OTTER, WATER VOLE AND WHITE-CLAWED CRAYFISH SURVEY & REPORT
at
Land at Watt Street/Whalley Road
Clitheroe
BB7 9ED

Client:
Skipton Properties

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JCA Ref:
13611f/g/DB

Version:
Planning Application

Date of Report:
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JCA Limited
Arboricultural & Ecological Consultants

Quality Assurance

JCA ref.	Version	Desktop Survey Completed:		Site Surveyed:		Report Completed:		Checked:	
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Summary

A report is required at the **Land at Watt Street/Whalley Road** to assess the site's potential for supporting otter, water vole and white-clawed crayfish, in the form of incidental evidence and sightings. The aim of this report is to investigate the potential impact that the proposed development may have on the local/ national otter, water vole and white-clawed crayfish populations. The development proposed on this site is the demolition of the existing mill structure and the construction of residential properties. This includes modifications to Sabden Brook.

The site has been considered to have a low potential for supporting water vole as no evidence of their presence was found. We therefore recommend that the proposed development at **Land at Watt Street/Whalley Road** should go ahead, and that no European Protected Species Mitigation Licence is required. However, the work should be carried out with care and vigilance. Should any water vole be seen during any stage of the development, all work must stop immediately and Natural England must be contacted. Natural England will provide advice on the best course of action. It must be stated that this is a legal requirement, and that water vole may only be handled and their shelter disturbed by an experienced ecologist holding an appropriate licence.

The site has been considered to have a low potential for supporting white clawed crayfish as no evidence of their presence was found. We therefore recommend that the proposed development at **Land at Watt Street/Whalley Road** should go ahead, and that no European Protected Species Mitigation Licence is required. However, the work should be carried out with care and vigilance. Should any white-clawed crayfish be seen during any stage of the development, all work must stop immediately and Natural England must be contacted. Natural England will provide advice on the best course of action. It must be stated that this is a legal requirement, and that white-clawed crayfish may only be handled and their shelter disturbed by an experienced ecologist holding an appropriate licence.

The site has been considered to have a moderate potential for supporting otter as two spraints were discovered on one of the three surveys conducted in and around Victoria Mill. These were only discovered in late February 2018, and no other evidence of otters have been discovered along Sabden Brook or the mill pond from October 2017 to February 2018. This suggests the site is only occasionally used by otters, possibly on the edge of their territory as suggested by a record of an otter dating from 2011, 1700m downstream of the site.

Although Victoria Mill may be on the extremities of an otter territory, as suggested by the evidence discovered, otters do certainly utilise the tunnel below Victoria Mill. Avoidance. mitigation and compensation will be required under the proposed development plan to preserve the favourable conservation status of this protected species, as otters may be disturbed during and post-construction. Therefore a Natural England Mitigation Licence for Otters will have to be applied for pending planning approval. The following is an outline of strategies that will be required at Victoria Mill to reduce disturbance and will be included in the Mitigation Method Statement:

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- Otter fencing: As the site is situated next to the Sabden Brook and an active otter territory, otters may enter the site during construction works. To prevent this happening exclusion fencing can be installed. 1.8m galvanised welded square mesh fencing should be erected around the entire site during the construction period to ensure otters don't enter the site when works are taking place. This mesh fencing is buried partially in the ground with an overlap to prevent digging. Mesh is held in place with wooden posts. An overlap at the top of the fence can also be created if required. Fencing can be removed once construction works have been completed.

- Timing and lighting during construction works: It is recommended that any construction works occur during daylight hours. Otters which may be encountered on site are mainly active around sunset to sunrise. If works do occur at night lighting and noise must be kept to a minimum. Any powerful construction lighting must point away from Sabden Brook.

- Post-construction mitigation and creation of a buffer zone: Permanent lighting must be a consideration. Any external lighting must be positioned away from Sabden Brook, in order to cause minimal disturbance to otters. The land adjacent to Sabden Brook can be converted into a wildlife area, which will act as a buffer zone between the office block and Sabden Brook. The creation of this wildlife area will include the removal of the invasive Himalayan Balsam (Impatiens glandulifera), as well as a planting scheme, faunal box scheme and construction of a fence around the area, to prevent pedestrians from entering.

Acknowledgements

Thank you to Jenny Butler and Amanda Beck for assisting during surveys.

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1. Introduction and Terms of Reference

1.1 Purpose of the Report

1.1.1 A report is required at **Land at Watt Street/Whalley Road** to assess the site's potential for supporting otter, water vole and white-clawed crayfish, in the form of incidental evidence and sightings.

1.1.2 The aim of this report is to investigate the potential impact that the proposed development may have on the local/ national otter, water vole and white-clawed crayfish populations.

1.2 Terms of Reference

1.2.1 I am instructed by **Skipton Properties** to visit the site and prepare my findings in a report.

1.2.2 For this purpose I have been supplied with a site map and brief details of the proposal.

1.3 Scope of the Report

1.3.1 This report is compiled in accordance with the Joint Nature Conservation Committee's (JNCC) '*Common Standards Monitoring Guidance for Mammals*', Natural England's *'IN112 Monitoring the Otter'* and the People's Trust For Endangered Species (PTES) '*National Water Vole Monitoring Programme Survey Guidelines 2015*'.

1.3.2 This report is also compiled in accordance with the Natural England's Guidelines and the Conserving Natura 2000 Rivers '*Monitoring the White-clawed Crayfish'*.

1.4 Details of Proposed Development

1.4.1 The development proposed on this site is the demolition of the existing mill structure and the construction of residential properties. This includes modifications to Sabden Brook.

1.5 Site Description

1.5.1 **Land at Watt Street/Whalley Road** is situated approximately 8km northwest of Burnley town centre, at grid reference: SD 77579 37276.

1.5.2 The site itself is a former mill which has fallen into disrepair over the past 15 years. Immediately surrounding it is a strip of riparian woodland, Sabden Brook which flows beneath the mill structure and a mill pond at the southwest of the site.

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1.5.3 The site is surrounded predominantly by the village of Sabden to the east and pastoral land and woodland strips to the west. A strip of riparian habitat extends west away from the mill, following Sabden Brook. A map of the site, in relation to the surrounding habitats can be seen in **Appendix 4.**

1.6 Otter, Water Vole and White-clawed Crayfish Ecology

1.6.1 **Otter (*Lutra lutra*)** are distributed throughout the UK. Mainly nocturnal and nomadic these amphibious mammals occupy large territories and make use of a wide range of habitats including rivers, streams, ditches and wetlands. Otters will use different areas within a home range based on the availability of food. Otters prey on a wide variety of species including fish, shellfish and amphibians. During the day otters rest at lying areas and in holts (see **Appendix 4** for glossary of terms).

1.6.2 Otters were once common throughout the UK, but between the 1950s to 1970s population quickly declined because of agricultural intensification, pollution of rivers, habitat loss and fragmentation and persecution. As the result of conservation efforts otter populations are beginning to recover.

1.6.3 **Water Vole (*Arvicola amphibious*)** are distributed throughout the UK. Superficially similar to rats, water voles are semi-aquatic rodents that have rounder noses, broader faces and hairy tails unlike rats. Water voles are commonly found in along a wide range of habitats including rivers streams and ditches, but prefer slow-moving riparian habitats with densely vegetated herbaceous banks. Herbaceous vegetation cover is important to these animals, as it both conceals and provides food for them. However, an open wetland habitat is preferred to riparian habitats with woodland cover (see **Appendix 4** for glossary of terms).

Water vole were once common throughout the UK, however their population has dropped from approximately 8 million pre-1960 to only 354,000 by 1990, a 90-95% loss. Unfortunately this trend continues and recent estimates approximate a population of 220,000 in 2004. Their decline is attributed to the non-native invasive American mink who predate water vole, as well a agricultural intensification and poor management of water courses.

1.6.4 **White-clawed Crayfish (*Austropotamobius pallipes*)** are classified as Endangered according to the IUCN Red List of Endangered Species and their populations are declining throughout much of their range but still occur patchily across much of England, Wales and Northern Ireland.

The only native crayfish in the UK it is threatened by crayfish plague, *Aphanomyces astaci*, a fungal disease carried by non-native Signal Crayfish (*Pacifastacus leniusculus*) as well as competition from this and other invasive crayfish species.

Adults may reach over 12 cm from the tip of the rostrum (snout) to the telson (tail

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plate), but more often are less than 10 cm. The body is smooth, generally brown to olive in colour, and has a pitted appearance, with a pinkish-white underside.

Breeding: Takes place in autumn and early winter (September to November) when the water temperature drops below 10°C for an extended period. Females overwinter with a clutch of eggs, usually less than 100, held beneath the tail. Eggs hatch on the female and juveniles become independent at the second stage of development. The timing of release of juveniles varies from June to August. They also undergo a moulting and growth period from May to October after which they are particularly vulnerable, until the exoskeleton has hardened.

Environment: The white-clawed crayfish is largely nocturnal, and occurs in areas with relatively hard, mineral-rich waters on calcareous and rapidly weathering rocks. It is found in a wide variety of environments, including canals, streams, rivers, lakes, reservoirs and water-filled quarries. It is typically found in watercourses of 0.75 m to 1.25 m deep, but may occur in very shallow streams (about 5 cm of water) and in deeper, slow-flowing rivers.

Habitat requirements: Key habitat features identified by Smith *et al*. (1996) include vertical banks, channel width overhung by a plant canopy more than 0.5 m above the water surface, bank length with tree root systems projecting into the water providing refuge, sources of food, calcium and protection from strong currents and predators. The white-clawed crayfish is principally found in clean, alkaline waters.

Diet: White-clawed crayfish are omnivorous but primarily carnivorous, eating macroinvertebrates and carrion when available. Worms, insect larvae, snails, small fish, macrophytes and algae are also components of the diet.

1.7 Otter, Water Vole and White-clawed Crayfish and the Law

1.7.1 **Otters** and their holts in the UK are protected under European and UK law. The main piece of legislation protecting otters in the UK is Schedule 2 of the Conservation of Habitats and Species Regulations 2010. In addition to this, otters are also protected in England and Wales under Schedule 5 and 6 of the Wildlife and Countryside Act 1981 (as amended).

Under these legislations, it is an offense to:

- Intentionally or deliberately capture, injure or kill an otter.
- Damage or destroy a breeding or resting place of an otter, or intentionally or recklessly damage or destroy any structure or place used for shelter or protection.
- Intentionally or recklessly disturb an otter in a place used for shelter or protection, or deliberately disturb otters in such a way as to be likely to significantly affect (i) the ability of any significant group of otters to survive, breed, rear or nurture their young, or (ii) the local distribution or abundance.

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- Intentionally or recklessly obstruct access to a place used for shelter or protection.
- Possess an otter (alive or dead), or any part of an otter.

1.7.2 **Water vole**s in the UK are protected under UK law. The main piece of legislation protecting water vole in England and Wales is Schedule 5 of the Wildlife and Countryside Act 1981. This protection was extended in April 2008 so that Water Voles are fully protected under Section 9 (offences under Section 9 carry a maximum penalty of a fine not exceeding Level 5 on the standard scale, currently £5,000, imprisonment for up to six months, or both. In addition, the courts may order the forfeiture of any vehicle or other thing that was used to commit the offence).

Under these legislations, it is an offense to:

- Intentionally kill, injure or take (capture) a water vole
- Possess or control a live or dead water vole, or any part of a water vole
- Intentionally or recklessly damage, destroy or obstruct access to any structure or place which water voles use for shelter or protection or disturb water voles while they are using such a place
- Sell, offer for sale or advertise for sale live or dead water voles.

If it is discovered that development may impact upon otter and/or water vole (thus leading to an offence being committed) a **mitigation plan** should be devised and a **European Protected Species Mitigation Licence** applied for from the relevant government department (i.e. Natural England). Gaining a licence will depend on many variables, including population abundance, its habitat use and local/regional/national importance.

1.7.3 **White-clawed Crayfish** are protected under UK law. The main piece of legislation protecting white-clawed crayfish in England and Wales is the **Wildlife and Countryside Act 1981**, where they are listed under Schedule 5.

Under these legislations, it is an offense to:

- Intentionally take (capture) white-clawed crayfish from the wild.
- Sell, offer for sale or advertise for sale live or dead white-clawed crayfish.

It is also listed until Annex II of the EU Conservation (Natural Habitats, &c.) Regulations 1994 allowing areas to be designated as Special Areas of Conservation (SAC) for the presence of white-clawed crayfish. Such a designation brings legal restrictions to the management and operations and development that can occur in such sites, to help conserve the white-clawed crayfish and the specific habitat it requires. This species is also listed as a UK BAP species and appears on the IUCN Red List Endangered Species List.

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2. Methodology

2.1 Desktop Survey Methodology

2.1.1 A desktop study has been undertaken in order to obtain any records of otter and water vole and designated sites within a 2km radius of the site. Lancashire Environment Record Network was contacted in order to obtain all records, within a 2km radius of the site.

2.1.2 The Multi-Agency Geographic Information for the Countryside (MAGIC) website was used to locate any designated sites, both statutory and non-statutory, such as Local Nature Reserves (LNRs), Ramsar Sites, Special Areas of Conservation (SACs), Special Protection Areas (SPAs) or Sites of Special Scientific Interest (SSSIs) that may be present within 2km of the survey site.

2.2 Otter Field and Water Vole Survey Methodology

2.2.1 The site was surveyed on the 27/10/2017 and the 12/12/2017 and the 22/02/2018 by David Bodenham *BSc Ind (Hons), MSc*. Survey conditions are summarised in **Table 1**.

Table 1: Survey times and weather conditions.

Survey date	Lead surveyor	Temp	Humidity	Wind speed/Direction		Cloud Cover	Precipitation
27/10/2017	David Bodenham	13°C	55%	BF0	N/A	30%	None
12/12/2017	David Bodenham	-1°C	63%	BF0	N/A	10%	None
22/02/2018	David Bodenham	5°C	54%	BF0	N/A	20%	None

The aim of an otter survey is to record field signs along rivers and streams to determine activity levels and patterns of behaviour along a set length of suitable habitat. Specifically otter surveys record locations of otter activity, for example footprints, feeding remains, spraints (otter droppings), lying-up areas, slides (worn patches along the waters edge where otters patrol), holts as well as sightings. These are used to determine the use of particular stretches of river and its tributaries by otters. The otter survey undertaken at **Land at Watt Street/Whalley Road** consisted of a survey of both banks (where accessible) 250m either side of the proposed development as well as a mill pond on site.

The aim of a water vole survey is to record field signs along rivers and streams to determine activity levels and patterns of behaviour along a set length of suitable habitat. Specifically water vole surveys record locations of water vole activity, for example footprints, latrines, pathways in vegetation, feeding remains, cropped grass around tunnel entrances, burrows as well as sightings. These are used to determine the use of particular stretches of watercourse by water voles. The water vole survey

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undertaken at **Land at Watt Street/Whalley Road** consisted of a survey of both banks (where accessible) 250m either side of the proposed development as well as a mill pond on site.

Other information is also collected including the nature of the habitat, condition of watercourse banks, quality of surrounding terrestrial habitat, bank shape, watercourse current and signs of other wildlife including American mink (*Neovison vison*) and brown rat (*Rattus norvegicus*).

2.2.2 Limitations: Otter surveys are not constrained to precise months and seasons unlike other protected species surveys. However, if there is heavy rain it is recommended that surveys are not undertaken as field signs will be washed away and/or obscured by higher water levels. The survey was conducted during fine weather, after a few days of dry weather. Water vole surveys are constrained to precise months and seasons, specifically the optimal survey period is between April and September. Surveys can be conducted in March and October but these times are suboptimal as water vole may still be living predominantly in burrows and little evidence may be found. If there is heavy rain it is recommended that surveys are not undertaken as field signs will be washed away and/or obscured by higher water levels. The survey was conducted during fine weather, after a few days of dry weather.

2.3 White-clawed Crayfish Survey Methodology

2.3.1 The site was surveyed on the 27/10/2017 and the 28/10/2017 by David Bodenham *BSc Ind (Hons), MSc*. Survey conditions are summarised in **Table 1**.

Table 2: Survey times and weather conditions.

Survey date	Lead surveyor	Start time	Water temp	Humidity	Wind speed/Direction		Cloud Cover	Precipitation
27/10/2017	David Bodenham	14:00	7°C	55%	BF0	N/A	30%	None
28/10/2017	David Bodenham	20:00	5°C	62%	BF0	N/A	50%	None

2.3.2 Surveys were carried out following the breeding season (mid-July to mid-October), avoiding May and June when females may be carrying newly hatched young. The surveys were also carried out during low and receding flow conditions as high flow prevents crayfish coming out of refuges, makes manual searching difficult as well as personal safety of surveyors.

2.3.3 The following methods were used on site to detect the presence of white-clawed crayfish:

- **Habitat Survey (27/10/2017)**: An appraisal of the river corridor habitat present, highlighting features of importance for crayfish. This will be presented as a map showing the channel which will be affected by works, plus adjacent upstream and

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downstream sections.

- **Manual searching** and **hand netting** (where the water is clear and low flowing) (**27/10/2017**): This involves searching under stones for crayfish, sweep netting in vegetation and under tree roots. Searching at suitable sites for a minimum of 15 minutes.
- **Night search by torch** (where water is deep) (**28/10/2017**): Torches are used at night to search for active animals at night. This was used as a supplementary method only.

2.3.4 All surveyors are equipped with the following:

- Recording form
- Site map
- Viewing aid
- Callipers
- Bucket
- Waders

2.3.5 Due to the threat of crayfish plague all equipment was disinfected with hypochlorite bleach or an iodophor (at least 100ppm available iodine) between watercourses and surveys to prevent the spread of the fungus to potential white-clawed crayfish sites.

2.3.6 Limitations: Torch surveys were carried out in the sub-optimal period. Searching surveys were carried out outside the survey season; however, weather conditions were still favourable. The survey was carried out over a dry period when the brook was not in high flow. Water was clear a shallow.

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3. Results

3.1 Desktop Survey Results

3.1.1 The records obtained from The Lancashire Environment Record Network are as follows:

There is one record of an otter (*Lutra lutra*) along Sabden Brook, approximately 1700m downstream of Victoria Mill. This record dates from 2011. Sabden Brook runs directly along the northern perimeter of the site, as well as underneath the mill structure. It is likely that otter may be present in the Brook next to the mill.

Sabden Brook does offer some suitable habitat for water vole and although there are no records of water vole in the area, there is potential for them to be present.

Sabden Brook does offer some suitable habitat for white clawed crayfish and although there are no records of white clawed crayfish in the area, there is potential for them to be present within the Brook.

Nature Conservation Designations

3.1.2 Nature designations are split into two types; those that confer some form of statutory protection, and other designations. These designated sites are summarised in the table below:

Table 1: Non-statutory designated sites with 2km of the site.

Site Name	Designation	Level	Proximity	Description
Non-statutory Designated Sites				
Read Heights Pasture	Biological Heritage Site	Local	1495m SW	A large species-rich, semi-natural, neutral grassland field, with a flattish plateau on the north side extending down to Back Lane.
Lower Barn Wood	Biological Heritage Site	Local	665m SW	Woodland and Scrub (Wd1).
The Rough	Biological Heritage Site	Local	989m NW	The site comprises dry dwarf shrub heath, acid grassland and mire communities.
Nick of Pendle Quarry	Biological Heritage Site	Local	1288m NW	Lichens (Li1a).
Black Hill	Biological Heritage Site	Local	645m SE	The site comprises a mosaic of dry dwarf shrub heath and marshy grassland situated 0.75 km south of Sabden.

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Huntroyde Demesne	Biological Heritage Site	Local	1259m SE	The site comprises an estate with a high proportion of broad-leaved woodland.
Pendle Hill	Biological Heritage Site	Local	977m N	The site comprises an extensive and prominent upland area rising to 557m, situated between the Bowland Fells and the Pennines.

3.2 Habitat Survey Results

3.2.1 Sabden Brook flows from east to west, under Victoria Mill. This brook has been modified, especially during the Victorian era, approximately when the mill was built. To the east of the mill, the brook has been channelized, with steep stone walls either side of the brook (**Appendix 2, Photo 1**). These walls contain a number of gaps and holes suitable for water voles. At this point of the brook, the substrate is mostly made of stones and boulders. The flow is also reasonably fast due to a steep gradient, flowing towards the mill. Surrounding land includes houses and roads which make up the village of Sabden. Access to surrounding land from the brook would be difficult for otters and water vole, because of the wall either side of the brook.

3.2.2 The brook passes below a bridge towards Victoria Mill. Here the course is more natural, flowing past the mill and gently meandering (**Appendix 2, Photo 2**). This then drops down a weir under the mill (**Appendix 2, Photo 3**). This area is bordered by trees and amenity grassland, which slope down to the brook from street level. This area is relatively open and exposed.

3.2.3 The brook passes under the mill through a tunnel (**Appendix 2, Photo 4**). This is a sheltered area with a relatively slow water flow. Water depth here increases up to 1m in depth.

3.2.4 The brook emerges on the west side of the mill (**Appendix 2, Photo 5**). Here it opens into woodland. South is the mill pond (**Appendix 2, Photo 7**). This a rectangular body of water, with a depth of approximately 1m. This has no major water source flowing into it. This is surrounded by broadleaf woodland with a mature understory. The brook meanders west on a more natural course (**Appendix 2, Photo 6**). The flow varies from fast to slow with changes in gradient. The average depth at this section is approximately 50cm. Substrate consists of a combination of rocks and silt. Surrounding land consists of open pastoral fields. The brook continues west, with a strip of woodland forming a riparian corridor down the valley.

3.3 Otter and Water Vole Survey Results

3.3.1 No evidence of otters, in the form of footprints, feeding remains, spraints (otter droppings), lying-up areas, slides (worn patches along the water's edge where otters patrol) and holts, as well as sightings were found along the brook or around the mill

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pond on both the 27/10/2017 and 12/12/2017. However, on return to the site on 22/02/2018, otter spraints were discovered in two locations under the tunnel at Sabden Brook, directly below the former mill (**Appendix 2, Photos 10 and 11**). The streatch of the brook and the mill pond were once again search, but no other evidence of otter could be found.

3.3.2 No evidence of water vole footprints, latrines, pathways in vegetation, feeding remains, cropped grass around tunnel entrances, burrows as well as sightings were found on the 27/10/2017. However, suspect droppings were found on the 12/12/2017 which have been sent off for analysis (**Appendix 2, Photo 10**).

3.4 White-clawed Crayfish Survey Results

3.4.1 No white-clawed crayfish were found along the brook or around the mill pond on both the 27/10/2017 and 28/10/2017. No other crayfish species were also found.

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4. Discussion and Analysis of Results

After conducting a thorough otter, water vole and white-clawed crayfish survey and a detailed Desktop Study, we found no evidence of any of these species at the **Land at Watt Street/Whalley Road** in both Sabden Brook and the Mill Pond.

4.1 Otter Discussion

4.1.1 There is one record of an otter along Sabden Brook, approximately 1700m downstream of Victoria Mill, dating from 2011. No evidence of otters were found either on the 27/10/2017 or 12/12/2017. However, two otter spraints were discovered on the 22/02/2018. No other evidence or sightings were made along either the brook or the mill pond. Due to the sparse evidence only found on one survey day and only one the historical record within 2km of the site, Victoria Mill complex may be at the limit of an otter territory. Regardless, otter do certainly utilise the brook and the tunnel below the mill complex.

4.2 Water Vole Discussion

4.2.1 No records of water vole were found within 2km of the site. Although the site does contain habitats suitable for water vole, including gaps in stone walls along the brook edge, no evidence of water were found on the 27/10/2017. Suspect droppings were found on the 12/12/2017 which are awaiting analysis.

4.3 White-clawed Crayfish Discussion

4.3.1 No white-clawed crayfish records were found within 2km of the site. Neither white-clawed crayfish, nor any other invasive species of crayfish were found during surveys on both 27/10/2017 and 28/10/2017. It is therefore concluded that no white-clawed crayfish are present in the brook or the mill pond.

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5. Conclusions and Recommendations

5.1 Otter Conclusions & Recommendations

5.1.1 The site has been considered to have a moderate potential for supporting otter as two spraints were discovered on one of the three surveys conducted in and around Victoria Mill. These were only discovered in late February 2018, and no other evidence of otters have been discovered along Sabden Brook or the mill pond from October 2017 to February 2018. This suggests the site is only occasionally used by otters, possibly on the edge of their territory as suggested by a record of an otter dating from 2011, 1700m downstream of the site.

5.1.2 Although Victoria Mill may be on the extremities of an otter territory, as suggested by the evidence discovered, otters do certainly utilise the tunnel below Victoria Mill. Avoidance. mitigation and compensation will be required under the proposed development plan to preserve the favourable conservation status of this protected species, as otters may be disturbed during and post-construction. Therefore a Natural England Mitigation Licence for Otters will have to be applied for pending planning approval. The following is an outline of strategies that will be required at Victoria Mill to reduce disturbance and will be included in the Mitigation Method Statement:

- **Otter fencing:** As the site is situated next to the Sabden Brook and an active otter territory, otters may enter the site during construction works. To prevent this happening exclusion fencing can be installed. 1.8m galvanised welded square mesh fencing should be erected around the entire site during the construction period to ensure otters don't enter the site when works are taking place. This mesh fencing is buried partially in the ground with an overlap to prevent digging. Mesh is held in place with wooden posts. An overlap at the top of the fence can also be created if required. Fencing can be removed once construction works have been completed.

- **Timing and lighting during construction works:** It is recommended that any construction works occur during daylight hours. Otters which may be encountered on site are mainly active around sunset to sunrise. If works do occur at night lighting and noise must be kept to a minimum. Any powerful construction lighting must point away from Sabden Brook.

- **Post-construction mitigation and creation of a buffer zone:** Permanent lighting must be a consideration. Any external lighting must be positioned away from Sabden Brook, in order to cause minimal disturbance to otters. The land adjacent to Sabden Brook can be converted into a wildlife area, which will act as a buffer zone between the office block and Sabden Brook. The creation of this wildlife area will include the removal of the invasive Himalayan Balsam (*Impatiens glandulifera*), as well as a planting scheme, faunal box scheme and construction of a fence around the area, to prevent pedestrians from entering.

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5.2 Water Vole Conclusions & Recommendations

5.2.1 The site has been considered to have a low potential for supporting water vole as no evidence of their presence was found. We therefore recommend that the proposed development at **Land at Watt Street/Whalley Road** should go ahead, and that no European Protected Species Mitigation Licence is required. However, the work should be carried out with care and vigilance.

5.2.2 Should any water vole be seen during any stage of the development, all work must stop immediately and Natural England must be contacted. Natural England will provide advice on the best course of action. It must be stated that this is a legal requirement, and that water vole may only be handled and their shelter disturbed by an experienced ecologist holding an appropriate licence.

5.2.3 Although no evidence of water vole were found, JCA recommends that habitat around the development is improved to benefit otter and/or water vole. JCA can provide this in the form of a Water Vole Enhancement Plan.

5.3 White-clawed Crayfish Conclusions & Recommendations

5.3.1 The site has been considered to have a low potential for supporting white clawed crayfish as no evidence of their presence was found. We therefore recommend that the proposed development at **Land at Watt Street/Whalley Road** should go ahead, and that no European Protected Species Mitigation Licence is required. However, the work should be carried out with care and vigilance.

5.3.2 Should any white-clawed crayfish be seen during any stage of the development, all work must stop immediately and Natural England must be contacted. Natural England will provide advice on the best course of action. It must be stated that this is a legal requirement, and that white-clawed crayfish may only be handled and their shelter disturbed by an experienced ecologist holding an appropriate licence.

5.3.3 Although no evidence of white-clawed crayfish were found, JCA recommends that habitat around the development is improved to benefit white-clawed crayfish. JCA can provide this in the form of a White-clawed crayfish Enhancement Plan.

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Conservation (Natural Habitats, &c.) Regulations 1994 (The Habitats Directive) (Amended 2010) <http://www.legislation.gov.uk/uksi/2010/490/contents/made>

Countryside and Rights of Way Act 2000 <http://www.legislation.gov.uk/ukpga/2000/37/pdfs/ukpga_20000037_en.pdf?view=interweave>

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Appendices

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W E

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Appendix 1: Habitat Map

Victoria Mill, Sabden, Lancashire, BB7 9ED.
JCA REF: 13611f/DB

NOT TO SCALE	PAPER SIZE : A2

KEY

- Water course surveyed
- Gaps in stone bank
- Otter droppings

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Appendix 2: Photographic Evidence

Photo 1: Sabden Brook east of the mill.

Photo 2: Sabden Brook at the north side of Victoria Mill.

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Photo 3: The weir.

Photo 4: The brook tunnel.

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Photo 5: The western exit of the brook tunnel.

Photo 6: Sabden Brook west of the mill.

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Photo 7: The mill pond.

Photo 8: Walls at along the brook.

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Photo 9: Gaps in the stone walls.

Photo 10: Otter spraints found on 22/02/2018.

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Photo 11: Otter spraints found on 22/02/2018.

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Appendix 3: Map of Surrounding Landscape

Figure 1: Google Maps image of **Land at Watt Street/Whalley Road** showing the survey site in relation to the surrounding landscape and habitats.

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Appendix 4: Glossary

Otters

Holts: These are structures used as permanent shelter by otters. Holts are usually a hole or burrow along the river bank amongst riparian vegetation. Holts can also be found in the root system of riverbank trees or behind large boulders set into the bank. Lying-up areas are associated with other otter field signs. They can also be connected to lying-up areas and have may more than one entrance.

Lying-up areas/couches: Also known as couches, these are locations along a watercourse used occasionally by otters for grooming, resting and feeding. Many lying-up areas can be located throughout an otter's territory and are typically found hidden in bankside riparian vegetation or as 'nest-like' structures amongst reeds and grasses. Lying-up areas usually have other field signs such as footprints, feeding remains and spraints (otter droppings).

Natal Dens: Natal dens are holts which are used by otters to give birth and rear their young. Natal dens are usually a lot more inconspicuous than other otter holts and lack evidence of otter activity around the entrance. Natal dens are also different to other holts as they can be found some distance from the watercourse, sometimes set back in woodland amongst tree roots, rubble, log piles or even amongst reed beds.

Slides: These are worn patches along the waters edge where otters patrol.

Spraints: A spraint is the dung of the otter. Spraints are typically identified by smell and are known for their distinct aromas, the smell of which has been described as ranging from freshly mown hay to putrefied fish.

Water Vole

Feeding stations: Favoured feeding location used by water voles. These are usually neat piles of chewed lengths of vegetation, with sections measuring 8cm with 45 degree cuts.

Latrines: Piles of droppings left by water voles. Droppings are cylindrical and range from green through to dark purple/black. Latrines are used to mark out territories between February to November. Trampled latrines are a good indication that breeding is taking place.

Nests: Water voles can make woven nests the size of footballs. However, they commonly form burrows in watercourse banks which are typically wider than they are high with a 4-8cm diameter.

Runways: Water voles create runways or tunnels through vegetation, used to commute to foraging sites and as escape routes from predators.

White-clawed Crayfish

Abdomen: The rear half of the crayfish, posterior to (to the rear of) the cephalothorax.

Anterior: Directional term indicating front end of an organism; toward the front.

Carapace: The exoskeleton of a crayfish that covers the front portion of the body.

Dorsal: Directional term indicating the "back" or "top" of an animal or object.

Endemic: Native to a particular place.

Exoskeleton: the hard outer covering of crayfish and other arthropods.

"In berry": Term used to describe a female crayfish carrying eggs under her abdomen.

Lentic: Areas with non-moving water such as ponds or swamps.

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Macrophytes: Plants large enough to be observed with the naked eye.

Medial: Pertaining to the middle.

Molting: The process of shedding the exoskeleton.

Omnivore: Animals that eat both plant and animal matter.

Riffle: Areas of fast flow in a stream where surface of water is agitated.

Riparian: Area along the margin of a stream.

Rostru: The "nose" of the crayfish; the portion of the carapace that is in front of the eyes

Telson: Centre segment of the tail.

Ventral: Directional term indicating the "belly" or "bottom/underside" of an animal.

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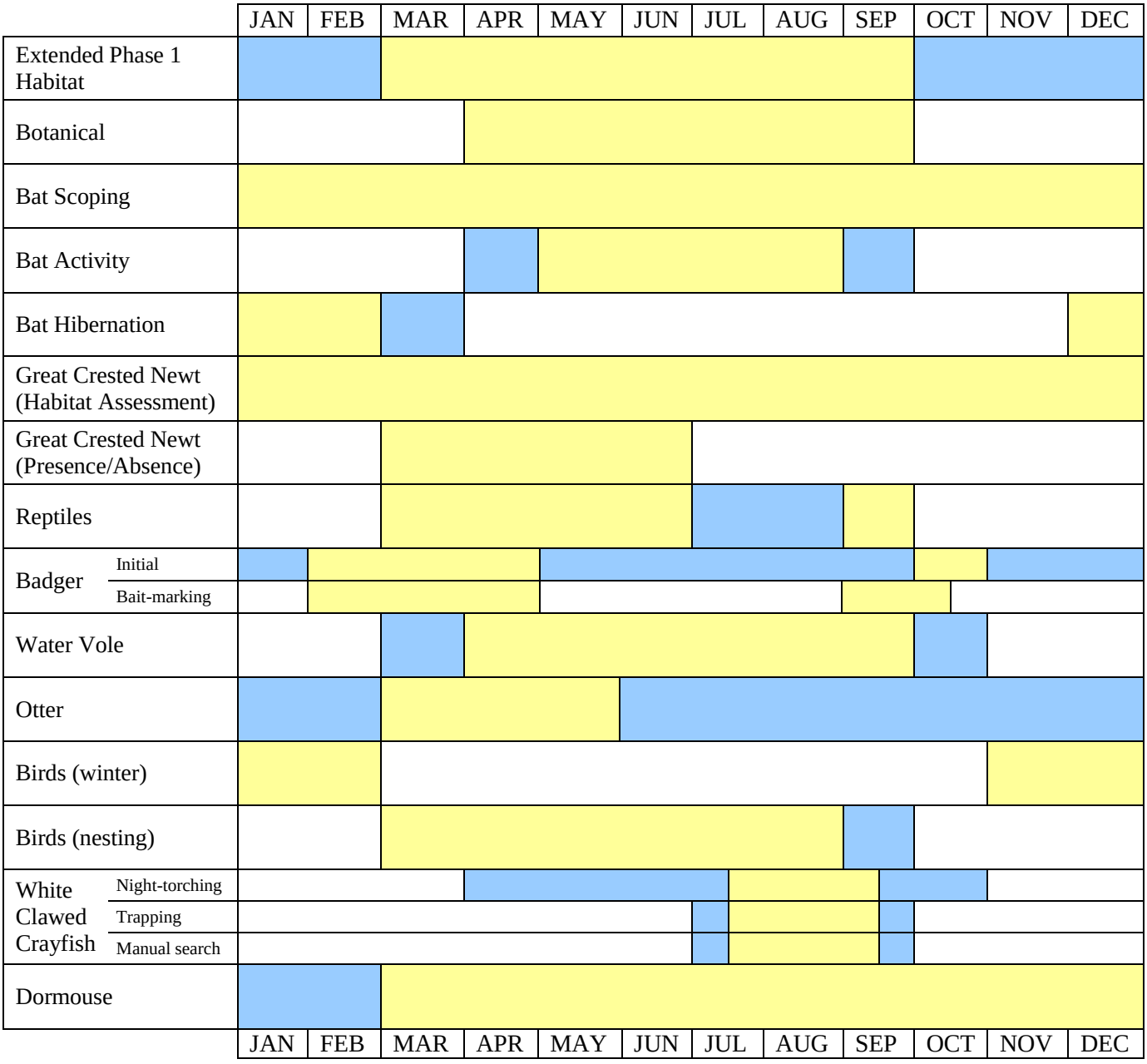
Appendix 5: Survey Calendar

Figure 2: Survey calendar for protected species and habitat surveys.



	Optimal Survey Time
	Sub-optimal Survey Time
	Survey Not Possible

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Appendix 6: Author Qualifications

Principal Consultant and Managing Director

Jonathan Cocking *F.R.E.S., Tech. Cert. (Arbor.A), PDipArb (RFS) FArborA CBiol MSB. MICFor.* Jonathan is a Registered Consultant and Fellow of the Arboricultural Association and sits on its Professional Committee. He has 31 years experience in the Arboricultural profession and served for eight years as Senior Arboriculturist with a large local authority before establishing JCA in 1997. Jonathan has since developed JCA's portfolio of services and its extensive client base. He is a Chartered Biologist, a Chartered Arboriculturalist and an Expert Witness with much experience of litigation work.

Technical Coordinator

Toby Thwaites *BSc (Hons), HND (Arboriculture).* Toby joined JCA in 1998 after graduating in Ecology at the University of Huddersfield and has since graduated in Arboriculture at the University of Central Lancashire. A former JCA team leader and Consulting Arboriculturist, Toby is now Technical Coordinator and oversees all office and on-site activities at JCA and is on hand to offer technical support and advice.

Consulting Staff: Arboriculture

Toby Parsons *Cert. Arb. (RFS), Tech. Cert. (Arbor.A).* Toby joined JCA after spending 6 years working as a senior climber for various Arboricultural contractors in the East Midlands and the South-West. He has gained the Level 2 Certificate in Arboriculture (RFS) and an Arboricultural Technicians Certificate. Toby is LANTRA certified in Professional Tree Inspection.

Scott Reid ***ND*** *(Arboriculture and Forestry).* Scott joined JCA after working with other consultancy companies in the south of England. He specialises in trees in relation to development and holds a National Diploma, various NPTC qualifications and is currently studying for his Level 4 Diploma in Arboriculture.

Andrew Bussey. Andrew joined JCA having spent 12 years working as a tree surgeon for various private companies and a Local Authority. He has various NPTC qualifications, is QTRA qualified and is currently studying for his Arboricultural Technicians Certificate.

Phil Humeniuk *FdSc (Arboriculture).* Phil joined JCA having spent 3 years working for various tree surgery companies and as a Tree Officer for a Local Authority. He also has several years experience working as a consultant both for JCA and for another consultancy. Phil obtained his foundation degree in Arboriculture at the University of Central Lancashire and has various NPTC's and is LANTRA certified in Professional Tree Inspection.

Emily Wilde *FdSc (Arboriculture).* Emily joined JCA having previously worked for various private tree surgery and consultancy companies over the past 8 years. She initially obtained a ND in Forestry & Arboriculture, followed by a FdSc in Arboriculture at Askham Bryan College, York. Emily has various NPTC certificates and is QTRA qualified.

Mick Eltringham *ND (Forestry).* Mick joined JCA after spending 12 years working in the industry for various private companies in the north and south of England. He has also spent the last five years working as a consultant for two canopy research projects in the Amazon Rainforest, working with Oxford University and the University of Arizona. He has various NPTC Qualifications.

Charles Cocking. Charles joined JCA in January 2014 as an Apprentice having previously worked for the company on a part time basis during 2013. In between his roles at JCA, Charles will be studying at Askham Bryan College, York, undertaking a two year course in order to obtain a Foundation Degree in Arboriculture (FdSc Arboriculture).

Consulting Staff: Ecology

David Bodenham *BSc Ind (Hons) Zoology, MSc Biodiversity and Conservation.* An advocate of evidence based conservation, he studied Zoology (Ind) at University and moved onto an MSc in Biodiversity and Conservation where he gained the myriad of skills needed as an ecologist. With over 7 years of experience, David specialises in bat and amphibian ecology.

Jenny Butler *Bsc (Hons) Environmental Science.* Jenny joined JCA's ecology department in 2017, bringing with her a bachelor degree in Environmental Science from Bangor University. Jenny has previously worked as an Environmental Consultant for an Agri-Environment company and as a freelance ecological consultant. Jenny specialises in great crested newt and bat ecology.

Administrative Staff

Sue Guest Administrative Team Leader.
Simeon Haigh *BSc (Hons).* IT Officer.
Lorraine Spink Administrative Assistant.
Yasmin Shahzad Administrative Assistant.
Catherine Cocking Accounts Manager.

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I hope that this report provides all the necessary information, but should any further advice be needed please do not hesitate to contact the author.

Signed

.....

David Bodenham *BSc Ind (Hons), MSc*

12/04/2018

Proofread by

.....

Toby Thwaites *BSc (Hons), HND (Arboriculture)*

12/04/2018

For and on behalf of ***JCA Ltd***

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- Protected Species Mitigation
- Ecological Management (Bat and Bird box installation and inspection)

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