch 6

1.1.27 A ditch with steep earth banks that were predominantly covered in short grass including species such as Cocksfoot *Dactylis glomerata*. Nettle and Bramble were also present, particularly at the westernmost end, where the first 20m was fairly overgrown and bordered by barbed wire fences. There was also occasional Soft Rush, some Common Duckweed and one mature Willow *Salix sp.*. The ditch was neighboured by arable crop on both sides. Additionally, the channel was approximately 30cm-2m wide and 5-10cm deep with slow moving water. Overall, steep banks offered optimal habitat for burrowing, however there were limited opportunities for foraging and cover due to the lack of vegetation.



Ditch 7

1.1.28 A ditch with extremely steep earth banks. During the late survey, dense bankside vegetation was present, consisting of abundant herbs such as Nettle and Bristly Oxtongue and frequent tall grass including Cocksfoot. Abundant Common Reed was also present within and along the edge of the channel. Dense vegetation throughout the ditch decreased accessibility, however spot checks were undertaken every couple of meters where safely accessible. During the early survey, the vegetation was less dense so the whole ditch was accessible from the channel. The ditch was neighboured by arable crop on both sides. Additionally, the channel was approximately 1m wide and 10cm deep with some sludgy areas. Overall, steep banks offered optimal habitat for burrowing and dense vegetation provided optimal habitat for foraging and cover.

Ditch 8

1.1.29 A ditch with steep earth banks that were predominantly covered in long grass including species such as Cocksfoot. Dense vegetation was present throughout the ditch. Herbs such as Nettle, Willowherb, White Dead Nettle, Yellow Flag Iris *Iris pseudacorus* and Bramble were abundant, with occasional submerged weeds and small amounts of Soft Rush also present. The ditch was neighboured by arable crop on both sides. Additionally, the channel was approximately 30cm-1m wide and <20cm deep with sluggish water. Some areas were sludgy, and the westernmost end had dried up when the late survey was undertaken. Overall, steep banks offered optimal habitat for burrowing and dense vegetation throughout the majority of the ditch provided optimal habitat for foraging and cover.

Ditch 9

1.1.30 A ditch with steep earth banks. During the late survey the banks were predominantly covered in long grass including species such as Cocksfoot, along with abundant herbs such as Common Hogweed *Heracleum sphondylium*. Hemlock Water Dropwort and Willowherb were also present in the channel and there were frequent submerged weeds. During the early



survey, the bankside vegetation was shorter and predominantly short grass. The ditch was neighboured by arable crop on both sides. Additionally, the channel was approximately 0.5m wide and 20cm deep with sluggish water. Steep banks offered optimal habitat for burrowing. During the late survey the vegetation provided optimal habitat for foraging and cover, however as the vegetation was shorter in the early survey the habitat provided for foraging and cover was limited.

Ditch 10

1.1.31 A ditch with steep earth banks. During the late survey the banks were predominantly covered in long grass including species such as Perennial Ryegrass *Lolium perenne*, along with abundant herbs such as Nettle. Hemlock Water Dropwort was also present in the channel, along with frequent submerged weeds and occasional reeds. During the early survey, the bankside vegetation was shorter and predominantly short grass. The ditch was neighboured by arable crop on both sides. Additionally, the channel was approximately 1m wide and 20cm deep with sluggish water. Steep banks offered optimal habitat for burrowing. During the late survey the vegetation provided optimal habitat for foraging and cover, however as the vegetation was shorter in the early survey the habitat provided for foraging and cover was limited.

Ditch 11

1.1.32 A ditch with steep earth banks. The ditch was neighboured by arable crop on both sides. During the late survey the ditch was densely vegetated, predominantly covered in herbs such as Nettle, Willowherb, White Dead Nettle, Bramble And Mugwort *Artemisia vulgaris*. Tall grass was abundant and included species such as False Oat-grass. Occasional bankside trees were present on the northern bank. The ditch was also completely dry. During the early survey, the bankside vegetation was short, and the majority of the ditch was dry, although there were some damp areas. During the late survey the presence of dense vegetation meant that the ditch was only accessed a couple of times. This isn't considered a limitation as during the late survey the



ditch was full of scrub and was dry in both surveys so the ditch is considered to have poor suitability for Water Vole.

Ditch 12

Western horizontal section

1.1.33 A ditch with steep earth banks. The ditch was neighboured by arable crop on both sides. During the late survey the ditch was densely vegetated, predominantly covered in tall grass and herbs such as Nettle, Common Hogweed, False Oat-grass and Cocksfoot. Bramble and Common Reed were also present. The presence of such dense vegetation restricted access to the ditch. Spot checks were undertaken where safe access was possible, however for some stretches this was not possible. The lack of accessibility isn't considered a limitation as the ditch was full of scrub and completely dry so is considered to have poor suitability for Water Vole.

1.1.34 During the early survey, the bankside vegetation was short, and the majority of the ditch was dry, although there were some wetter areas. Although the steep banks provided habitat for burrowing, the ditch was dry and offered limited habitat for foraging and cover so is considered to have poor suitability for Water Vole.

Vertical section

1.1.35 The vertical section of D12 was extremely shallow, to the extent it did not differ from its surroundings. It was also dry in both surveys so is not considered suitable for Water Vole.

Eastern horizontal section

1.1.36 A ditch with steep earth banks. During the late survey the banks were predominantly covered in herbs such as Nettle, Common Chickweed *Stellaria media* and Greater Stitchwort *Stellaria holostea*, with tall grass frequent. Bankside trees, including Oak *Quercus robur* and Silver Birch *Betula pendula*, and some Common Reed were also present. Some areas had more limited vegetation and were bare. The ditch was completely dry. During the early survey the grass was shorter, dry leaves were present in the channel and



areas of the south bank were bare. The majority of the ditch was dry, with some damper sections. Overall, steep banks offered optimal habitat for burrowing, however the habitat provided for foraging and cover was sub-optimal.

Ditch 13

- 1.1.37 A ditch with steep earth banks. The ditch was neighboured by arable crop on both sides. During the late survey the banks were predominantly covered in short grass including species such as Cocksfoot, with herbs also frequent. The ditch had recently been mown so the vegetation was extremely short. One section still consisted of scrub, an approximately 1m section of Willow. Another section of Common Reed also remained, approximately 4m long. The channel was 20-50cm deep with sluggish water and some drier sections. The steep banks offered optimal burrowing habitat and close proximity to watercourses with confirmed Water Vole presence increased the likelihood of use by Water Vole. However, the lack of vegetation due to recent mowing meant that there was limited habitat for foraging and cover.
- 1.1.38 During the early survey the ditch was densely vegetated with the banks predominantly covered in tall grass including species such as False Oat-grass, with herbs also abundant. The ditch was completely choked with dense vegetation, dominated by Bramble and Common Reed, with abundant Willow and Blackthorn *Prunus spinosa*. The presence of such dense vegetation restricted access to the ditch. Spot checks were undertaken where safe access was possible, however for some stretches this was not possible. The ditch was also dry. As a result of accessibility issues, even though no field signs were observed during surveys the presence of Water Vole could not be discounted. The steep banks offered optimal burrowing habitat and close proximity to watercourses with confirmed Water Vole presence increased the likelihood of use by Water Vole. The vegetation offered suitable habitat for foraging and cover, particularly in the less dense areas of vegetation. The use of D13 for occasional foraging and dispersal by the local Water Vole population can therefore not be ruled out.



Ditch 14

1.1.39 A ditch with steep earth banks. The ditch was neighboured by arable crop on both sides. During the late survey the banks were predominantly covered in short grass, with herbs also abundant. The ditch had recently been mown so the vegetation was extremely short. One section still consisted of scrub, approximately 0.5m of Willow. Some Silver Birch also remained, with small amounts of Common Reed remaining around the trees. The channel was 1m wide and <50cm deep with sluggish water. The steep banks offered optimal burrowing habitat, however, the lack of vegetation due to recent mowing meant there was limited habitat for foraging and cover.

1.1.40 During the early survey the ditch was densely vegetated with the banks predominantly covered in long grass and Nettle. The channel was filled with Common Reed. The presence of such dense vegetation restricted access to the ditch. Spot checks were undertaken every couple of metres, where safe access was possible. The channel was approximately 20cm deep. During the early survey the steep banks offered optimal burrowing habitat and the vegetation offered suitable habitat for foraging and cover.

Ditch 15

1.1.41 A ditch with steep earth banks. The ditch was neighboured by arable crop on both sides. During the late survey the banks were predominantly covered in short grass, with herbs also frequent. The ditch had recently been mown so the vegetation was extremely short. The channel was 1m wide and <50cm deep with sluggish water. The steep banks offered optimal burrowing habitat, however, the lack of vegetation due to recent mowing meant there was limited habitat for foraging and cover.

1.1.42 During the early survey the ditch was densely vegetated with the banks predominantly covered in long grass with herbs such as Nettle and Willowherb frequent. The channel was filled with Common Reed. The presence of such dense vegetation restricted access to the ditch. Spot checks were undertaken every couple of metres, where safe access was possible.



The channel was approximately 5cm deep. During the early survey the steep banks offered optimal burrowing habitat and the vegetation offered suitable habitat for foraging and cover.

Ditch 16

1.1.43 A ditch with steep earth banks. The ditch was neighboured by arable crop on both sides. During the late survey the banks were predominantly covered in short grass, with herbs also frequent. A few reeds/sedges were also present. The ditch had recently been mown so the vegetation was extremely short. The channel was <1m wide and <50cm deep with static water. The steep banks offered optimal burrowing habitat, however, the lack of vegetation due to recent mowing meant there was limited habitat for foraging and cover, and as the ditch was dry the overall suitability for Water Vole was limited.

1.1.44 During the early survey the ditch was densely vegetated with the banks predominantly covered in long grass such as False Oat-grass and Bramble. Other herbs were also frequent, including Field Bindweed *Convolvulus arvensis* and Willowherb, with Purple Loosestrife *Lythrum salicaria* and Cocksfoot frequent. The ditch was completely dry. During the early survey the steep banks offered optimal burrowing habitat and the vegetation offered suitable habitat for foraging and cover, however as the ditch was dry the overall suitability for Water Vole was limited.

Otter field survey

1.1.45 The survey did not record any signs of Otter within any of the watercourses.

Water Vole field survey

1.1.46 Potential field signs of Water Vole were recorded in D1-D10, and D13-D15; a summary of evidence of Water Vole is given in Table 3. Full survey data is included in Appendix E.

1.1.47 The survey did not record any signs of Water Vole within D11, D12 and D16. However, as some of the watercourses were subject to limitations, and Water Vole are confirmed to be present in the vicinity, habitat suitability was also



used to infer Water Vole presence for certain watercourses, as shown in Table 1-3.

1.1.48 The survey did not record potential field signs of Water Vole within D7, D10 and D12-D16.

1.1.49 Of the potential field signs recorded during the surveys, field signs that confirm the presence of Water Vole were only recorded in D14 and D15. These consisted of latrines that confirm the presence of the species.

Table 1-3 Evidence of Water Vole

Watercourse	Survey number	Date	Potential Water Vole field signs	Water Vole presence inferred from habitat suitability	Description of evidence present
D1	Survey 1	27/04/2021	Yes	No	Three burrows recorded on the west bank and another three on the east bank, some of which were at the waterline.
D1	Survey 2	22/10/2021	No	No	No evidence of Water vole recorded.
D2	Survey 1	27/04/2021	Yes	No	21 burrows recorded throughout the ditch, with a concentration of burrows at the western end of the ditch.
D2	Survey 2	22/10/2021	Yes	No	One burrow recorded on the north bank at the eastern end of D2, with two possible burrows recorded in the same area.
D3	Survey 1	27/04/2021	Yes	No	Four burrows recorded on the east bank throughout the northern half of the ditch. A single burrow recorded on the west bank at the southern end of the ditch.



Watercourse	Survey number	Date	Potential Water Vole field signs	Water Vole presence inferred from habitat suitability	Description of evidence present
D3	Survey 2	22/10/2021	Yes	No	Two burrows recorded on the west bank in the northern half of the ditch. One burrow was associated with feeding remains. An additional record of feeding remains was recorded on the west bank in the northern end of the ditch. Two further records of feeding remains were recorded on the east bank at the southern end of the ditch.
D4	Survey 1	27/04/2021	Yes	No	A single possible Water Vole burrow recorded on the south bank at the westernmost end of the horizontal section. Two further burrows were recorded on the south bank at the easternmost end, one with two linked entrances and the other a possible Water Vole burrow on top of the bank.
D4	Survey 2	22/10/2021	Yes	No	A single burrow recorded at the south end of the vertical section on the west bank.
D5	Survey 1	27/04/2021	No	No	No evidence of Water vole recorded.



Watercourse	Survey number	Date	Potential Water Vole field signs	Water Vole presence inferred from habitat suitability	Description of evidence present
D5	Survey 2	22/10/2021	Yes	No	Two burrows recorded at the western end and another single burrow recorded at the easternmost end. Three records of feeding remains were recorded towards the eastern end of the ditch.
D6	Survey 1	28/04/2021	Yes	No	A single possible disused Water Vole burrow at the westernmost end of the ditch.
D6	Survey 2	22/10/2021	Yes	No	Two burrows recorded in the western end of the ditch, both with three entrances. Two records of feeding remains were also recorded in the same area. Two more burrows were recorded in the central section of the ditch, along with another single record of feeding remains.
D7	Survey 1	28/04/2021	Yes	No	Six burrows were recorded throughout the ditch, with a concentration of burrows towards the southernmost end of the ditch, one of which was on top of the bank. Two records of feeding remains were also recorded at the southernmost end of the ditch.
D7	Survey 2	21/10/2021	No	No	No evidence of Water vole recorded.

Watercourse	Survey number	Date	Potential Water Vole field signs	Water Vole presence inferred from habitat suitability	Description of evidence present
D8	Survey 1	28/04/2021	Yes	No	Eight records of feeding remains recorded, with a concentration of feeding remains towards the easternmost end and in the central section of the ditch.
D8	Survey 2	22/10/2021	No	No	No evidence of Water vole recorded.
D9	Survey 1	28/04/2021	Yes	No	Two burrows recorded at the eastern end of the ditch. A run was associated with one of the burrows.
D9	Survey 2	22/10/2021	Yes	No	Ten records of feeding remains recorded throughout the ditch, with a concentration of feeding remains at the easternmost end.
D10	Survey 1	27/04/2021	Yes	No	Nine burrows were recorded throughout the ditch, with a concentration of burrows at the easternmost end. A single record of feeding remains was recorded towards the western end of the ditch.
D10	Survey 2	22/10/2021	Yes	No	Two records of feeding remains recorded towards the western end of the ditch, with a single additional record of feeding remains recorded towards the eastern end of the ditch.
D11	Survey 1	28/04/2021	No	No	No evidence of Water vole recorded.



Watercourse	Survey number	Date	Potential Water Vole field signs	Water Vole presence inferred from habitat suitability	Description of evidence present
D11	Survey 2	21/10/2021	No	No	No evidence of Water vole recorded.
D12	Survey 1	28/04/2021	No	No	No evidence of Water vole recorded.
D12	Survey 2	21/10/2021	No	No	No evidence of Water vole recorded.
D13	Survey 1	22/06/2021 (southern half)	No	Yes	No evidence of Water vole recorded.
D13	Survey 1	29/06/2021 (northern half)	Yes	Yes	Two burrows recorded at the northern end. A single record of feeding remains was recorded in the same area.
D13	Survey 2	21/10/2021	No	Yes	No evidence of Water vole recorded.
D14	Survey 1	18/05/2021	Yes	No	Six latrines were recorded throughout the ditch. Four burrows were recorded at the southernmost end of the ditch, near two of the latrines. Three records of feeding remains were recorded throughout the ditch.
D14	Survey 2	21/10/2021	Yes	No	A single latrine with an associated record of feeding remains was recorded at the northern end of the ditch.



Watercourse	Survey number	Date	Potential Water Vole field signs	Water Vole presence inferred from habitat suitability	Description of evidence present
D15	Survey 1	28/04/2021	Yes	No	A single burrow was recorded at the easternmost end of the ditch. Three latrines and five records of feeding remains were recorded in the same area. Another single latrine was recorded at the westernmost end of the latrine.
D15	Survey 2	21/10/2021	No	No	No evidence of Water vole recorded.
D16	Survey 1	29/06/2021	No	No	No evidence of Water vole recorded.
D16	Survey 2	21/10/2021	No	No	No evidence of Water vole recorded.



1.1.50 No evidence of American Mink was recorded during these surveys.

1.1.51 Evidence of Brown Rat were recorded in D1, D3 and D10.

1.1.52 Evidence of small mammals, such as Bank Vole, were recorded in D1, D3-D10, D13-D16.

Relative Water Vole population density

1.1.53 The latrine counts from the surveys can give an indication of relative Water Vole population density for each watercourse (as described in the ‘Habitat descriptions’ in the results above). This aids in identifying the most valuable parts of the Survey Area for Water Voles, along with areas most suitable for enhancement, however latrine counts cannot provide robust estimates of absolute numbers of animals. The method was informed by guidance in The Water Vole Mitigation Handbook (Dean, Strachan, Gow, & Andrews, 2016).

1.1.54 The thresholds used were based on the approximate number of latrines per 100m of bankside habitat and the overall threshold was decided by taking into account the varying thresholds met throughout the whole watercourse. During the early survey season, the thresholds were ≥ 10 for high density, 3-9 for medium density and ≤ 2 (or none with other confirmatory field signs) for low density. During the late survey season, the thresholds were ≥ 20 for high density, 6-19 for medium density and ≤ 5 (or none with other confirmatory field signs) for low density. Latrine counts from the surveys indicate the following relative population densities, as shown in Table 1-4.

Table 1-4 Relative Water Vole Population Densities

Watercourse	Relative population densities
D1	None.
D2	None.
D3	None.
D4	None.
D5	None.
D6	None.
D7	None.



Watercourse	Relative population densities
D8	None.
D9	None.
D10	None.
D11	None.
D12	None.
D14	Low density.
D15	Low density.
D16	None.

1.1.55 The limitations on surveys meant that Water Vole absence could not be confirmed by the lack of field signs in D13, so habitat assessments were used to assist in estimating the Water Vole population density present. D13 had some suitable habitat for Water Vole during the early survey and an existing Water Vole population in nearby habitat. However suitable habitat for Water Vole was limited during the late survey, so D13 was assessed as having low densities of Water Vole present.



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