

Kirkby Brook adjacent to the Former All Saints School, Cherryfield Drive, Kirkby L32 5TQ

ECIA ADDENDUM: WATER VOLE AND OTTER PRESENCE / ABSENCE SURVEY 2024

October 2024

ERAP (Consultant Ecologists) Ltd ref: 2021-296e

ERAP (Consultant Ecologists) Ltd
Building N2
Chorley Business and Technology Centre
East Terrace
Euxton Lane
Euxton
Chorley
PR7 6TE
Tel: 01772 750502

mail@erap.co.uk
www.erap.co.uk



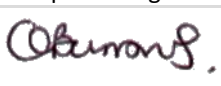
CONTENTS

Summary	3
1.0 Introduction	4
1.1 Background and Rationale	4
1.2 Relevant Legislation and Protection.....	4
2.0 Method of Survey	5
2.1 Desktop Study and Data Search	5
2.2 Survey Area	5
2.3 Surveyors, Survey Date and Conditions.....	5
2.4 Survey and Assessment	6
2.5 Survey Limitations	8
3.0 Results.....	8
3.1 Desktop Study and Data Search	8
3.2 Habitat Assessment	8
3.3 Water Vole Presence / Absence Survey	8
3.4 Otter Presence / Absence Survey.....	9
4.0 Evaluation, Assessment and Recommendations.....	9
4.1 Evaluation	9
4.2 Actions to be Applied During Construction Phase / Construction Environment Management Plan (CEMP)	9
5.0 References.....	12
6.0 Appendix 1: Tables.....	14
6.1 Plant Species List	14
6.2 Cross-Section Survey Data	16
7.0 Appendix 2: Figure	22

List of Tables

Table 2.1: Water Vole and Otter Survey Date and Conditions.....	5
Table 2.2: Cross-section Locations	6
Table 2.3: Reproduction of Table 2.1, Water Vole Field Signs and Habitat Assessment, A Practical Guide to Water Vole Surveys (Dean, 2021)	7
Table 6.1: Plant Species List for Surveyed Length of Kirkby Brook	14
Table 6.2: Kirkby Brook Cross-Section A-a.....	16
Table 6.3: Kirkby Brook Cross-Section B-b	17
Table 6.4: Kirkby Brook Cross-Section C-c.....	18
Table 6.5: Kirkby Brook Cross-Section D-d	19
Table 6.6: Kirkby Brook Cross-Section E-e.....	20
Table 6.7: Kirkby Brook Cross-Section F-f.....	21

Document Control

Survey Type:	Surveyors ¹	Survey Date(s)
Water vole and otter presence / absence survey	Chris Swindells B.Sc. (Hons) and assistant	8 th October 2024
Reporting	Personnel	Date
Author	Victoria Burrows B.Sc. (Hons) M.Sc. CEnv MCIEEM Principal Ecologist	18 th October 2024
Signature(s)		
Checked	Rachel Brown B.Sc. (Hons)	21 st October 2024
Reviewed and Updated	Victoria Burrows	21 st October 2024
Report issued to	David Wilson Homes	
Version Number	1	
¹ Licence reference numbers Water vole Victoria Burrows, Natural England WML-CL31 Class Licence Registration Number CL31/00023		

SUMMARY

Introduction and Scope

- i. This report presents the results of a habitat suitability assessment and water vole and otter presence / absence survey carried out at Kirkby Brook, adjacent to the proposed residential development at site at the Former All Saints School, Cherryfield Drive, Kirkby L32 5TQ in 2024.
- ii. Kirkby Brook (2.05 hectares) is designated as a Local Wildlife Site (LWS) owing to the presence of 'good water vole habitat'. Merseyside BioBank reported known records of water vole at Kirkby Brook with the closest record located 71 metres from the north-western site boundary and dated 1999 and the most recent record dated 2013 and located 340 metres from the site boundary (downstream). No records of otter were reported for Kirkby Brook and the surrounding 2 kilometre radius.
- iii. The survey for evidence and field signs of water vole and otter covered the whole length of Kirkby Brook (both banks) that extends within the Valley Park to the west of the site (length of 365 metres) and extended 1013 metres upstream from the culvert beneath the A506 (Valley Road) northwards and downstream for a length of 794 metres beyond the culvert beneath Bewley Drive southwards and towards the M57 (i.e. a total length of approximately 2.172 kilometres of open channel).
- iv. The survey was carried out in October 2024 by experienced ecologists and in accordance with standard, recognised survey methods as described in *Water Vole Field Signs and Habitat Assessment: A Practical Guide to Water Vole Surveys* (Dean, 2021) and *The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series)* Eds. Fiona Mathews and Paul Chanin (Dean, et al., 2016), and *Monitoring the Otter Lutra lutra. Conserving Natura 2000 Rivers Monitoring Series No 10* (Chanin, 2003) and current Natural England guidance (Natural England, 2022).
- v. No significant survey limitations were experienced.

Results and Evaluation

- vi. The habitats at Kirkby Brook are assessed to be 'good suitability' or 'suitable but poor' for use by water vole. The corridor is assessed to support suitable 'lying up' habitat for use by otter and may provide a migratory corridor.
- vii. No evidence of water vole or otter activity was detected at the surveyed section of Kirkby Brook in 2024. Importantly, no evidence of water vole activity was detected at the proposed location of the surface water outfall (Cross-section B-b).

Assessment and Recommendations

- viii. Subject to the implementation of the mandatory actions in relation to the protection of the brook corridor (refer to **Section 4.2**) during works to prepare the land and install the surface water outfall, there are currently no constraints in relation to otter and water vole on works that will affect the brook corridor.
- ix. Based on the current site proposals (i.e. retention of the whole length of Kirkby Brook and the installation of one small surface water outfall only), it is advised that the installation of the surface water outfall and its presence in the long-term is not likely to significantly adversely affect the integrity of the Kirkby Brook corridor and Local Wildlife Site nor the future suitability of the relevant section of Kirkby Brook for colonisation by water vole. It is advised that water vole is removed from the list of Important Ecological Features (IERs) identified in the EcIA at Chapter 12 of the Environmental Impact assessment (EIA).
- x. As water vole is reported to be present at the wider Kirkby Brook corridor and catchment, the recommendations outlined in **Section 4.2** are appropriate to the proposals and works and comprise a proportionate approach to ensure the works are carried out in accordance with relevant wildlife legislation, planning policy and best practice.

1.0 INTRODUCTION

1.1 Background and Rationale

- 1.1.1 This report presents the results of a habitat suitability assessment and water vole and otter presence / absence survey carried out at Kirkby Brook, adjacent to the proposed residential development at site at the Former All Saints School, Cherryfield Drive, Kirkby L32 5TQ in 2024.
- 1.1.2 This report has been prepared as an addendum to the Ecological Impact Assessment (EclA) prepared for a planning application proposing the '*demolition of existing buildings and erection of 807 dwellings (use class C3) with vehicular access from Cherryfield Drive and Bewley Drive and associated landscaping and infrastructure, extension to the existing Cherryfield Drive car park to provide an additional 60 parking space and highway improvements to Cherryfield Drive*' (Knowsley Council reference 24/00068/FUL).
- 1.1.3 As part of the proposals it is necessary to install a new surface water outfall to direct water to the eastern bank of Kirkby Brook and discharge at a rate of 40 litres / second (as shown on *Drainage Strategy Sheet 4 of 4 Drawing 7778/ SK04-4 Rev D* (Coopers, 2024)).
- 1.1.4 Kirkby Brook (2.05 hectares) is designated as a Local Wildlife Site (LWS) owing to the presence of 'good water vole habitat' (refer to **Section 3.1** and **Figure 1**).

1.2 Relevant Legislation and Protection

Water Vole

- 1.2.1 Water vole is listed as a protected species on Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended) (Great Britain, 1981). The *Wildlife and Countryside Act 1981* (as amended) lists the following offences:
- Intentionally killing, taking or injuring a water vole (Section 9(1));
 - Possessing or controlling any live or dead water vole, or any part or derivative (Section 9(2));
 - Intentionally or recklessly damaging or destroying a water vole's place or shelter or protection (Section 9(4)(a));
 - Intentionally or recklessly disturbing a water vole whilst it is occupying a structure or place which it uses for shelter or protection (Section 9(4)(b));
 - Intentionally or recklessly obstructing access to a water vole's place or shelter or protection (Section 9(4)(c)); and
 - Selling, offering for sale, or possessing or transporting for the purposes of sale, any live or dead water vole, or any part or derivative, or advertising any of these for buying or selling (Section 9(5)).
- 1.2.2 Water vole is listed on Section 41 of the *Natural Environment and Rural Communities (NERC) Act 2006* (Great Britain, 2006) and is therefore a Priority Species.

Otter

- 1.2.3 The European otter is a European protected species (EPS) protected under *The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019* (Department for Environment, Food and Rural Affairs, 2019) and is also fully protected under Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended).

1.2.4 It is an offence to:

- Capture, kill, disturb or injure otters (on purpose or by not taking enough care);
- Damage or destroy a breeding or resting place (deliberately or by not taking enough care);
- Obstruct access to their resting or sheltering places (deliberately or by not taking enough care); and
- Possess, sell, control or transport live or dead otters, or parts of otters.

1.2.5 Otter is listed on Section 41 of the *Natural Environment and Rural Communities (NERC) Act 2006* (Great Britain, 2006) and is therefore a Priority Species.

2.0 METHOD OF SURVEY

2.1 Desktop Study and Data Search

2.1.1 Data provided by Merseyside BioBank were consulted for records of water vole and otter at the site and within a radius of 2 kilometres from the site boundary.

2.2 Survey Area

2.2.1 The survey for evidence and field signs of water vole and otter covered the following search area to total a length of 2.172 kilometres of open channel (also identified on **Figure 1**):

- The whole length of Kirkby Brook (both banks) that extends within the parkland (Valley Park) to the west of the site, including the location of the proposed surface water outfall (length of 365 metres);
- Extended 1013 metres upstream from the culvert beneath the A506 (Valley Road) northwards; and
- Extended downstream for a length of 794 metres beyond the culvert beneath Bewley Drive southwards and towards the M57.

2.2.2 Within each component of the survey area the associated banks up to a distance of 2 metres from the water's edge were searched for field signs.

2.3 Surveyors, Survey Date and Conditions

2.3.1 The survey was carried out by Chris Swindells B.Sc. (Hons) and an assistant on the following survey date, and under the following conditions:

Table 2.1: Water Vole and Otter Survey Date and Conditions

Repetition	Survey Date	Conditions
1	8 th October 2024	Dry and sunny with scattered cloud, Beaufort scale 1 (light air) and an air temperature of 16°C

2.3.2 Care was taken to select a survey date that avoided the time following a period of heavy rain / high water conditions to ensure the risk of field signs being underwater or having washed away was minimised.

- 2.3.3 It is recognised that early October is just outside the recommended optimum survey season of mid-May to mid-September in north-west England¹; this is taken into account by the assessment and recommendations later in this report.

2.4 Survey and Assessment

Habitat Suitability

- 2.4.1 To inform the assessment of habitat suitability for these protected species the conditions at the following six cross-sections of Kirkby Brook were recorded, refer to **Figure 1** and **Tables 6.2 to 6.7**, appended:

Table 2.2: Cross-section Locations

Cross-Section	Ordnance Survey Grid Reference Location	Notes
A-a	SJ 40878 99217	Upstream
B-b	SJ 40753 98771	At location of proposed surface water outfall
C-c	SJ 40699 98580	Downstream
D-d	SJ 40762 98257	Downstream
E-e	SJ 40745 98075	Downstream
F-f	SJ 40459 97849	Downstream

Plant Species

- 2.4.2 The plant species along the lengths of Kirkby Brook were determined with estimates of the distribution, ground cover, abundance and constancy of individual species. The estimation of abundance was based on the DAFOR system, where D = Dominant, A = Abundant, F = Frequent, O = Occasional and R = Rare, this being a widely used and accepted system employed by ecological surveyors. The terms L = Locally and V = Very were additionally used to describe the plant species distributions with greater precision.

Water Vole

- 2.4.3 The survey methods detailed in *Water Vole Field Signs and Habitat Assessment: A Practical Guide to Water Vole Surveys* (Dean, 2021) and *The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series)* Eds. Fiona Mathews and Paul Chanin (Dean, et al., 2016), were applied. The brook and its associated banks were searched for burrows, latrines, feeding remains, runs, feeding lawns, nests and footprints.
- 2.4.4 The habitat was also assessed for suitability for use by water vole in accordance with the criteria at Section 3.3 of *The Water Vole Mitigation Handbook*, as reproduced at **Table 2.3**.

¹ Paragraph 3.3.23 of *The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series)* Eds. Fiona Mathews and Paul Chanin (Dean, et al., 2016)

Table 2.3: Reproduction of Table 2.1, Water Vole Field Signs and Habitat Assessment, A Practical Guide to Water Vole Surveys (Dean, 2021)

Habitat Category	Dry Areas for Burrows or Nests			Herbaceous Vegetation	Water
	Bank Profile	Bank Substrate	Variation in Water Level		
Optimal (all criteria need to be met)	Steep (approaching 1:1) on at least on side of the watercourse. Steep or shallow banks on static waterbodies or fen-type habitat, where water levels do not fluctuate significantly.	Earth or peat.	No noticeable variation during the summer months; banks are not overtopped regularly.	Continuous swathe of tall and luxurious riparian vegetation providing 90-100% cover on the banks (tall tussocky grassland) and marginal / in-channel vegetation is present (emergent species).	Permanent water.
Good (all criteria need to be met)	Steep (approaching 1:1) on at least one side of a watercourse. Steep or shallow banks on static waterbodies or fen-type habitat, where water levels do not fluctuate significantly.	Earth or peat banks, or stony / reinforced banks with gaps allowing access to the earth behind.	No noticeable variation during the summer months; banks are not overtopped regularly.	Continuous swathe of bankside or in-channel (emergent) vegetation providing at least 60% ground cover. May be dominated by grasses and weeds, rather than luxurious riparian vegetation. The vegetation should generally be tall, except in urban or suburban areas, where shorter bankside vegetation may also qualify.	Permanent water. Or routinely wet for at least 2-3 months during the summer, and where other 'good' habitat is present in immediately adjacent areas with permanent water.
Negligible value (will generally need to meet the criteria for herbaceous vegetation and at least one other)	Shallow profile on both banks, or vertical bank face with no burrowing opportunities behind it.	Rocky or gravel, unsuitable for burrowing, or reinforced banks with no gaps.	Considerable variation in water level – the bank toe can move by more than 1 metre horizontally over the breeding season.	No or limited bankside and marginal vegetation (due to shading or other 'permanent' factors – note that management can change and is often a 'temporary' factor).	N/A.
Suitable but poor	Any habitat that falls short of the criteria to qualify as 'good' but does not meet the criteria of 'negligible value' could reasonably be considered to be 'suitable but poor'				

Otter

- 2.4.5 The survey area was also searched for dung (spraints), tracks (footprints), feeding remains, otter slides (into water), holts (underground dens) and couches (above ground sites where otters rest during the day).
- 2.4.6 An assessment of the suitability of each habitat feature was undertaken to assess their suitability for use by otter (*Lutra lutra*) in accordance with the habitat requirements and preferences detailed in *Ecology of the European Otter. Conserving Natura 2000 Rivers, Ecology Series 10* (Chanin, 2003) and searches were made for signs of otter in accordance with *Monitoring the Otter Lutra lutra. Conserving Natura 2000 Rivers Monitoring Series No 10* (Chanin, 2003) and current Natural England guidance (Natural England, 2022).

2.5 Survey Limitations

- 2.5.1 No significant survey limitations were experienced.

3.0 RESULTS

3.1 Desktop Study and Data Search

- 3.1.1 Consultation of the data provided by Merseyside BioBank reported 40 records of water vole at Kirkby Brook dated between 1999 and 2013 (refer to **Figure 1**).
- 3.1.2 The closest record is located 71 metres from the north-western site boundary and dated 1999 and the most recent record dated 2013 and located 340 metres from the site boundary (downstream).
- 3.1.3 No records of otter were reported for Kirkby Brook and the surrounding 2 kilometre radius.

3.2 Habitat Assessment

Kirkby Brook

- 3.2.1 Photographs of Kirkby Brook taken in October 2024 are appended at **Section 6.0**. A plant species list for the brook corridor is appended at **Table 6.1**.
- 3.2.2 Refer to **Tables 6.2 to 6.7** for the survey data recorded at cross-sections A-a to F-f.
- 3.2.3 The habitats at cross-sections A-a, E-e and F-f are assessed to be of ‘good’ value owing to the presence of steeply sloping earth banks with a cover of vegetation and limited shading.
- 3.2.4 Cross-sections B-b, C-c and D-d are assessed to be ‘suitable but poor’ suitability for colonisation by water vole owing to the presence of shallow banks, likely fluctuations in water levels (‘spatey conditions’) and high cover of Indian Balsam which will reduce availability of cover in the winter months.

3.3 Water Vole Presence / Absence Survey

- 3.3.1 No evidence of water vole or water vole field signs were detected at any of the surveyed length of Kirkby Brook in October 2024.

3.4 Otter Presence / Absence Survey

- 3.4.1 No evidence of otter or otter activity were detected at any of the surveyed length of Kirkby Brook in October 2024.

4.0 EVALUATION, ASSESSMENT AND RECOMMENDATIONS

4.1 Evaluation

Water Vole

- 4.1.1 The comprehensive survey carried out in October 2024 did not detect any evidence of current use of the surveyed section of Kirkby Brook by water vole. Importantly, no evidence of water vole activity was detected at the proposed location of the surface water outfall.
- 4.1.2 It is recognised that two visits² at an appropriate time of year are typically recommended to confirm the absence of water vole, however, based on the small and discrete working area / length of Kirkby Brook to be temporarily impacted during the installation of the surface water outfall, the minor zone of potential influence of the works, the baseline conditions present at Cross-section B-b and in the presence of the mandatory and precautionary actions outlined in **Section 4.2**, it is advised that appropriate survey data are available to be able to determine the assessment of effects on water vole.
- 4.1.3 Based on the current site proposals (i.e. retention of the whole length of Kirkby Brook and the installation of one small surface water outfall only), it is advised that the installation of the surface water outfall and its presence in the long-term is not likely to significantly adversely affect the integrity of the Kirkby Brook corridor and Local Wildlife Site nor the future suitability of the relevant section of Kirkby Brook for colonisation by water vole.
- 4.1.4 It is advised that water vole is removed from the list of Important Ecological Features (IEFs) identified in the EclA at Chapter 12 of the Environmental Impact assessment (EIA).
- 4.1.5 As water vole is reported to be present at the wider Kirkby Brook corridor and catchment the guidance, mandatory actions and recommendations at **Section 4.2** are applicable.

Otter

- 4.1.6 The survey has not detected the presence of otter at surveyed section of Kirkby Brook; the presence of this species is reasonably discounted and no further action is required.

4.2 Actions to be Applied During Construction Phase / Construction Environment Management Plan (CEMP)

- 4.2.1 As outlined in the EclA, the following actions will be accommodated / achieved by preparation and implementation of an appropriate Construction Environmental Management Plan (CEMP) for the site (and a specific Construction Method Statement relevant to the surface water outfall installation, as appropriate)).

² Box 2 of *The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series)* Eds. Fiona Mathews and Paul Chanin (Dean, et al., 2016)

Ecological Clerk of Works (ECoW)

- 4.2.2 It is recommended that an Ecological Clerk of Works (ECoW) is appointed to oversee all works involved in the vegetation clearance and earthworks in proximity to Kirkby Brook.

Demarcation and Protective Fencing

- 4.2.3 The relevant section of the Kirkby Brook corridor / the 'construction zone' will be demarcated with temporary protective fencing prior to and during the construction phase.

Pre-commencement Survey

- 4.2.4 Immediately prior to any works that will directly affect the brook corridor (i.e. vegetation clearance and headwall installation) it is recommended that a precautionary pre-commencement and updated water vole survey is carried out.
- 4.2.5 If positive evidence of the presence of water vole is detected at the relevant working area / zone of potential influence of the works at this time it may be appropriate to carry out works such as displacement under the Natural England Class Licence WML-CL31 *Intentional disturbance of water voles and damage / destruction of water vole burrows by means of 'displacement'*. Please note, the period for licensed works under the class licence is between 15th February and 15th April inclusive.

Pollution Prevention Guidelines

- 4.2.6 In the absence of updated guidance, the following Pollution Prevention Guidelines (PPG) will be adhered to at any works near Kirkby Brook:
- a. PPG1: Basic good environmental practices (Environment Agency, 2013);
 - b. PPG5: Works in, near or over watercourses (Environment Agency, 2014);
 - c. PPG6: Construction and demolition sites (Environment Agency, 2012); and
 - d. PPG7: Operating refuelling sites (Environment Agency, 2011).

Biosecurity

- 4.2.7 To minimise the risk of introduction of invasive species to the working area at Kirkby Brook *and* the spread of invasive species around the site and into the adjacent habitats, all machinery / plant to be brought to the site must be clean. Wheels / tracks of machinery / plant must have been pressure washed before use at the site.
- 4.2.8 No excessive remnant soil or plant material from other sites must be present on the machinery / plant or in the tyre treads as this may increase the risk of spread of non-native and invasive plant species e.g. Japanese Knotweed (*Fallopia japonica*), Indian Balsam (*Impatiens glandulifera*) and Giant Hogweed (*Heracleum mantegazzianum*).
- 4.2.9 Similarly, owing to the presence of Indian Balsam along Kirkby Brook, to prevent the spread of Indian Balsam elsewhere, any machinery used near Kirkby Brook must be cleaned prior to use elsewhere at the site / removal from site.

Lighting

- 4.2.10 During the construction phase, any temporary / security lighting associated with the site compound or the working area at Kirkby Brook must involve the use of appropriate products and screening, where

necessary, to ensure no excessive artificial lighting shines over the remainder of the brook corridor, as lighting overspill may deter use by wildlife such as foraging bats.

4.2.11 Where it may impact bats at retained habitats, the lighting specification must meet the requirements of current guidance, namely:

- a. *Guidance Note 08/23: Bats and Artificial Lighting at Night* (Institution of Lighting Professionals & Bat Conservation Trust, 2023); and
- b. Bats and lighting: Overview of current evidence and mitigation guidance (Stone, 2014).

Protection of Other Wildlife

Nesting Birds

4.2.12 All wild birds are protected under the *Wildlife and Countryside Act 1981* (as amended) while they are nesting. It is mandatory that works such as vegetation clearance are scheduled to commence outside the bird nesting season. Commencement of works in the nesting season must be informed by a pre-works nesting bird survey, carried out by a suitably experienced ecologist. The bird breeding season typically extends between March to August inclusive.

4.2.13 If breeding birds are detected the ecologist will issue guidance in relation to the protection of the nesting birds in conjunction with the scheduled works. This may involve cordoning off an area of the site until the young birds have fledged.

4.2.14 Once any trees or shrubs have been removed it is advised that the arisings are chipped *immediately* as brush piles can also be used by nesting birds.

Protection of General Wildlife

4.2.15 During the site preparation works and surface water outfall construction operations it is essential that the following best practice and Reasonable Avoidance Measures (RAMs) Method Statement are applied for the protection of wildlife:

- a. Cleared woody vegetation must be removed from the working area or chipped immediately to avoid the accumulation of brush that may be colonised by sheltering fauna;
- b. During any vegetation clearance works all arising materials must be either removed from the area or placed in a skip to avoid the accumulation of materials that may create suitable habitat and shelter for wildlife;
- c. Where practical, any pipes must be stored with caps on (to prevent entry by wildlife);
- d. No fires must be lit at the site;
- e. Deep trenches / excavations must not be left open overnight. Trenches or holes must be fitted with a means of escape (such as ramped edge or a sloping plank of timber). This will ensure that any inquisitive animals do not become trapped; and
- f. The use of chemicals (such as fertiliser and herbicides) harmful to wildlife should be avoided wherever possible.

Good Site Practice

- 4.2.16 To ensure no additional impacts to wildlife such as wind-blown debris and attraction of vermin (for example) are created as a result of the construction site, good site practice will be applied at all times, and will comprise the following:
- All working areas will be kept in a clean and tidy condition;
 - Adequate toilet facilities will be provided for all site staff;
 - Litter will be removed at frequent intervals and the site kept clean and tidy;
 - Food waste will be removed at frequent intervals; and
 - Any waste susceptible to spreading by wind or liable to cause litter will be stored in enclosed containers.

5.0 REFERENCES

- Chanin, P., 2003. *Ecology of the European Otter. Conserving Natura 2000 Rivers, Ecology Series 10*. Peterborough: English Nature.
- Chanin, P., 2003. *Monitoring the Otter Lutra lutra. Conserving Natura 2000 Rivers Monitoring Series No 10*, Peterborough: English Nature.
- Coopers, 2024. *Cherryfield Drive, Kirkby. Drainage Strategy Sheet 4 of 4 Drawing 7778/ SK04-4 Rev D*, Chester: Coopers.
- Dean, M., 2021. *Water Vole Field Signs and Habitat Assessment. A Practical Guide*, London: Pelagic Publishing.
- Dean, M., Strachan, R., Gow, D. & Andrews, R., 2016. *The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series) Eds. Fiona Mathews and Paul Chanin*, London: The Mammal Society.
- Department for Environment, Food and Rural Affairs, 2019. *The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019*. London: Department for Environment, Food and Rural Affairs.
- Environment Agency, 2011. *Operating Refuelling Sites, PPG7: Prevent Pollution*. [Online]
Available at: <https://www.gov.uk/government/publications/operating-refuelling-sites-ppg7-prevent-pollution>
- Environment Agency, 2012. *Construction and Demolition Sites, PPG6: Prevent Pollution*. [Online]
Available at: <https://www.gov.uk/government/publications/construction-and-demolition-sites-ppg6-prevent-pollution>
- Environment Agency, 2013. *Basic Good Environmental Practices, PPG1: Prevent Pollution*. [Online]
Available at: <https://www.gov.uk/government/publications/basic-good-environmental-practices-ppg1-prevent-pollution>
- Environment Agency, 2014. *Works in, near or over watercourses, PPG5: Prevent Pollution*. [Online]
Available at: <https://www.gov.uk/government/publications/works-in-near-or-over-watercourses-ppg5-prevent-pollution>
- Great Britain, 1981. *Wildlife and Countryside Act*. London: H.M.S.O.
- Great Britain, 2006. *Natural Environment and Rural Communities Act*. London: H.M.S.O.
- Institution of Lighting Professionals & Bat Conservation Trust, 2023. *Guidance Note 08/23: Bats and Artificial Lighting at Night*. [Online]
Available at: <https://theilp.org.uk/publication/guidance-note-8-bats-and-artificial-lighting/>
[Accessed 21 August 2023].
- Natural England, 2022. *Otters: surveys and mitigation for development projects*. [Online]
Available at: <https://www.gov.uk/guidance/otters-protection-surveys-and-licences>
[Accessed 03 September 2024].

Stace, C. A., 2010. *New Flora of the British Isles 3rd Edition*. Cambridge: Cambridge University Press.

Stone, E. L., 2014. *Bats and Lighting: Overview of current evidence and mitigation guidance*. Bristol: University of Bristol.

6.0 APPENDIX 1: TABLES

6.1 Plant Species List

Table 6.1: Plant Species List for Surveyed Length of Kirkby Brook

Scientific Name	Common Name	Abundance	Cover
Woody Species			
<i>Acer platanoides</i>	Norway Maple	R	<1%
<i>Acer pseudoplatanus</i>	Sycamore	O	<1%
<i>Alnus glutinosa</i>	Alder	O	1%
<i>Betula pendula</i>	Silver Birch	R	<1%
<i>Corylus avellana</i>	Hazel	O	<1%
<i>Crataegus monogyna</i>	Hawthorn	O	<1%
<i>Fagus sylvatica</i>	Beech	R	<1%
<i>Fraxinus excelsior</i>	Ash	O	1%
<i>Ilex aquifolium</i>	Holly	O	<1%
<i>Laburnum anagyroides</i>	Laburnum	R	<1%
<i>Pinus nigra</i>	Austrian Pine	R	<1%
<i>Populus x canescens</i>	Grey Poplar	A*	10%
<i>Populus nigra</i>	Lombardy Poplar	O	<1%
<i>Populus</i> sp.	Poplar species	O	1%
<i>Prunus spinosa</i>	Blackthorn	O	<1%
<i>Prunus</i> sp.	Cherry species	F	2%
<i>Quercus robur</i>	Pedunculate Oak	R	<1%
<i>Rosa canina</i>	Dog Rose	R	<1%
<i>Salix alba</i>	White Willow	F	2%
<i>Salix caprea</i>	Goat Willow	O	<1%
<i>Salix</i> sp.	Willow species	F	2%
<i>Sambucus nigra</i>	Elder	R	<1%
<i>Tilia x vulgaris</i>	Common Lime	R	<1%
<i>Viburnum opulus</i>	Guelder Rose	O	<1%
Herb species			
<i>Achillea millefolium</i>	Yarrow	O	<1%
<i>Aegopodium podagraria</i>	Ground Elder	O	1%
<i>Agrostis capillaris</i>	Creeping Bent-grass	F*	2%
<i>Anthriscus sylvatica</i>	Cow Parsley	F*	<1%
<i>Arrhenatherum elatius</i>	False Oat-grass	O	<1%
<i>Aster</i> sp.	Michaelmas Daisy	F*	1%
<i>Calystegia sepium</i>	Hedge Bindweed	A*	3%
<i>Cardamine amara</i>	Large Bittercress	O	<1%
<i>Centaurea nigra</i>	Common Knapweed	O	<1%
<i>Chamerion angustifolium</i>	Rosebay Willowherb	O	<1%
<i>Cirsium arvense</i>	Creeping Thistle	F*	<1%
<i>Conyza canadensis</i>	Canadian Fleabane	O	<1%
<i>Dactylis glomerata</i>	Cocksfoot	O	<1%
<i>Dryopteris filix-mas</i>	Male Fern	R	<1%
<i>Elymus repens</i>	Common Couch-grass	O	<1%
<i>Epilobium hirsutum</i>	Great Willowherb	F*	3%
<i>Epilobium montanum</i>	Broad-leaved Willowherb	O	<1%
<i>Equisetum arvense</i>	Field Horsetail	O	<1%
<i>Festuca rubra</i>	Red Fescue	O	<1%
<i>Filipendula ulmaria</i>	Meadowsweet	O	<1%
<i>Galium aparine</i>	Cleavers	F*	2%
<i>Geranium molle</i>	Dove's-foot Crane's-bill	R	<1%
<i>Geranium robertianum</i>	Herb Robert	R	<1%

Scientific Name	Common Name	Abundance	Cover
<i>Glyceria maxima</i>	Reed Sweet-grass	O	<1%
<i>Heracleum sphondylium</i>	Hogweed	O	<1%
<i>Holcus lanatus</i>	Yorkshire-fog	O	1%
<i>Impatiens glandulifera</i>	Indian Balsam	A*	60%
<i>Juncus effusus</i>	Soft Rush	O	<1%
<i>Lolium perenne</i>	Perennial Rye-grass	O	<1%
<i>Oenanthe crocata</i>	Hemlock Water Dropwort	O	<1%
<i>Phalaris arundinacea</i>	Reed Canary-grass	O	<1%
<i>Plantago lanceolata</i>	Ribwort Plantain	O	<1%
<i>Poa annua</i>	Annual Meadow grass	O	<1%
<i>Poa trivialis</i>	Rough Meadow-grass	O	<1%
<i>Pteridium aquilinum</i>	Bracken	O	<1%
<i>Ranunculus acris</i>	Meadow Buttercup	R	<1%
<i>Ranunculus repens</i>	Creeping Buttercup	R	<1%
<i>Rubus fruticosus</i> agg.	Bramble	A*	20%
<i>Rumex acetosa</i>	Common Sorrel	R	<1%
<i>Rumex obtusifolius</i>	Broad-leaved Dock	O	<1%
<i>Scrophularia nodosa</i>	Common Figwort	O	<1%
<i>Senecio jacobaea</i>	Common Ragwort	R	<1%
<i>Solanum dulcamara</i>	Bittersweet	F*	2%
<i>Stachys sylvatica</i>	Hedge Woundwort	R	<1%
<i>Symphytum officinale</i>	Common Comfrey	R	<1%
<i>Taraxacum officinale</i> agg.	Dandelion	O	<1%
<i>Trifolium pratense</i>	Red Clover	O	<1%
<i>Trifolium repens</i>	White Clover	R	<1%
<i>Tussilago farfara</i>	Coltsfoot	O	<1%
<i>Urtica dioica</i>	Common Nettle	A*	20%
<i>Vicia tetrasperma</i>	Smooth Tare	O	<1%
¹ Key to DAFOR: D=Dominant, A=Abundant, F=Frequent, O=Occasional, R=Rare, V=Very, L=Local and *denotes a constant species			

6.2 Cross-Section Survey Data

Table 6.2: Kirkby Brook Cross-Section A-a

Photo			
			
Channel			
Width (m)	3		
Water depth (m)	0.5		
Silt depth (m)	0 (sand)		
Water quality	Good (i.e. no signs of organic or chemical pollution or debris. No odour)		
Flow rate	Fast		
Variation in water level	Signs of high water and previous scour / submergence of vegetation approximately 0.5 metres higher than current water level.		
Permanence	Permanent		
Shading (by woody vegetation)	10%		
Banks	A. Western	a. Eastern	
Bank substrate	Soft earth	Soft earth	
Bank height (m)	1	2	
Angle of bank (°)	45	45	
Vegetation: Refer to species list at Table 7.1			
In-channel vegetation	None		
Bank vegetation	100% cover		
Further information			
Evidence of management	None		
Disturbance (recreational / livestock)	None from livestock. Footpath higher up bank on both sides.		
Presence of other mammals / animals	None		
Water Vole Presence / Absence Information			
Grid Reference	Burrow	Feeding Station	Latrine (count)
-	-	-	-
Further evidence	No		
Water vole presence	None		
Population estimate	N/A		
Suitability for water vole	Good		
Otter Presence / Absence Information			
Grid Reference	Holt	Field Signs	Spraint (count)
-	-	-	-
Further evidence	None		
Otter presence	None		
Population estimate	N/A		
Suitability for otter	May provide a corridor for passage elsewhere and lying up habitat.		

Table 6.3: Kirkby Brook Cross-Section B-b

Photo			
			
Channel			
Width (m)	3		
Water depth (m)	0.5		
Silt depth (m)	0 (sand)		
Water quality	Good (i.e. no signs of organic or chemical pollution or debris. No odour)		
Flow rate	Fast		
Variation in water level	Signs of high water and previous scour / submergence of vegetation approximately 0.5 metres higher than current water level.		
Permanence	Permanent		
Shading (by woody vegetation)	10%		
Banks	B. Western	b. Eastern	
Bank substrate	Soft earth	Soft earth	
Bank height (m)	2	2	
Angle of bank (°)	20	20	
Vegetation: Refer to species list at Table 7.1			
In-channel vegetation	10% cover of Reed Canary grass		
Bank vegetation	100% cover		
Further information			
Evidence of management	None		
Disturbance (recreational / livestock)	None from livestock. Footpath higher up bank on both sides.		
Presence of other mammals / animals	None		
Water Vole Presence / Absence Information			
Grid Reference	Burrow	Feeding Station	Latrine (count)
-	-	-	-
Further evidence	No		
Water vole presence	None		
Population estimate	N/A		
Suitability for water vole	Suitable but poor owing to shallow banks and high cover of Indian Balsam which will reduce availability of cover in the winter months		
Otter Presence / Absence Information			
Grid Reference	Holt	Field Signs	Spraint (count)
-	-	-	-
Further evidence	None		
Otter presence	None		
Population estimate	N/A		
Suitability for otter	May provide a corridor for passage elsewhere and lying up habitat.		

Table 6.4: Kirkby Brook Cross-Section C-c

Photo			
			
Channel			
Width (m)	5		
Water depth (m)	0.5		
Silt depth (m)	0 (sand)		
Water quality	Good (i.e. no signs of organic or chemical pollution or debris. No odour)		
Flow rate	Fast		
Variation in water level	Signs of high water and previous scour / submergence of vegetation approximately 0.5 metres higher than current water level.		
Permanence	Permanent		
Shading (by woody vegetation)	10%		
Banks	C. Western	c. Eastern	
Bank substrate	Soft earth	Soft earth	
Bank height (m)	1	3	
Angle of bank (°)	30	30	
Vegetation: Refer to species list at Table 7.1			
In-channel vegetation	None		
Bank vegetation	100% cover		
Further information			
Evidence of management	None		
Disturbance (recreational / livestock)	None from livestock. Footpath higher up bank on both sides.		
Presence of other mammals / animals	None		
Water Vole Presence / Absence Information			
Grid Reference	Burrow	Feeding Station	Latrine (count)
-	-	-	-
Further evidence	No		
Water vole presence	None		
Population estimate	N/A		
Suitability for water vole	Suitable but poor owing to spatey conditions and high cover of Indian Balsam which will reduce availability of cover in the winter months		
Otter Presence / Absence Information			
Grid Reference	Holt	Field Signs	Spraint (count)
-	-	-	-
Further evidence	None		
Otter presence	None		
Population estimate	N/A		
Suitability for otter	May provide a corridor for passage elsewhere and lying up habitat.		

Table 6.5: Kirkby Brook Cross-Section D-d

Photo			
			
Channel			
Width (m)	4		
Water depth (m)	0.5		
Silt depth (m)	0 (sand)		
Water quality	Good (i.e. no signs of organic or chemical pollution or debris. No odour)		
Flow rate	Fast		
Variation in water level	Signs of high water and previous scour / submergence of vegetation approximately 0.5 metres higher than current water level.		
Permanence	Permanent		
Shading (by woody vegetation)	10%		
Banks	D. Western	d. Eastern	
Bank substrate	Soft earth	Soft earth	
Bank height (m)	2	2	
Angle of bank (°)	30	30	
Vegetation: Refer to species list at Table 7.1			
In-channel vegetation	None		
Bank vegetation	100% cover		
Further information			
Evidence of management	None		
Disturbance (recreational / livestock)	None from livestock. Footpath higher up bank on both sides.		
Presence of other mammals / animals	None		
Water Vole Presence / Absence Information			
Grid Reference	Burrow	Feeding Station	Latrine (count)
-	-	-	-
Further evidence	No		
Water vole presence	None		
Population estimate	N/A		
Suitability for water vole	Suitable but poor owing to spatey conditions and high cover of Indian Balsam which will reduce availability of cover in the winter months		
Otter Presence / Absence Information			
Grid Reference	Holt	Field Signs	Spraint (count)
-	-	-	-
Further evidence	None		
Otter presence	None		
Population estimate	N/A		
Suitability for otter	May provide a corridor for passage elsewhere and lying up habitat.		

Table 6.6: Kirkby Brook Cross-Section E-e

Photo			
			
Channel			
Width (m)	5		
Water depth (m)	0.5		
Silt depth (m)	0 (sand)		
Water quality	Good (i.e. no signs of organic or chemical pollution or debris. No odour)		
Flow rate	Fast		
Variation in water level	Signs of high water and previous scour / submergence of vegetation approximately 0.5 metres higher than current water level.		
Permanence	Permanent		
Shading (by woody vegetation)	30%		
Banks	E. Western	e. Eastern	
Bank substrate	Soft earth	Soft earth	
Bank height (m)	1	1	
Angle of bank (°)	45	40	
Vegetation: Refer to species list at Table 7.1			
In-channel vegetation	None		
Bank vegetation	100% cover		
Further information			
Evidence of management	None		
Disturbance (recreational / livestock)	None / Neither		
Presence of other mammals / animals	None		
Water Vole Presence / Absence Information			
Grid Reference	Burrow	Feeding Station	Latrine (count)
-	-	-	-
Further evidence	No		
Water vole presence	None		
Population estimate	N/A		
Suitability for water vole	Good		
Otter Presence / Absence Information			
Grid Reference	Holt	Field Signs	Spraint (count)
-	-	-	-
Further evidence	None		
Otter presence	None		
Population estimate	N/A		
Suitability for otter	May provide a corridor for passage elsewhere and lying up habitat.		

Table 6.7: Kirkby Brook Cross-Section F-f

Photo			
			
Channel			
Width (m)	7		
Water depth (m)	0.5		
Silt depth (m)	0 (sand)		
Water quality	Good (i.e. no signs of organic or chemical pollution or debris. No odour)		
Flow rate	Fast		
Variation in water level	Signs of high water and previous scour / submergence of vegetation approximately 0.5 metres higher than current water level.		
Permanence	Permanent		
Shading (by woody vegetation)	15%		
Banks	F. Western	f. Eastern	
Bank substrate	Soft earth	Soft earth	
Bank height (m)	1	3	
Angle of bank (°)	30	30	
Vegetation: Refer to species list at Table 7.1			
In-channel vegetation	None		
Bank vegetation	100% cover		
Further information			
Evidence of management	None		
Disturbance (recreational / livestock)	None / Neither		
Presence of other mammals / animals	None		
Water Vole Presence / Absence Information			
Grid Reference	Burrow	Feeding Station	Latrine (count)
-	-	-	-
Further evidence	No		
Water vole presence	None		
Population estimate	N/A		
Suitability for water vole	Good		
Otter Presence / Absence Information			
Grid Reference	Holt	Field Signs	Spraint (count)
-	-	-	-
Further evidence	None		
Otter presence	None		
Population estimate	N/A		
Suitability for otter	May provide a corridor for passage elsewhere and lying up habitat.		

7.0 APPENDIX 2: FIGURE

Figure 1: Plan to Show Location of Kirkby Brook, Water Vole Records, Local Wildlife Sites (LWS) and Cross-sections

