

# HIGH SPEED RAIL (LONDON - WEST MIDLANDS)

## Supplementary Environmental Statement and Additional Provision 2 Environmental Statement

Volume 5 | Technical appendices | Ecology CFAs 16-22

CFA16 | Ladbroke and Southam

CFA17 | Offchurch and Cubbington

CFA18 | Stoneleigh, Kenilworth and Burton Green

CFA19 | Coleshill Junction

CFA20 | Curdworth to Middleton

CFA21 | Drayton Bassett, Hints and Weeford

CFA22 | Whittington to Handsacre

July 2015

SES and AP2 ES 3.5.5.3

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# Volume 5: Technical Appendices

## CFA 16 to 22: Supplementary Ecological Baseline Data

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# 1 Introduction

- 1.1.1 This document presents the results of ecological surveys carried out on accessible land in 2014 in support of the original scheme. Surveys were carried out to provide further information on the location of populations of the European Protected Species: dormouse, otter, great crested newt and bats, to inform the detailed design and relevant protected species licence applications. Surveys were also carried out to further investigate the likely presence of ancient woodland within the extents of the scheme.
- 1.1.2 The report details ecological baseline data collected for the following community forum area (CFA):
- CFA16: Ladbroke and Southam;
  - CFA17: Offchurch and Cubbington;
  - CFA18: Stoneleigh, Kenilworth and Burton Green;
  - CFA19: Coleshill Junction;
  - CFA20: Curdworth to Middleton;
  - CFA21: Drayton Bassett, Hints and Weeford; and
  - CFA22: Whittington to Handsacre.
- 1.1.3 The document should be read in conjunction with the following sections of the main Environmental Statement (ES)<sup>1</sup> : Volume 2 (Community forum area reports), Volume 3 (Route wide effects) and Volume 4 (Off-route effects).

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<sup>1</sup> HS2 London-West Midlands Environmental Statement. DfT November 2013. <https://www.gov.uk/government/collections/hs2-phase-one-environmental-statement-documents>



## 2 Designated sites

- 2.1.1 This section of the appendix presents details of sites designated on the basis of their importance for nature conservation, which fall within the scope of the ecological assessment for the section of the scheme that will pass through CFA 16 to 22 inclusive.
- 2.1.2 No new baseline information on designated sites was collected during 2014. However, Coleshill Sludge Lagoons Local Wildlife Site (LWS) has been designated since the submission of the main ES. The majority of the LWS falls within CFA20 although the southern and eastern edge falls within CFA19. It consists of a series of disused sludge lagoons stretching for almost 1km alongside the River Tame within the grounds of Coleshill Sewage Treatment Works. Information on Coleshill Sludge Lagoons Local Wildlife Site was received from Warwickshire County Council (Biological Record Centre).
- 2.1.3 Riley Hill Biodiversity Alert Site (BAS) is within CFA22 and was not mentioned within the main ES.
- 2.1.4 Table 1 provides further details of these non-statutory designated sites.

Table 1 - Non-statutory designated sites relevant to the assessment of CFA 16 to 22 inclusive

Site name and designation	OS grid reference	Site description	Approximate distance from the original scheme (m) and orientation	Relevant CFA number
Coleshill Sludge Lagoons LWS	SP195915	<p>The site consists of a series of disused sludge lagoons stretching for almost 1km alongside the River Tame within the grounds of Coleshill Sewage Treatment Works. The River Tame forms the southern boundary, with a water conduit forming the northern boundary. The lagoons once contained a series of habitats ranging from open water and swamp through drying mud to older disused lagoons which were colonised by sallow scrub. Since the lagoons became redundant about ten or more years ago they no longer receive liquid effluent and are drying out.</p> <p>The LWS has been designated for its mosaic of habitats including swamp, bare ground, pioneer habitats, steep banks, dense and open scrub and damp areas. The site also has several county rare or notable species including blue fleabane, common cudweed and common meadow-rue. The mosaic habitat is important for breeding warblers including willow warbler and there are two breeding birds on the Royal Society for the Protection of Birds (RSPB)/British Trust for Ornithology (BTO) Red-list of Birds of Conservation Concern associated with the lagoons including grasshopper warbler. The site also forms an important link in the chain of wetland habitats along the Tame Valley.</p>	Within land required <sup>2</sup>	19 and 20
Riley Hill (old sand and gravel pits) BAS	SK113152	Old sand and gravel pits, part flooded to provide pools for angling which are surrounded by woodland. Remainder is an open disturbed area with a very diverse weed flora. Tipping occurring in 1983 affected some of the woodland and open water within the BAS	15m north west (of utilities works), over 400m from closet construction works	22

<sup>2</sup> The term 'land required' is used as a shortened version of the full term 'land required for the construction of the original scheme'

## 3 Ancient Woodland

### 3.1 Introduction

3.1.1 This section of the appendix details ancient woodland baseline data relevant to the section of the scheme that will pass through CFA 16 to 22 inclusive. This baseline information was collected during surveys of accessible land carried out in 2014.

### 3.2 Methodology

3.2.1 A petition response from the Woodland Trust on the Phase One ES suggested that some woodland fragments in areas that HS2 were not able to survey during 2012 and 2013 may be ancient woodland. The focus of the 2014 survey work was to gather further data on potential ancient woodlands where these became accessible during 2014.

3.2.2 Woodland requiring further assessment was identified via a scoping exercise which is outlined below:

- Ordnance Survey maps and existing Phase 1 habitat survey data from the Phase One ES were reviewed to establish sites previously not accessible within the land required for construction of the scheme which contained woodland. The area of each woodland was also measured from Ordnance Survey maps and aerial photography to see whether the area was <2ha (only ancient woodland sites that were over 2 ha on the 1920's base maps are included on the ancient woodland inventory by Natural England. Some of these may now be less than 2ha because of subsequent clearance. Woods that were less than 2ha on the base maps are not included even though some of these are ancient<sup>3</sup>);
- For each site containing woodland, the ancient woodland inventory was reviewed. For example South Cubbington Wood, in CFA17 Offchurch and Cubbington, and North Wood, in CFA20 Curdworth and Middleton, had not been previously surveyed but were identified as ancient on the ancient woodland inventory so it was not necessary to carry out an ancient woodland assessment at these sites;
- For those woodlands not identified on the ancient woodland inventory, Ordnance Survey County Series Maps from the 1880s and the Historic Landscape Characterisation (i.e. a standard method for mapping and identifying the age and character of the landscape) used for the Phase One ES were reviewed by a heritage specialist to determine the likely age of the woodland (ancient woodland is land that has had continuous woodland cover since 1600 AD<sup>3</sup>).

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<sup>3</sup> Ancient Woodland Inventory (Provisional) for England - Digital Boundaries, Natural England website (accessed November 2014)  
[http://www.gis.naturalengland.org.uk/pubs/gis/tech\\_aw.htm](http://www.gis.naturalengland.org.uk/pubs/gis/tech_aw.htm)

- 3.2.3 Some woodlands were scoped out of further assessment as they were clearly not ancient in origin such as Job's Hill Plantation in CFA21 Drayton Bassett, Hints and Weeford; this area was not marked as woodland on the first edition Ordnance Survey map (1887) and the Historic Landscape Characterisation indicates previous that the previous land type was small, irregular fields typical of earlier piecemeal enclosures.
- 3.2.4 If, as a result of the scoping exercise, there was a possibility of a woodland being of ancient origin and if access was available a survey was carried out in May or June 2014 when ancient woodland indicator species would be more likely to be identified (see Table 2). During the surveys, suitably experienced ecologists noted information on the presence of ancient or veteran trees, evidence of past coppicing and pollarding, and the presence of historic woodland landscape features (e.g. the presence of old banks and ditches). For this project the definition of a veteran tree is taken from Annex 2 of the National Planning Policy Framework: "A tree which, because of its great age, size or condition is of exceptional value for wildlife, in the landscape, or culturally." Surveyors also noted the presence of ancient woodland indicator species from a comprehensive list tailored for Staffordshire and Warwickshire<sup>4</sup>. The surveyors made a decision based on their observations during the survey as to whether the woodland was likely to be ancient. The survey findings were then compared with the findings of the heritage assessment to conclude whether the woodland was likely to be ancient.
- 3.2.5 Ancient woodland assessments were carried out at a total of 11 sites within CFA 16 to 22 inclusive as shown in Table 2.

**Table 2 - Summary of ancient woodland assessments undertaken in 2014 within CFA 16 to 22 inclusive**

CFA	Name of woodland (if applicable) and location	OS grid reference	Survey date	Approximate distance from the land required for construction of the original scheme (m) and orientation
16	Continuous with Fox Covert/Glyn Davies Wood Stoneton, south of Priors Hardwick	SP461535	28 May 2014	Within land required <sup>5</sup>
16	Berryhill Plantation Stoneton, south of Priors Hardwick	SP463539	21 May 2014	Within land required
17	Woodland along Grand Union Canal South of the Grand Union Canal roughly between Welsh Road Bridge and Longhole Bridge	SP382638	30 June 2014	Within land required
17	Continuous with Offchurch Greenway Within grounds of residential house, east of Offchurch	SP366655	30 June 2014	Within land required

<sup>4</sup> Although there is no definitive list of ancient woodland indicator plants for Warwickshire and Staffordshire, a list was compiled to be reflective of the region.

<sup>5</sup> The term 'land required' is used as a shortened version of the full term 'land required for the construction of the original scheme'.

CFA	Name of woodland (if applicable) and location	OS grid reference	Survey date	Approximate distance from the land required for construction of the original scheme (m) and orientation
17	Sutton Spinney South-east of the Offchurch Greenway	SP370658	30 June 2014	Within land required
18	Continuous with Black Waste Wood East of Burton Green and north of the Kenilworth Greenway	SP270758	7 May 2014	Within land required
18	Woodland off Red Lane East of Burton Green and adjacent to the Kenilworth Greenway	SP270757	7 May 2014	Within land required
20	Continuous with Dunton Wood West of Lea Marston	SP195940	6 May 2014	Within land required
21	Copse Off Drayton Lane West of Drayton Bassett	SK169002	1 May 2014	Within land required
22	Harvey's Rough North-west of Shaw Lane, Hanch Hall	SK102144	28 May 2014	Within land required
22	Little Lyntus East of Netherstowe Lane and south of Wood End Lane, Curdborough	SK136127	28 May 2014	Within land required

### 3.3 Deviations, constraints and limitations

3.3.1 There are four woodlands that were scoped in for survey during 2014, but where no access was available. These woodlands are shown in Table 3.

3.3.2 Vegetation survey is limited by factors which affect the presence of plants such as the time of year and general weather conditions. Therefore the ancient woodland assessment has not produced a complete list of plants and the absence of evidence of any particular species should not be taken as conclusive proof that the species is not present or that it will not be present in the future. Nevertheless, the results of these surveys permit an assessment of the likely ancient original of woodlands.

Table 3 - Summary of locations in CFA 16 to 22 inclusive where requirement for ancient woodland assessment was identified (via the scoping exercise described above) but no access was available for survey in 2014

CFA number	Name of woodland (if applicable) and location	OS grid reference	Distance from the land required for the construction of the original scheme (m) and orientation
18	Birches Wood Around and east of Birches Wood Farm, Crackley Lane, Kenilworth	SP291743 and SP290745	Within land required  NOTE: It is understood that Natural England is adding Birches Wood to the ancient woodland inventory.
20	Cocksparrow Farm North-west of Lea Marston	SP195948	Within land required
20	Continuous with Dunton Wood West of Lea Marston	SP194938	Within land required

## 3.4 Baseline

### CFA16 Ladbroke and Southam

#### *Continuous with Fox Covert (Glyn Davies Wood)*

- 3.4.1 This small (0.04ha) area of broadleaved parkland/scattered trees is immediately adjacent to the western boundary of Fox Covert (Glyn Davies Wood) (in Greatworth to Lower Boddington (CFA15)), between Stoneton Lane and Warwick Road, and is within the land required for construction of the original scheme.
- 3.4.2 The site visit in May 2014 confirmed that this area comprises scattered mature pedunculate oak (*Quercus robur*) on the hedgerow boundary with Warwick Road and a pond surrounded by scrub. Beyond the area of scattered trees there is a field of sheep-grazed improved grassland.
- 3.4.3 No ancient or veteran trees, or evidence of past coppicing or pollarding was observed. No ancient woodland indicator species were recorded.
- 3.4.4 This area of scattered trees was not wooded on the first edition Ordnance Survey maps of 1876, although there were trees present at this time along Warwick Road and at Fox Covert (Glyn Davies Wood). The scattered trees are just north of the Warwickshire border whereas Fox Covert (Glyn Davies Wood) lies in Northamptonshire. Due to the area being on the opposite side of the county/parish boundary from the potentially ancient Fox Covert (Glyn Davis Wood) (it is understood that Fox Covert (Glyn Davis Wood) is likely to be ancient (see SES and AP2 ES Volume 5 Appendix EC-001-002)) and the fact that the predominant Historic Landscape Character of the area is open fields it is unlikely that the area would be classified as ancient woodland. This is supported by survey evidence.

<sup>6</sup> Ordnance Survey (1887), County Series Map of Warwickshire, 1:2,500 scale

- 3.4.5 Following the further desk study and survey this area of woodland is not considered to be ancient.

### *Berryhill Plantation*

- 3.4.6 Berryhill Plantation, adjacent to Stoneton Lane, is 4.36ha. Due to its size (i.e. >2ha) it should theoretically have been included on the ancient woodland inventory if it is ancient. The south-east corner of Berryhill Plantation adjoins Fox Covert/Glyn Davies Wood and its north-east corner is continuous with Lodge Spinney. The northern edge of Berryhill Plantation is within the land required for construction of the original scheme; the majority of the woodland is outside the land required. Lodge Spinney is over 250m from the land required. The ancient woodland survey, undertaken in May 2014, included both Berryhill Plantation and Lodge Spinney for completeness.
- 3.4.7 The Phase One ES (Volume 5, Appendix EC\_001-003) describes Berryhill Plantation as: "...a recent plantation of broad-leaved trees planted in the twentieth century. It is listed on the National Inventory of Woodland and Trees and is recognised as lowland deciduous woodland on the Natural England inventory of habitats of principal importance".
- 3.4.8 The site visit confirmed that Berryhill Plantation is dominated by pendunculate oak (*Quercus robur*) and ash (*Fraxinus excelsior*), with some sycamore (*Acer pseudoplatanus*). The field layer is dominated by ruderal species.
- 3.4.9 The following ancient woodland indicator species were recorded: field maple (*Acer campestre*), holly (*Ilex aquifolium*), wood anemone (*Anemone nemorosa*) (very rare) and greater stitchwort (*Stellaria holostea*). The hybrid bluebell (*Hyacinthoides x massartiana*), which is not an indicator species, is also present.
- 3.4.10 No ancient or veteran trees were observed in Berryhill Plantation. Some large coppiced stands of sycamore were recorded in the north-east corner of Berryhill Plantation, close to where it joins Lodge Spinney. There is a 1-2 m high bank following the south/south-east boundary of Berryhill Plantation and continuing along the southern boundary of Lodge Spinney. This runs along the Northamptonshire and Warwickshire border and a result is likely to be a boundary bank, pre-dating the rest of the woodland. Berryhill Plantation is not shown on the first edition Ordnance Survey maps of 1887.
- 3.4.11 It is understood that Fox Covert (Glyn Davies Wood) is likely to be ancient (see SES and AP2 ES Volume 5 Appendix EC-001-002), although the adjacent Berryhill Plantation is not thought to be ancient. Following the further desk study and survey Berryhill Plantation is considered unlikely to be ancient.

### **CFA17 Offchurch and Cubbington**

#### *Woodland along Grand Union Canal*

- 3.4.12 This area of woodland is located to the south of the Grand Union Canal, roughly between Welsh Road Bridge and Longhole Bridge (there is >2ha of woodland continuously along the Grand Union Canal, but they are in blocks of <2ha each). The majority of this woodland is within the land required for construction of the original scheme.

- 3.4.13 The western part of this woodland (in the vicinity of Longhole Bridge) is wetter in nature and the dominant canopy species is alder (*Alnus glutinosa*) with ash (*Fraxinus excelsior*) and crack willow (*Salix fragilis*). The shrub layer comprises blackthorn (*Prunus spinosa*), elder (*Sambucus nigra*) and hawthorn (*Crataegus monogyna*), with hazel (*Corylus avellana*). Ground flora is either dominated by common nettle (*Urtica dioica*) or in wetter areas by reed sweet grass (*Glyceria maxima*) and other wetland plants.
- 3.4.14 Drier woodland/scrub was recorded in the eastern half of the woodland. There was a low shrub canopy of field maple (*Acer campestre*), elder (*Sambucus nigra*), hawthorn (*Crataegus monogyna*) and occasional mature ash (*Fraxinus excelsior*) and pendunculate oak (*Quercus robur*) to 15m height. In more open areas the ground flora comprises a dense cover of wood false brome (*Brachypodium sylvaticum*) and wood meadow grass (*Poa nemoralis*), but where the canopy is dense the ground flora is undeveloped.
- 3.4.15 The following ancient woodland indicator species were observed during the site visit in June 2014: field maple and hairy brome (*Bromopsis ramosa*).
- 3.4.16 No ancient or veteran trees were recorded. There was evidence of past coppicing in both the western and eastern ends of the woodland, but no evidence of past pollarding or historic woodland landscape features.
- 3.4.17 The heritage assessment concluded that the woodland is unlikely to be ancient as it follows the line of the canal and was therefore planted at the same time to screen the canal, or has developed through colonisation by opportunistic species since the canal was built. The ecologist who carried out the woodland survey concurred with this assessment.
- 3.4.18 This area of woodland is not considered to be ancient.

#### *Continuous with Offchurch Greenway*

- 3.4.19 This woodland strip (5m wide; <2ha) occurs within a residential land holding adjacent to the Offchurch Greenway. The Offchurch Greenway is a Warwickshire Country Park and part of the Sustrans National Cycleway Route 41; it was formerly part of the Leamington to Rugby railway line. Approximately one third of the woodland strip is within the land required for construction of the original scheme.
- 3.4.20 The woodland strip comprises a mixture of woody species and ornamental planting, with a mostly native ground flora. The trees are young to semi-mature in age. Forsythia is dominant with native shrubs such as spindle (*Eunomys europaeus*) and blackthorn (*Prunus spinosa*). The invasive non-native variegated yellow archangel (*Lamiastrum galeobdolon* spp *argentatum*) is also present.
- 3.4.21 The following ancient woodland indicator species were recorded within the woodland strip during the site visit in June 2014: Midland hawthorn (*Crataegus laevigata*), field rose (*Rosa arvensis*), green hellebore (*Helleborus viridis*), hyacinth (*Hyacinthoides non-scripta*) and primrose (*Primula vulgaris*).



- 3.4.22 No ancient or veteran trees, evidence of past coppicing or pollarding, or historic woodland landscape features was observed.
- 3.4.23 The heritage assessment concluded that this woodland is extremely unlikely to be ancient; it is most likely to be associated with the development of the Leamington to Rugby rail line. The rail line was first opened in 1851 and was closed in the mid 1960's. The ecologist who carried out the woodland survey concurred with this assessment.
- 3.4.24 Neither this area of woodland, nor the woodland along the Offchurch Greenway, is considered to be ancient.

### *Sutton Spinney*

- 3.4.25 Sutton Spinney (0.91ha) is located along the southern edge of the Offchurch Greenway and is entirely within the land required for construction of the original scheme.
- 3.4.26 The woodland canopy is dominated by mature ash (*Fraxinus excelsior*) and pendunculate oak (*Quercus robur*). The shrub layer comprises coppiced hazel (*Corylus avellana*) with hawthorn (*Crataegus monogyna*), field maple (*Acer campestre*) and elder (*Sambucus nigra*). Ground flora is dominated by bluebell (*Hyacinthoides non-scripta*). There are damp patches throughout the woodland dominated by crack willow (*Salix fragilis*) with a common nettle (*Urtica dioica*) and wavy bitter cress (*Cardamine flexuosa*) understorey.
- 3.4.27 The following ancient woodland indicator species were recorded during the site visit in June 2014: field maple, wild apple (*Malus sylvestris*), field rose (*Rosa arvensis*) and bluebell.
- 3.4.28 A small number of ancient or veteran trees were observed (i.e. pendunculate oaks). There was also evidence of past coppicing, but no evidence of past pollarding or historic woodland landscape features.
- 3.4.29 Place-name evidence suggests that Sutton Spinney may be related to, and hence date from, the 18th century use (i.e. fox hunting) of Offchurch Bury House, which is located less than 1km west of Sutton Spinney. However, spinneys (i.e. woodlands used for fox hunting) were often areas of existing woodland that were then altered to accommodate later usage, rather than newly planted. The ecologist who carried out the survey concluded that although Sutton Spinney has probably been wooded for a few hundred years (as suggested by the heritage assessment) it is unlikely to be of ancient origin.
- 3.4.30 There are two other small areas of woodland in proximity to Sutton Spinney (i.e. Burnt Firs plantation (1.45ha), and a thin strip of plantation woodland along the track to/from Bunkers Hill Farm (1.1ha)). These are also within the land required for construction of the original scheme. The heritage assessment concluded that these woodlands are highly unlikely to be ancient, based on the Historic Landscape Characterisation. As a result these areas were not subject to survey in 2014.

## CFA18 Stoneleigh, Kenilworth and Burton Green

### *Black Waste Wood Extension*

#### *Area 1 (i.e. area of woodland continuous with Black Waste Wood)*

- 3.4.31 This area of woodland occurs within a residential land holding, although it is continuous with Black Waste Wood, which is lowland mixed deciduous woodland, a Habitat of Principal Importance. Part of Black Waste Wood is included on the ancient woodland inventory.
- 3.4.32 The southern part of this area of woodland falls within Black Waste Wood LWS. Only a thin strip along the south-western boundary of the land holding is within the land required for construction of the original scheme.
- 3.4.33 The following ancient woodland indicator species were observed during the site visit in May 2014: wood anemone (*Anemone nemorosa*), bluebell (*Hyacinthoides non-scripta*), yellow pimpernel (*Lysimachia nemorum*) and primrose (*Primula vulgaris*). Dog violet (*Viola* sp) was also recorded.
- 3.4.34 No ancient or veteran trees were recorded. There was evidence of past coppicing (hazel stools), but no evidence of past pollarding or historic woodland landscape features.
- 3.4.35 The heritage assessment confirmed that the first edition Ordnance Survey maps of 1887 show this area as part of Black Waste Wood.
- 3.4.36 The LWS citation describes Black Waste Wood as follows: "Black Waste Wood was first mentioned in documents as 'Blackwaste' in 1542 when it was covered in heathland and one of a series of heaths in this part of Stoneleigh parish. Black Waste then covered a considerable area stretching from Westwood Heath in the north to Burton Green in the south. The presence of straight roads and boundary lines in the vicinity would suggest that it had been enclosed at the height of the enclosure acts, around 1790-1820 when the majority of Arden's heathland and commonland was enclosed. Black Waste Wood was presumably enclosed as an Oak-Hazel coppice about that time and is clearly marked on the OS first edition of 1830. The presence of a variety of ancient woodland indicator plants would suggest that these had survived in wood pasture or on boundary banks from a previous medieval woodland. The wood formerly covered a greater area than at present including a portion to the south of the railway and encompassed more woodland along the western boundary than the boundary currently states. The area south of the old railway had gone by 1958 (OS) and the western third fronting Burton Green Road disappeared probably in the 1960s and 1970s as development spread along the road. A disused railway with a public footpath runs north-west to south-east along the southern boundary of the woodland. A small area in the north of the woodland has been replanted with coniferous plantation. The northern boundary of the woodland is interrupted by amenity gardens and fenced pig enclosures. The southern portion of the woodland has been reduced by clear felling and partially used by horse riders. Small areas within the woodland have been clear felled and are now dominated by tall stands of bracken".

3.4.37 The citation is slightly conflicting, describing Black Waste Wood as heathland in 1542, yet also suggesting that there had been medieval woodland present at the site.

3.4.38 Without interrogating County Historical Records in more detail it is not possible to state that the entirety of Black Waste Wood is not ancient woodland. As a result, this area of woodland continuous with Black Waste Wood is considered likely to be ancient.

*Area 2 (i.e. area of woodland off Red Lane)*

3.4.39 The habitat off Red Lane was categorised as broadleaved parkland/scattered trees in the Phase 1 habitat survey in 2012/13 and is within the land required for construction of the original scheme. It is adjacent to the Kenilworth Greenway. Beyond the Greenway is Black Waste Wood LWS. The citation describes how the wood covered a greater area than at present including a portion to the south of the railway (i.e. Kenilworth Greenway).

3.4.40 The following ancient woodland indicator species were recorded during the site visit in May 2014: wood anemone (*Anemone nemorosa*), pendulous sedge (*Carex pendula*), bluebell (*Hyacinthoides non-scripta*) and yellow archangel (*Lamiastrum galeobdolon*). Common spotted orchid was also observed.

3.4.41 No ancient or veteran trees were recorded. There was evidence of past coppicing (hazel and ash coppice stools), but no evidence of past pollarding or historic woodland landscape features.

3.4.42 The first edition Ordnance Survey maps of 1887 show this area as part of Black Waste Wood.

3.4.43 Without interrogating County Historical Records in more detail it is not possible to state that Black Waste Wood is not all ancient woodland. As a result, this area of woodland off Red Lane could be part of the original Black Waste Wood and is likely to be ancient.

**CFA2o Curdworth to Middleton**

*Continuous with Dunton Wood*

3.4.44 This woodland is within the Lea Marston Hotel golf course. There are numerous small (<2ha) areas of woodland present, mainly located around the boundaries. The woodland is continuous with Dunton Wood, a Local Wildlife Site. The Phase One ES (Volume 5, Appendix EC\_001-003) describes Dunton Wood as: "... deciduous sessile oak/birch woodland with rowan, hawthorn and American holly" and as "semi-natural ancient woodland and is recognised as lowland deciduous woodland on the Natural England inventory of habitats of principal importance.". A thin strip of woodland along the western boundary of the golf course is within the land required for construction of the Propose original schemed Scheme.

3.4.45 The site visit in May 2014 confirmed that the areas of woodland comprise fairly young trees planted at the edge of the golf course and willows surrounding a pond. Ground flora includes bramble (*Rubus fruticosus*), common nettle (*Urtica dioica*).

- 3.4.46 The following ancient woodland indicator species were recorded during the site visit: field maple (*Acer campestre*), wild apple (*Malus sylvestris*), wild cherry (*Prunus avium*) and bluebell (*Hyacinthoides non-scripta*).
- 3.4.47 No ancient or veteran trees were recorded. There was evidence of past coppicing, but no evidence of past pollarding or historic woodland landscape features. This area is not shown as woodland on the first edition Ordnance Survey maps of 1887.
- 3.4.48 This area of woodland is not considered to be ancient.

### **CFA21 Drayton Bassett, Hints and Weeford**

#### *Copse Off Drayton Lane*

- 3.4.49 This unnamed copse (1.93ha) is located approximately 300m east of the larger Loddy Wood, which is described in the Phase One ES (Volume 5, Appendix EC\_001-003) as: "lowland deciduous woodland on the Natural England inventory of habitats of principal importance". The copse is within the land required for construction of the original scheme, but Loddy Wood is outside the land required and was therefore not surveyed in 2014.
- 3.4.50 The site visit in May 2014 confirmed that the copse supports pendunculate oak (*Quercus robur*), ash (*Fraxinus excelsior*), field maple (*Acer campestre*), hawthorn (*Crataegus monogyna*), elder (*Sambucus nigra*), rose (*Rosa* sp) and bramble (*Rubus fruticosus*). The ground flora predominantly comprises red campion (*Silene dioica*), common nettle (*Urtica dioica*), wood avens (*Geum urbanum*) and bluebell (*Hyacinthoides non-scripta*).
- 3.4.51 The following ancient woodland indicator species were observed during the site visit: field maple, holly (*Ilex aquifolium*), hairy brome (*Bromopsis ramosa*), water avens (*Geum rivale*), bluebell, wood mellick (*Melica uniflora*), dog's mercury (*Mercurialis perrenis*) and wood speedwell (*Veronica montana*).
- 3.4.52 No ancient or veteran trees were recorded. There was no evidence of past coppicing, past pollarding or historic woodland landscape features.
- 3.4.53 The heritage assessment confirmed that the unnamed copse is within the medieval Shirrall deer park, in proximity to other ancient woodland (i.e. Shirrall Coppice and Trickley Coppice), and includes archaeological earthworks.
- 3.4.54 This copse is considered likely to be a remnant of ancient woodland.

### **CFA22 Whittington to Handsacre**

#### *Harvey's Rough*

- 3.4.55 The Phase One ES (Volume 5, Appendix EC\_001-003) describes Harvey's Rough as: "...a small woodland surrounded by arable land and bisected by the existing West Coast Main Line Railway. This site is shown as woodland on the 1884 OS map but is not recognised as lowland mixed deciduous woodland on the Natural England inventory of habitats of principal importance or is not included within the Natural England inventory as ancient woodland". The northern section of this woodland (0.49ha) is within the land required for construction of the original scheme.

- 3.4.56 The site visit in May 2014 confirmed that this woodland comprises pendunculate oak (*Quercus robur*), sycamore (*Acer pseudoplatanus*), silver birch (*Betula pendula*), willow (*Salix* sp), hazel (*Corylus avellana*), elder (*Sambucus nigra*), bramble (*Rubus fruticosus*) and common nettle (*Urtica dioica*). Only one ancient woodland indicator species was observed during the site visit, namely wild cherry (*Prunus avium*).
- 3.4.57 No ancient or veteran trees were recorded. There was no evidence of past coppicing, past pollarding or historic woodland landscape features.
- 3.4.58 The heritage assessment confirmed that this site is shown as woodland (bisected by the railway) on the first edition Ordnance Survey maps of 1884.
- 3.4.59 It is considered that this woodland is well established, but not ancient.

### *Little Lyntus*

- 3.4.60 This woodland is described in the Phase One ES (Volume 5, Appendix EC\_001-003) as: "... a small woodland within an arable field which is not listed as ancient woodland or as lowland deciduous woodland on the Natural England Inventory, but is shown on the 1844 OS maps as woodland".
- 3.4.61 Big Lyntus Wood, which is located approximately 300m west of Little Lyntus, is a Site of Biological Importance and ancient semi-natural woodland. It is also recognised in part as lowland deciduous woodland on the Natural England inventory of habitats of principal importance. An NVC survey was carried out in Big Lyntus during 2012/13 and the woodland is in part semi-natural ancient woodland (1.3ha) and part replanted ancient woodland (5.3ha).
- 3.4.62 Little Lyntus (1.43ha) is within the land required for construction of the original scheme.
- 3.4.63 The site visit in May 2014 confirmed that Little Lyntus contains a number of ancient woodland indicator species including: field maple (*Acer campestre*), wild apple (*Malus sylvestris*), small-leaved lime (*Tilia cordata*), wych elm (*Ulmus glabra*), moschatel (*Adoxa moschatellina*), wood anemone (*Anemone nemorosa*), remote sedge (*Carex remota*), pignut (*Conopodium majus*), bluebell (*Hyacinthoides non-scripta*), yellow archangel (*Lamiastrum galeobdolon*), dog's mercury (*Mercurialis perennis*), wood millet (*Milium effusum*) and greater stitchwort (*Stellaria holostea*). Other species recorded included sessile oak (*Quercus petraea*), black bryony (*Tamus communis*), poplar (*Populus* sp), red currant (*Ribes rubrum*) and red campion (*Silene dioica*).
- 3.4.64 A couple of ancient or veteran trees and evidence of past coppicing were recorded during the site visit. A ditch bank was also observed at the woodland edge. No evidence of pollarding was recorded.
- 3.4.65 The heritage assessment concluded that Little Lyntus is almost certainly ancient based on both the proximity to the ancient woodland of Big Lyntus and based on the Historic Landscape Characterisation and the survey evidence concurs with this.
- 3.4.66 Little Lyntus is considered likely to be ancient woodland.

## 4 Amphibians

### 4.1 Introduction

4.1.1 This section of the appendix presents details of baseline information relating to amphibians<sup>7</sup> for the section of the scheme that will pass through CFA 16 to 22 inclusive. This baseline information was collected during surveys of accessible land carried out in 2014.

### 4.2 Methodology

4.2.1 Details of the standard methodology utilised for amphibian surveys are provided in the Phase One ES in Ecology technical note: Ecological field survey methods and standards (Volume 5: Appendix CT-001-000/2).

4.2.2 The scoping and desk study exercises were undertaken in 2013 and can be found in the main ES (Volume 5: Appendix EC-002-003). This baseline report focuses solely on the water bodies surveyed in 2014.

### 4.3 Deviations, constraints and limitations

4.3.1 Within each area there are locations where surveys have been constrained or limited, and also where deviations to the methodology have occurred. The principal reasons for variation are:

- Lack of access to land requiring survey in the appropriate survey season;
- Weather constraints e.g. low temperatures preventing bottle trapping;
- Access to water bodies restricted due to dense, impenetrable vegetation; and
- Access to water bodies restricted due to health and safety constraints such as steep banks.

4.3.2 Table 4 sets out the details of those water bodies which were identified from the scoping exercises, undertaken in 2012 and 2013, as requiring further survey (i.e. HSI or presence/absence survey) but could not be surveyed due to access limitations in 2014.

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<sup>7</sup> Great crested newt (*Triturus cristatus*), smooth newt (*Lissotriton vulgaris*), palmate newt (*Lissotriton helveticus*), common frog (*Rana temporaria*), and common toad (*Bufo bufo*).

**Table 4 - Summary of locations where requirement for amphibian survey was identified but no access available for survey in 2014**

Ecology survey code	Location	OS grid reference	Initial survey prescription based on scoping exercise	CFA	Distance from the original scheme (m) and orientation
030-AA-117006	Stoneton	SP 46312 54628	HSI + Presence/Absence	16	10 south
030-AA-117008	West of Stoneton	SP 54789 54349	HSI + Presence/Absence	16	5 north-east
030-AA-117009	West of Stoneton	SP 45994 54253	HSI + Presence/Absence	16	142 north-east
030-AA-117010	West of Stoneton	SP 45834 54597	HSI + Presence/Absence	16	95 north
030-AA-117011	West of Stoneton	SP 45650 54998	HSI + Presence/Absence	16	30 north
030-AA-117013	Wormleighton	SP 44832 53979	HSI + Presence/Absence	16	Within land required <sup>8</sup>
030-AA-117014	Wormleighton	SP 44680 54046	HSI + Presence/Absence	16	87 west
030-AA-117015	West of Stoneton	SP 46072 54759	HSI + Presence/Absence	16	31 south
030-AA-119005	West of Priors Hardwick	SP 44472 56649	HSI + Presence/Absence	16	210 east
030-AA-119006	North of Wormleighton	SP 43747 56337	HSI + Presence/Absence	16	291 west
030-AA-119008	North-west of Wormleighton	SP 42712 55271	HSI + Presence/Absence	16	43 west
030-AA-119010	North-west of Wormleighton	SP 42634 55667	HSI + Presence/Absence	16	166 north-west
030-AA-119012	North-west of Wormleighton	SP 43617 55968	HSI + Presence/Absence	16	147 north
030-AA-119013	North-west of Wormleighton	SP 42975 56062	HSI + Presence/Absence	16	390 north
030-AA-120001	West of Priors Hardwick	SP 43912 56747	HSI + Presence/Absence	16	Within land required
030-AA-120002	West of Priors Hardwick	SP 44143 56985	HSI + Presence/Absence	16	Within land required
030-AA-120003	West of Priors Hardwick	SP 44043 56973	HSI + Presence/Absence	16	<5 west
030-AA-120008	West of Priors Hardwick	SP 43482 56697	HSI + Presence/Absence	16	292 west
030-AA-120009	West of Priors Hardwick	SP 44320 57133	HSI + Presence/Absence	16	23 west
030-AA-120010	North-west of Priors Hardwick	SP 44253 57343	HSI + Presence/Absence	16	94 north

<sup>8</sup> In this table and following tables the term 'land required' is used as a shortened version of the full term 'land required for the construction of the original scheme'

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Ecology survey code	Location	OS grid reference	Initial survey prescription based on scoping exercise	CFA	Distance from the original scheme (m) and orientation
030-AA-120011	West of Priors Hardwick	SP 43318 56837	HSI + Presence/Absence	16	231 west
030-AA-120012	South-east of Ladbroke	SP 44358 57582	HSI + Presence/Absence	16	222 east
030-AA-120013	South-east of Ladbroke	SP 44327 57588	HSI + Presence/Absence	16	191 east
030-AA-121002	South-east of Ladbroke	SP 43371 57538	HSI + Presence/Absence	16	Within land required
030-AA-121003	South-east of Ladbroke	SP 43226 57632	HSI + Presence/Absence	16	Within land required
030-AA-121004	North of Ladbroke Fox Covert	SP 43409 58230	HSI + Presence/Absence	16	Within land required
030-AA-121006	South-east of Ladbroke	SP 42909 58030	HSI + Presence/Absence	16	300 west
030-AA-121007	South-east of Ladbroke	SP 42730 58031	HSI + Presence/Absence	16	342 west
030-AA-121008	West of Marston Doles	SP 45279 58483	HSI + Presence/Absence	16	330 south-east
030-AA-121009	West of Marston Doles	SP 45317 58759	HSI + Presence/Absence	16	55 east
030-AA-121011	West of Marston Doles	SP 45239 59035	HSI + Presence/Absence	16	185 north-east
030-AA-121015	West of Marston Doles	SP 45165 58776	HSI + Presence/Absence	16	58 south-east
030-AA-122003	South-east of Ladbroke	SP 43397 58501	HSI + Presence/Absence	16	23 east
030-AA-122005	South-east of Ladbroke	SP 42952 58366	HSI + Presence/Absence	16	<5 south
030-AA-122006	South-east of Ladbroke	SP 42853 58349	HSI + Presence/Absence	16	24 west
030-AA-122007	East of Ladbroke	SP 42857 58643	HSI + Presence/Absence	16	22 west
030-AA-122008	South-east of Ladbroke	SP 42840 58251	HSI + Presence/Absence	16	52 south-west
030-AA-123003	North of Ladbroke	SP 41840 59622	HSI + Presence/Absence	16	55 south
030-AA-123004	North of Ladbroke	SP 41649 59177	HSI + Presence/Absence	16	203 south-west
030-AA-123005	North of Ladbroke	SP 41799 59557	HSI + Presence/Absence	16	64 east
030-AA-124006	South of Ladbroke	SP 41806 60667	HSI + Presence/Absence	16	152 east
030-AA-124017	South of Ladbroke	SP 41418 60587	HSI + Presence/Absence	16	20 north
030-AA-125003	South of Southam	SP 41503 60987	HSI + Presence/Absence	16	200 north
030-AA-125006	South of Southam	SP 41202 61227	HSI + Presence/Absence	16	166 north
030-AA-126001	West of Southam	SP 39750 61640	HSI + Presence/Absence	16	15 west
030-AA-126002	West of Southam	SP 39682 61672	HSI + Presence/Absence	16	108 west
030-AA-126007	West of Southam	SP 39704 61277	HSI + Presence/Absence	16	82 south-west
030-AA-126008	West of Southam	SP 39663 61239	HSI + Presence/Absence	16	126 south-west
030-AA-126009	West of Southam	SP 39636 61254	HSI + Presence/Absence	16	121 south-west



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Ecology survey code	Location	OS grid reference	Initial survey prescription based on scoping exercise	CFA	Distance from the original scheme (m) and orientation
030-AA-127007	South of Bascote Heath	SP 39860 62613	HSI + Presence/Absence	16	134 north-east
030-AA-127018	South of Bascote Heath	SP 39742 62710	HSI + Presence/Absence	16	206 north
030-AA-127022	South of Long Itchington Wood	SP 38828 62250	HSI + Presence/Absence	16	231 west
030-AA-128001	West of Ufton Wood	SP 38414 62988	HSI + Presence/Absence	16	171 south-west
030-AA-128015	Ufton	SP 37843 62273	HSI + Presence/Absence	16	60 south
030-AA-128019	North of Ufton	SP 37712 62490	HSI + Presence/Absence	16	67 west
030-AA-129001	East of Longhole Wood	SP 38398 63869	HSI + Presence/Absence	16	Within land required
030-AA-129003	South-east of Longhole Wood	SP 38130 63836	HSI + Presence/Absence	16	Within land required
030-AA-129006	North of Longhole Wood	SP 38329 64114	HSI + Presence/Absence	17	117 east
030-AA-129007	North of Long Itchington Wood	SP 38777 63737	HSI + Presence/Absence	16	62 north
030-AA-129008	North of Long Itchington Wood	SP 38708 63751	HSI + Presence/Absence	16	61 north
030-AA-129010	South of Grand Union Canal, north of Ufton	SP 37739 63743	HSI + Presence/Absence	16	244 west
030-AA-129011	South of Print Wood	SP 38435 64400	HSI + Presence/Absence	17	153 east
030-AA-129014	North of Grand Union Canal, south of Print Wood	SP 37924 63931	HSI + Presence/Absence	17	Within land required
030-AA-129015	North of Grand Union Canal, south of Print Wood	SP 38135 63962	HSI + Presence/Absence	17	Within land required
030-AA-129019	North of Ufton	SP 37806 63213	HSI + Presence/Absence	16	250 west
030-AA-130001	South of Print Wood	SP 37839 64812	HSI + Presence/Absence	17	110 north
030-AA-130002	South of Print Wood	SP 38244 64512	HSI + Presence/Absence	17	124 east
030-AA-130003	South-west of Print Wood	SP 37433 64075	HSI + Presence/Absence	17	215 west
030-AA-130005	West of Welsh Road, south-east of Offchurch	SP 37441 64510	HSI + Presence/Absence	17	110 west
030-AA-131001	Sutton Spinney	SP 37376 65220	HSI + Presence/Absence	17	Within land required
030-AA-131005	South of Offchurch	SP 36482 65328	HSI + Presence/Absence	17	183 west

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Ecology survey code	Location	OS grid reference	Initial survey prescription based on scoping exercise	CFA	Distance from the original scheme (m) and orientation
030-AA-131012	Sutton Spinney	SP 37459 65449	HSI + Presence/Absence	17	42 north
030-AA-132008	North of Offchurch	SP 36406 66237	HSI + Presence/Absence	17	28 south
030-AA-134003	East of Cubbington	SP 35104 68382	HSI + Presence/Absence	17	Within land required
030-AA-134004	South-east of Cubbington	SP 35233 67409	HSI + Presence/Absence	17	97 south
030-AA-134005	South-east of Cubbington	SP 35187 67500	HSI + Presence/Absence	17	5 south
030-AA-134007	East of South Cubbington Wood	SP 35897 68437	HSI + Presence/Absence	17	228 south-east
030-AA-135003	East of Cubbington	SP 35227 69579	HSI + Presence/Absence	17	Within land required
030-AA-135005	North Cubbington Wood	SP 35227 69581	HSI + Presence/Absence	17	Within land required
030-AA-135008	South of Rugby Road, north of South Cubbington Wood	SP 35160 68998	HSI + Presence/Absence	17	63 east
030-AA-135012	North Cubbington Wood	SP 35053 69071	HSI + Presence/Absence	17	Within land required
030-AA-136001	North of Cubbington	SP 34157 69601	HSI + Presence/Absence	17	161 south-west
030-AA-136002	North of Cubbington	SP 34318 69984	HSI + Presence/Absence	18	13 east
030-AA-136003	North of Cubbington	SP 33964 69956	HSI + Presence/Absence	18	Within land required
030-AA-136005	West of Waverley Wood	SP 34561 70060	HSI + Presence/Absence	18	Within land required
030-AA-136006	West of Waverley Wood	SP 34519 70219	HSI + Presence/Absence	18	23 north
030-AA-136007	West of Waverley Wood	SP 34722 70488	HSI + Presence/Absence	18	179 east
030-AA-136008	North of Cubbington	SP 33928 69439	HSI + Presence/Absence	17	Within land required
030-AA-136009	West of Waverley Wood	SP 34873 69817	HSI + Presence/Absence	17	Within land required
030-AA-136011	West of Waverley Wood	SP 34668 70291	HSI + Presence/Absence	18	Within land required
030-AA-136012	West of Waverley Wood	SP 34826 70588	HSI + Presence/Absence	18	196 east
030-AA-137012	North of Cubbington	SP 33621 69870	HSI + Presence/Absence	17	Within land required
030-AA-137013	West of Waverley Wood	SP 34491 70531	HSI + Presence/Absence	18	Within land required
030-AA-139005	Stoneleigh Park	SP 32042 71745	HSI + Presence/Absence	18	124 west

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Ecology survey code	Location	OS grid reference	Initial survey prescription based on scoping exercise	CFA	Distance from the original scheme (m) and orientation
030-AA-140007	West of Stoneleigh	SP 31980 73044	HSI + Presence/Absence	18	85 north
030-AA-141010	North-east of Kenilworth	SP 31665 73523	HSI + Presence/Absence	18	187 east
030-AA-143005	North of Crackley Wood	SP 29053 74333	HSI + Presence/Absence	18	76 south
030-AA-143006	North of Crackley Wood	SP 28961 74322	HSI + Presence/Absence	18	132 west
030-AA-144004	South of Broadwells Wood	SP 28036 74750	HSI + Presence/Absence	18	19 south-west
030-AA-144005	South of Broadwells Wood	SP 27818 74848	HSI + Presence/Absence	18	83 south-west
030-AA-145011	South of Burton Green	SP 28884 75087	HSI + Presence/Absence	18	109 east
030-AA-145018	East of Burton Green	SP 27604 75338	HSI + Presence/Absence	18	Within land required
040-AA-146007	South of Burton Green	SP 26610 75377	HSI + Presence/Absence	18	121 west
040-AA-146008	South of Burton Green	SP 26466 75339	HSI + Presence/Absence	18	248 west
040-AA-146009	South of Burton Green	SP 26294 75424	HSI + Presence/Absence	18	170 east
040-AA-146016	South-west of Burton Green	SP 26320 75531	HSI + Presence/Absence	18	93 east
040-AA-147006	South of Beechwood	SP 25904 76869	HSI + Presence/Absence	18	53 north
040-AA-147007	South of Beechwood	SP 25921 76908	HSI + Presence/Absence	18	72 north
040-AA-147010	West of Burton Green	SP 25811 75844	HSI + Presence/Absence	18	5 north
040-AA-147013	South of Beechwood	SP 25631 76077	HSI + Presence/Absence	18	215 south-west
040-AA-147016	South of Beechwood	SP 25682 76346	HSI + Presence/Absence	18	Within land required
040-AA-147018	South of Beechwood	SP 25516 76346	HSI + Presence/Absence	18	129 west
040-AA-147026	South-west of Beechwood	SP 25783 76855	HSI + Presence/Absence	18	Within land required
040-AA-147030	West of Beanit Spinney	SP 25889 76500	HSI + Presence/Absence	18	21 north
040-AA-147031	South of Beechwood	SP 25684 76230	HSI + Presence/Absence	18	<5 south-west
040-AA-147032	West of Beanit Spinney	SP 25940 76884	HSI + Presence/Absence	18	44 north
040-AA-147035	South of Beechwood	SP 25845 76198	HSI + Presence/Absence	18	Within land required
040-AA-147036	South of Beechwood	SP 25703 75778	HSI + Presence/Absence	18	31 north-west
030-AA-161001	West of Coleshill	SP 19136 88227	HSI + Presence/Absence	19	Within land required
030-AA-161011	South-east of Manor Drive	SP 18747 88255	HSI + Presence/Absence	19	150 south

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Ecology survey code	Location	OS grid reference	Initial survey prescription based on scoping exercise	CFA	Distance from the original scheme (m) and orientation
030-AA-161015	West of Coleshill	SP 19609 88193	HSI + Presence/Absence	19	48 north
030-AA-161016	East of Kingshurst	SP 18494 88362	HSI + Presence/Absence	19	127 west
030-AA-161017	East of Kingshurst	SP 18504 88462	HSI + Presence/Absence	19	101 west
030-AA-161018	East of Kingshurst	SP 18400 88458	HSI + Presence/Absence	19	108 west
030-AA-161019	East of Kingshurst	SP 18392 88371	HSI + Presence/Absence	19	238 west
030-AA-162013	South of Gilson	SP 19189 89797	HSI + Presence/Absence	19	Within land required
030-AA-162014	South of Gilson	SP 19119 89850	HSI + Presence/Absence	19	Within land required
030-AA-163004	Gilson	SP 18826 90310	HSI + Presence/Absence	19	93 south
030-AA-165001	North-east of Water Orton	SP 19034 91891	HSI + Presence/Absence	20	Within land required
030-AA-165003	South of Curdworth	SP 18374 92042	HSI + Presence/Absence	20	Within land required
030-AA-165004	South of Curdworth	SP 18390 92150	HSI + Presence/Absence	20	Within land required
030-AA-165005	South of Curdworth	SP 18109 92320	HSI + Presence/Absence	20	187 west
030-AA-165006	South-east of Curdworth	SP 18551 92112	HSI + Presence/Absence	20	37 north
030-AA-165008	West of Curdworth	SP 19081 92453	HSI + Presence/Absence	20	Within land required
030-AA-166002	West of Lea Marston	SP 19694 93354	HSI + Presence/Absence	20	246 east
030-AA-166007	West of Lea Marston	SP 19636 93354	HSI + Presence/Absence	20	148 east
030-AA-166009	West of Lea Marston	SP 19607 93165	HSI + Presence/Absence	20	111 east
030-AA-166012	West of Lea Marston	SP 20488 92987	HSI + Presence/Absence	20	56 south
030-AA-166013	West of Lea Marston	SP 19887 93115	HSI + Presence/Absence	20	Within land required
030-AA-166021	South of Lea Marston	SP 20597 93197	HSI + Presence/Absence	20	47 south
030-AA-167034	North of Lea Marston	SP 20276 94873	HSI + Presence/Absence	20	38 east
030-AA-167035	North of Lea Marston	SP 20232 94736	HSI + Presence/Absence	20	72 east
030-AA-167036	North of Lea Marston	SP 20306 94736	HSI + Presence/Absence	20	172 east
030-AA-167037	North of Lea Marston	SP 19268 93928	HSI + Presence/Absence	20	Within land required
030-AA-167047	North of Lea Marston	SP 18410 94598	HSI + Presence/Absence	20	138 south-west
030-AA-168007	North of Marton Field Bridge	SP 19688 95122	HSI + Presence/Absence	20	Within land required
030-AA-168010	North-east of Marston	SP 19764 95636	HSI + Presence/Absence	20	192 west
030-AA-168011	North-east of Marston	SP 19791 95692	HSI + Presence/Absence	20	204 west
030-AA-168012	North of Marston	SP 20103 95797	HSI + Presence/Absence	20	Within land required

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Ecology survey code	Location	OS grid reference	Initial survey prescription based on scoping exercise	CFA	Distance from the original scheme (m) and orientation
030-AA-168013	North-east of Marston	SP 19618 95895	HSI + Presence/Absence	20	310 east
030-AA-168026	Cuttle Mill Fisheries	SP 18895 95105	HSI + Presence/Absence	20	Within land required
030-AA-168028	West of Marston	SP 20986 95011	HSI + Presence/Absence	20	270 east
030-AA-168031	The Belfry	SP 17920 95251	HSI + Presence/Absence	20	230 south-west
030-AA-168032	The Belfry	SP 18191 95221	HSI + Presence/Absence	20	95 south
030-AA-168033	The Belfry	SP 17981 95382	HSI + Presence/Absence	20	120 west
030-AA-168034	The Belfry	SP 18187 95751	HSI + Presence/Absence	20	102 west
030-AA-168035	The Belfry	SP 18068 95753	HSI + Presence/Absence	20	190 west
030-AA-168036	The Belfry	SP 18217 95833	HSI + Presence/Absence	20	115 west
030-AA-168039	North-east of Marston	SP 20313 94975	HSI + Presence/Absence	20	27 east
030-AA-169004	West of Kingsbury water park	SP 19698 96126	HSI + Presence/Absence	20	309 east
030-AA-169006	West of Kingsbury water park	SP 19528 96238	HSI + Presence/Absence	20	110 east
030-AA-169009	North of the Belfry	SP 18530 95895	HSI + Presence/Absence	20	8 west
030-AA-169010	North of the Belfry	SP 18439 96105	HSI + Presence/Absence	20	22 east
030-AA-169011	North of the Belfry	SP 18509 96279	HSI + Presence/Absence	20	Within land required
030-AA-169012	West of Bodymoor Heath	SP 19611 97035	HSI + Presence/Absence	20	188 east
030-AA-169013	North of the Belfry	SP 18498 96408	HSI + Presence/Absence	20	43 north
030-AA-169017	The Belfry	SP 18115 95980	HSI + Presence/Absence	20	213 west
030-AA-169018	The Belfry	SP 18020 96126	HSI + Presence/Absence	20	302 west
030-AA-170014	South of Hunts Green	SP 18562 96893	HSI + Presence/Absence	20	<5 east
030-AA-170017	Hunts Green	SP 18337 97247	HSI + Presence/Absence	20	153 west
030-AA-170038	South of Hunts Green	SP 18287 96902	HSI + Presence/Absence	20	227 west
030-AA-170039	South of Hunts Green	SP 18286 96868	HSI + Presence/Absence	20	222 west
030-AA-171015	East of Middleton	SP 18937 98542	HSI + Presence/Absence	20	145 east
030-AA-171019	South of Middleton	SP 17973 98116	HSI + Presence/Absence	20	171 west
030-AA-171020	South of Middleton	SP 18013 98107	HSI + Presence/Absence	20	155 west
030-AA-172012	North-west of Middleton	SP 17098 99061	HSI + Presence/Absence	20	39 east

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030-AA-172013	North-west of Middleton	SP 17218 99174	HSI + Presence/Absence	20	50 east
030-AA-172016	West of Middleton	SP 17127 98383	HSI + Presence/Absence	20	244 south
030-AA-172017	West of Middleton	SP 17024 98584	HSI + Presence/Absence	20	49 south
030-AA-172018	West of Middleton	SP 16966 98726	HSI + Presence/Absence	20	26 west
030-AA-173004	West of Drayton Bassett	SP 17560 99905	HSI + Presence/Absence	21	33 north
030-AA-173005	West of Drayton Bassett	SK 17409 00125	HSI + Presence/Absence	21	9 north
030-AA-173006	West of Drayton Bassett	SK 17405 00112	HSI + Presence/Absence	21	6 north
030-AA-173007	West of Drayton Bassett	SK 17219 00087	HSI + Presence/Absence	21	Within land required
030-AA-173008	North-east of Middleton	SP 17076 99171	HSI + Presence/Absence	21	6 south
030-AA-173015	West of Carroway Head	SP 16708 99720	HSI + Presence/Absence	21	20 west
030-AA-173019	West of Drayton Bassett	SP 17551 99818	HSI + Presence/Absence	21	Within land required
030-AA-174026	South-west of Fazeley	SK 17401 01664	HSI + Presence/Absence	21	22 west
030-AA-174027	South-west of Fazeley	SK 17146 01621	HSI + Presence/Absence	21	129 east
030-AA-174028	South-west of Fazeley	SK 17388 01615	HSI + Presence/Absence	21	13 west
030-AA-174030	West of Fazeley	SK 17700 02331	HSI + Presence/Absence	21	29 south
030-AA-174031	West of Fazeley	SK 17780 02327	HSI + Presence/Absence	21	10 south
030-AA-174032	West of Fazeley	SK 17731 02346	HSI + Presence/Absence	21	<5 south
030-AA-174033	West of Fazeley	SK 17792 02498	HSI + Presence/Absence	21	120 north
030-AA-175004	South of Lower Bangley	SK 16679 01416	HSI + Presence/Absence	21	164 east
030-AA-175005	South-west of Lower Bangley	SK 16392 01597	HSI + Presence/Absence	21	18 east
030-AA-175006	South-west of Lower Bangley	SK 16465 01353	HSI + Presence/Absence	21	Within land required
030-AA-175007	South of Lower Bangley	SK 16763 01679	HSI + Presence/Absence	21	Within land required
030-AA-175008	South of Lower Bangley	SK 16763 01722	HSI + Presence/Absence	21	98 west
030-AA-175009	West of Lower Bangley	SK 16753 01777	HSI + Presence/Absence	21	61 south

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Ecology survey code	Location	OS grid reference	Initial survey prescription based on scoping exercise	CFA	Distance from the original scheme (m) and orientation
030-AA-175018	South-west of Fazeley	SK 17039 01747	HSI + Presence/Absence	21	36 east
030-AA-175021	West of Fazeley	SK 17473 02603	HSI + Presence/Absence	21	168 north
030-AA-175022	North of Carroway Head	SK 14973 01389	HSI + Presence/Absence	21	449 south
030-AA-176013	South of Hints	SK 15735 01991	HSI + Presence/Absence	21	Within land required
030-AA-176014	South-east of Hints	SK 16426 02429	HSI + Presence/Absence	21	310 north
030-AA-176017	West of Fazeley	SK 17221 02937	HSI + Presence/Absence	21	170 east
030-AA-176018	West of Fazeley	SK 17238 02828	HSI + Presence/Absence	21	210 north-east
030-AA-176019	West of Fazeley	SK 17018 02644	HSI + Presence/Absence	21	8 south
030-AA-176020	South-east of Hints	SK 16854 02475	HSI + Presence/Absence	21	50 west
030-AA-176021	South-west of Hnts	SK 14788 02075	HSI + Presence/Absence	21	7 north
030-AA-176022	South-west of Hnts	SK 14820 02181	HSI + Presence/Absence	21	Within land required
030-AA-176025	East of Hints	SK 16635 03263	HSI + Presence/Absence	21	393 north-west
030-AA-176027	West of Hints	SK 14214 01781	HSI + Presence/Absence	21	100 south
030-AA-176028	West of Hints	SK 14150 01794	HSI + Presence/Absence	21	127 south
030-AA-176029	West of Hints	SK 14247 01900	HSI + Presence/Absence	21	Within land required
030-AA-176030	West of Hints	SK 14173 01991	HSI + Presence/Absence	21	Within land required
030-AA-176031	West of Hints	SK 14159 02056	HSI + Presence/Absence	21	10 north
030-AA-176032	West of Hints	SK 14389 02167	HSI + Presence/Absence	21	102 north
030-AA-176033	West of Hints	SK 14237 02120	HSI + Presence/Absence	21	51 north
030-AA-176034	West of Hints	SK 14152 02116	HSI + Presence/Absence	21	62 north
030-AA-176035	West of Hints	SK 14048 02099	HSI + Presence/Absence	21	5 east
030-AA-176036	West of Hints	SK 14088 01899	HSI + Presence/Absence	21	75 south
030-AA-176037	West of Hints	SK 13107 01531	HSI + Presence/Absence	21	144 south
030-AA-176038	West of Hints	SK 12984 01715	HSI + Presence/Absence	21	Within land required
030-AA-176039	West of Hints	SK 12393 01696	HSI + Presence/Absence	21	160 west
030-AA-177016	East of Little Hay	SK 12479 02044	HSI + Presence/Absence	21	170 north
030-AA-177017	East of Little Hay	SK 13132 01895	HSI + Presence/Absence	21	35 north
030-AA-177018	East of Little Hay	SK 13251 02239	HSI + Presence/Absence	21	230 north-west

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Ecology survey code	Location	OS grid reference	Initial survey prescription based on scoping exercise	CFA	Distance from the original scheme (m) and orientation
030-AA-177020	West of Hints	SK 13796 02215	HSI + Presence/Absence	21	200 west
030-AA-177021	West of Hints	SK 13870 02235	HSI + Presence/Absence	21	100 west
030-AA-177022	West of Hints	SK 13830 02332	HSI + Presence/Absence	21	35 west
030-AA-177023	West of Hints	SK 14058 02641	HSI + Presence/Absence	21	206 north
030-AA-177024	West of Hints	SK 13993 02699	HSI + Presence/Absence	21	185 north
030-AA-177025	West of Hints	SK 13944 02766	HSI + Presence/Absence	21	308 north
030-AA-178004	North of Weeford	SK 14281 04606	HSI + Presence/Absence	21	195 west
030-AA-178005	North of Weeford	SK 14285 04644	HSI + Presence/Absence	21	207 west
030-AA-178013	North of Weeford	SK 14262 04661	HSI + Presence/Absence	21	226 west
030-AA-178017	North of Weeford	SK 14200 04324	HSI + Presence/Absence	21	148 west
030-AA-179003	North of Weeford	SK 14241 04676	HSI + Presence/Absence	21	232 west
030-AA-179004	North of Weeford	SK 14200 04720	HSI + Presence/Absence	21	251 west
030-AA-179005	North of Weeford	SK 14228 04805	HSI + Presence/Absence	21	255 west
030-AA-180017	South of Lichfield	SK 12176 06718	HSI + Presence/Absence	22	55 east
030-AA-181009	South of Lichfield	SK 11801 06894	HSI + Presence/Absence	22	89 west
030-AA-181010	South of Lichfield	SK 12218 06816	HSI + Presence/Absence	22	115 east
030-AA-183001	West of Huddlesford	SK 14666 09657	HSI + Presence/Absence	22	Within land required
030-AA-183003	South-west of Huddlesford	SK 15047 08893	HSI + Presence/Absence	22	131 east
030-AA-183007	West of Huddlesford	SK 14956 09494	HSI + Presence/Absence	22	23 east
030-AA-183008	West of Huddlesford	SK 14999 09515	HSI + Presence/Absence	22	55 east
030-AA-183010	West of Huddlesford	SK 14401 09602	HSI + Presence/Absence	22	Within land required
030-AA-183016	North of Huddlesford	SK 15278 09725	HSI + Presence/Absence	22	87 east
030-AA-183021	West of Huddlesford	SK 14749 09439	HSI + Presence/Absence	22	Within land required
030-AA-183022	South-west of Huddlesford	SK 14985 09355	HSI + Presence/Absence	22	10 east
030-AA-183023	East of Lichfield	SK 14157 08912	HSI + Presence/Absence	22	120 east
030-AA-183024	North-east of Huddlesford	SK 15793 10007	HSI + Presence/Absence	22	80 south-east
030-AA-183025	North-east of Huddlesford	SK 16005 09933	HSI + Presence/Absence	22	350 south
030-AA-184003	West of Huddlesford	SK 14874 09740	HSI + Presence/Absence	22	Within land required



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Ecology survey code	Location	OS grid reference	Initial survey prescription based on scoping exercise	CFA	Distance from the original scheme (m) and orientation
030-AA-184004	West of Huddlesford	SK 14840 09825	HSI + Presence/Absence	22	Within land required
030-AA-184007	North of Huddlesford	SK 15416 09787	HSI + Presence/Absence	22	241 east
030-AA-184008	North of Huddlesford	SK 15569 09905	HSI + Presence/Absence	22	175 south
030-AA-184013	West of Streethay	SK 15314 10543	HSI + Presence/Absence	22	130 north-east
030-AA-184014	North of Streethay	SK 15019 10751	HSI + Presence/Absence	22	59 east
030-AA-184015	North of Huddlesford	SK 15018 10751	HSI + Presence/Absence	22	91 south-east
030-AA-184016	North of Huddlesford	SK 15511 10251	HSI + Presence/Absence	22	Within land required
030-AA-184017	North-east of Huddlesford	SK 15766 10211	HSI + Presence/Absence	22	81 south
030-AA-184018	North-east of Huddlesford	SK 15825 10238	HSI + Presence/Absence	22	32 south-west
030-AA-184019	North-east of Huddlesford	SK 15897 10312	HSI + Presence/Absence	22	7 east
030-AA-184020	North-east of Huddlesford	SK 15848 10359	HSI + Presence/Absence	22	Within land required
030-AA-184021	North-east of Huddlesford	SK 15851 10446	HSI + Presence/Absence	22	Within land required
030-AA-184022	West of Streethay	SK 15592 10492	HSI + Presence/Absence	22	110 north
030-AA-184023	West of Streethay	SK 15827 10683	HSI + Presence/Absence	22	70 north
030-AA-184024	West of Streethay	SK 15757 10692	HSI + Presence/Absence	22	113 north
030-AA-184025	West of Fradley	SK 16463 10489	HSI + Presence/Absence	22	180 south-west
030-AA-184026	West of Fradley	SK 16342 10906	HSI + Presence/Absence	22	85 north
030-AA-184027	West of Fradley	SK 16370 10904	HSI + Presence/Absence	22	62 north
030-AA-184028	West of Fradley	SK 16317 11097	HSI + Presence/Absence	22	240 north
030-AA-184029	West of Fradley	SK 16272 11133	HSI + Presence/Absence	22	290 north
030-AA-184030	West of Fradley	SK 16510 11044	HSI + Presence/Absence	22	63 north
030-AA-184031	West of Fradley	SK 16728 10870	HSI + Presence/Absence	22	50 south
030-AA-184034	West of Fradley	SK 17167 11354	HSI + Presence/Absence	22	12 north
030-AA-184036	West of Fradley	SK 17080 11180	HSI + Presence/Absence	22	Within land required
030-AA-184037	West of Fradley	SK 17118 11214	HSI + Presence/Absence	22	Within land required
030-AA-184038	West of Fradley	SK 17192 11458	HSI + Presence/Absence	22	80 north
030-AA-184039	West of Fradley	SK 17310 11358	HSI + Presence/Absence	22	Within land required
030-AA-184042	West of Fradley	SK 17913 11699	HSI + Presence/Absence	22	Within land required

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Ecology survey code	Location	OS grid reference	Initial survey prescription based on scoping exercise	CFA	Distance from the original scheme (m) and orientation
030-AA-184043	West of Fradley	SK 18595 11508	HSI + Presence/Absence	22	42 south
030-AA-184044	West of Fradley	SK 18689 11561	HSI + Presence/Absence	22	Within land required
030-AA-184045	West of Fradley	SK 18379 11718	HSI + Presence/Absence	22	170 north
030-AA-184046	West of Fradley	SK 18251 11787	HSI + Presence/Absence	22	42 east
030-AA-184047	West of Fradley	SK 18181 11887	HSI + Presence/Absence	22	15 east
030-AA-185001	North-east of Streethay	SK 14453 10812	HSI + Presence/Absence	22	Within land required
030-AA-185002	North-east of Streethay	SK 14370 10721	HSI + Presence/Absence	22	22 west
030-AA-185010	South of Rough Stockings	SK 14292 11451	HSI + Presence/Absence	22	Within land required
030-AA-185011	North of Streethay	SK 14068 11486	HSI + Presence/Absence	22	Within land required
030-AA-185012	North of Streethay	SK 14165 11501	HSI + Presence/Absence	22	Within land required
030-AA-185022	North of Brookhay	SK 16061 11460	HSI + Presence/Absence	22	90 south
030-AA-185023	North of Brookhay	SK 16203 11543	HSI + Presence/Absence	22	80 south
030-AA-185025	North-west of Streethay	SK 13325 10839	HSI + Presence/Absence	22	390 north-east
030-AA-185026	North-west of Streethay	SK 13294 10810	HSI + Presence/Absence	22	370 north-east
030-AA-185029	North of Elford	SK 18471 12101	HSI + Presence/Absence	22	183 east
030-AA-185031	South of Fradley South	SK 15267 11343	HSI + Presence/Absence	22	65 north
030-AA-186004	South-west of Fradley South	SK 14389 11827	HSI + Presence/Absence	22	<5 south
030-AA-186008	South-west of Fradley South	SK 14042 11998	HSI + Presence/Absence	22	Within land required
030-AA-186013	East of Curborough	SK 13748 11578	HSI + Presence/Absence	22	131 west
030-AA-186015	East of Curborough	SK 13380 11948	HSI + Presence/Absence	22	150 north-west
030-AA-186016	East of Curborough	SK 13222 12011	HSI + Presence/Absence	22	243 north-west
030-AA-186023	South of Fradley South	SK 15491 11622	HSI + Presence/Absence	22	167 north
030-AA-186024	South of Fradley South	SK 15564 11678	HSI + Presence/Absence	22	184 north
030-AA-186025	South of Fradley South	SK 15532 11692	HSI + Presence/Absence	22	218 north
030-AA-186026	South of Curborough	SK 15521 11713	HSI + Presence/Absence	22	178 north
030-AA-187012	South of Little Lyntus	SK 13509 12755	HSI + Presence/Absence	22	Within land required
030-AA-187015	South of Little Lyntus	SK 13299 12552	HSI + Presence/Absence	22	118 south

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Ecology survey code	Location	OS grid reference	Initial survey prescription based on scoping exercise	CFA	Distance from the original scheme (m) and orientation
030-AA-187037	South of Fradley Junction	SK 13866 13633	HSI + Presence/Absence	22	230 east
030-AA-187038	South of Fradley Junction	SK 13895 13783	HSI + Presence/Absence	22	275 east
030-AA-187039	South of Fradley Junction	SK 13929 13862	HSI + Presence/Absence	22	355 east
030-AA-189014	East of Kings Bromley Marina	SK 12064 14325	HSI + Presence/Absence	22	<5 south-west
030-AA-189015	South of Rileyhill	SK 12039 14470	HSI + Presence/Absence	22	191 west
030-AA-189020	North of Elmhurst	SK 11368 12812	HSI + Presence/Absence	22	8 west
030-AA-189023	East of Kings Bromley Marina	SK 12247 14253	HSI + Presence/Absence	22	100 north-west
030-AA-189031	East of Kings Bromley Marina	SK 12275 14285	HSI + Presence/Absence	22	68 south-west
030-AA-189032	North of Elmhurst	SK 11038 12761	HSI + Presence/Absence	22	160 south
030-AA-189034	South of Rileyhill	SK 12193 14679	HSI + Presence/Absence	22	Within land required
030-AA-189035	West of Rileyhill	SK 12004 15024	HSI + Presence/Absence	22	40 east
030-AA-189036	South-west of Rileyhill	SK 11497 14944	HSI + Presence/Absence	22	55 south-east
030-AA-189044	West of Curborough	SK 11883 12672	HSI + Presence/Absence	22	240 north-east
030-AA-189045	West of Curborough	SK 11843 12700	HSI + Presence/Absence	22	215 north-east
030-AA-189046	West of Curborough	SK 11790 12797	HSI + Presence/Absence	22	220 north-east
030-AA-189047	West of Curborough	SK 11688 12945	HSI + Presence/Absence	22	220 north-east
030-AA-189050	South of Rileyhill	SK 11650 14626	HSI + Presence/Absence	22	20 north-east
030-AA-189051	South of Elmhurst	SK 11873 11975	HSI + Presence/Absence	22	45 south-west
030-AA-189056	North of Elmhurst	SK 11148 12806	HSI + Presence/Absence	22	150 south
030-AA-189059	North of Elmhurst	SK 13731 15029	HSI + Presence/Absence	22	Within land required
030-AA-189060	South of Kings Bromley	SK 13319 15586	HSI + Presence/Absence	22	260 north-west
030-AA-189061	South of Kings Bromley	SK 13658 14772	HSI + Presence/Absence	22	<5 east
030-AA-190003	South of Hanch	SK 10735 13345	HSI + Presence/Absence	22	111 east
030-AA-190029	South of Hanch	SK 10945 13257	HSI + Presence/Absence	22	150 west
030-AA-190030	South of Hanch	SK 10584 13259	HSI + Presence/Absence	22	37 east
030-AA-190031	South of Hanch	SK 10468 13242	HSI + Presence/Absence	22	11 north
030-AA-190032	South of Hanch	SK 10565 13422	HSI + Presence/Absence	22	15 north

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Ecology survey code	Location	OS grid reference	Initial survey prescription based on scoping exercise	CFA	Distance from the original scheme (m) and orientation
030-AA-190033	South of Hanch	SK 10396 13384	HSI + Presence/Absence	22	134 north
030-AA-190034	Hanch	SK 10214 13712	HSI + Presence/Absence	22	Within land required
030-AA-190035	South of Hanch	SK 10040 13723	HSI + Presence/Absence	22	105 north
030-AA-190038	South-west of Rileyhill	SK 11346 14769	HSI + Presence/Absence	22	64 south
030-AA-190040	South-west of Rileyhill	SK 11331 14529	HSI + Presence/Absence	22	7 north
030-AA-190041	South-west of Rileyhill	SK 11240 14588	HSI + Presence/Absence	22	24 north
030-AA-190042	West of Rileyhill	SK 11376 15203	HSI + Presence/Absence	22	58 north-west
030-AA-190043	South-west of Rileyhill	SK 11461 14705	HSI + Presence/Absence	22	45 west
030-AA-190044	West of Rileyhill	SK 11497 15337	HSI + Presence/Absence	22	105 north-west
030-AA-190045	East of Hanch	SK 10516 14095	HSI + Presence/Absence	22	Within land required
030-AA-190051	South of Hanch	SK 09672 13527	HSI + Presence/Absence	22	95 north
030-AA-190052	South of Hanch	SK 08962 13440	HSI + Presence/Absence	22	175 north
030-AA-190054	South of Hanch	SK 09077 13561	HSI + Presence/Absence	22	230 north
030-AA-190055	South of Hanch	SK 09503 13849	HSI + Presence/Absence	22	364 north-west
030-AA-190057	South-west of Hanch	SK 09848 13067	HSI + Presence/Absence	22	120 south
030-AA-190058	South-west of Hanch	SK 09723 13219	HSI + Presence/Absence	22	Within land required
030-AA-191010	South-east of Tuppenhurst	SK 10367 15044	HSI + Presence/Absence	22	<5 south
030-AA-191013	South of Tuppenhurst	SK 09969 14766	HSI + Presence/Absence	22	Within land required
030-AA-191014	East of Hanch	SK 09982 13749	HSI + Presence/Absence	22	87 north
030-AA-191016	East of Hanch	SK 09922 13717	HSI + Presence/Absence	22	Within land required
030-AA-191017	East of Hanch	SK 09873 13658	HSI + Presence/Absence	22	9 south
030-AA-191040	East of Rileyhill	SK 10806 14997	HSI + Presence/Absence	22	212 east
030-AA-191043	North of Hanch	SK 10232 14490	HSI + Presence/Absence	22	Within land required
030-AA-191044	North of Hanch	SK 10209 14406	HSI + Presence/Absence	22	Within land required
030-AA-191045	North of Hanch	SK 10143 14450	HSI + Presence/Absence	22	Within land required
030-AA-191046	North of Hanch	SK 09743 14749	HSI + Presence/Absence	22	Within land required
030-AA-191047	West of Hanch	SK 09476 13068	HSI + Presence/Absence	22	210 south
030-AA-191048	West of Hanch	SK 09545 13202	HSI + Presence/Absence	22	130 south-west
030-AA-191049	West of Hanch	SK 09528 13388	HSI + Presence/Absence	22	98 west
030-AA-191050	West of Hanch	SK 09671 13530	HSI + Presence/Absence	22	102 north

Ecology survey code	Location	OS grid reference	Initial survey prescription based on scoping exercise	CFA	Distance from the original scheme (m) and orientation
030-AA-191051	West of Hanch	SK 09062 13115	HSI + Presence/Absence	22	60 south
030-AA-191052	West of Hanch	SK 08975 13446	HSI + Presence/Absence	22	170 north
030-AA-191054	West of Hanch	SK 09088 13569	HSI + Presence/Absence	22	230 north
030-AA-191056	West of Hanch	SK 10807 14995	HSI + Presence/Absence	22	220 east
030-AA-195010	South of Water Orton	SK 17630 89896	HSI + Presence/Absence	19	85 south
030-AA-209005	Water Orton	SP 17043 91042	HSI + Presence/Absence	19	264 north
030-AA-210006	South-east of Water Orton	SK 18656 90644	HSI + Presence/Absence	19	Within land required
030-AA-210007	South-east of Water Orton	SK 18664 90657	HSI + Presence/Absence	19	Within land required
030-AA-211001	East of Water Orton	SK 18981 91048	HSI + Presence/Absence	19	Within land required

## 4.4 Baseline

### CFA16 Ladbroke and Southam

#### Scoping

4.4.1 The water bodies surveyed in 2014 were water bodies that were scoped in during the 2013 exercise<sup>9</sup> but for which no access was available to survey during the 2012/13 great crested newt survey season.

4.4.2 For CFA16 there were a total of 22 water bodies for which surveys were proposed during 2014. Of these, 10 water bodies had no access, and a further six were scoped out following initial walkover / HSI surveys. The remaining six water bodies were scoped in for further assessment, as follows:

- three water bodies are between the land required for construction of the original scheme and 100m; and
- three water bodies are between 100m and 250m from the land required for construction of the original scheme.

#### Field survey

##### Habitat suitability index/walkover surveys

4.4.3 Following the completion of walkover surveys, incorporating a Habitat Suitability Index (HSI) survey (where appropriate), six water bodies identified in Table 5 were scoped out of further assessment. All HSI surveys were undertaken during April and May 2014.

<sup>9</sup> Volume 5 appendix EC-002-003, ES 3.5.2.16-22.2

**Table 5 - Summary of locations in CFA16 where requirement for further survey was scoped out following walkover survey in 2014**

Ecology survey code	Location	OS grid reference	Brief rationale for scoping out	Distance from the original scheme (m) and orientation
030-AA-116011	North of Wormleighton	SP 45554 53365	Water body dry	205 south-west
030-AA-117005	East of Wormleighton	SP 45252 53763	Water body dry	55 west
030-AA-117007	North of Wormleighton	SP 44907 54107	Water body dry	40 west
030-AA-117012	North-west of Stoneton	SP 45494 54894	Water body dry	25 north
030-AA-118004	North-west of Stoneton	SP 45338 55392	Water body dry	135 north
030-AA-118005	South-west of Priors Hardwick	SP 45426 55290	Water body dry	210 north

### *Presence/absence and population size class estimate surveys*

- 4.4.1 Presence/absence surveys were undertaken at six water bodies within the area.
- 4.4.2 The results of the amphibian presence/absence and population size class estimate surveys are detailed within Table 6.

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Table 6 - Summary of results from CFA16 amphibian presence/absence and population size class estimate surveys in 2014

Ecology survey code	Location	OS grid reference	Survey type	Number of visits completed	First survey visit	Last survey visit	Peak count during single visit with single method					CFA	Approximate distance from the original scheme (m) and orientation
							Great crested newt	Smooth newt	Palmate newt	Common frog	Common toad		
030-AA-116003	East of Wormleighton	SP 45992 53589	P/A	4	16/05/14	03/06/14	0	0	0	1	0	16	Within land required
030-AA-116006	North of Wormleighton	SP 45541 53794	P/A	4	07/04/14	28/05/14	0	4 (L)	0	0	0	16	160 west
030-AA-116007	North of Wormleighton	SP 45551 53782	P/A	4	07/04/14	28/05/14	0	2 (L)	0	0	0	16	160 west
030-AA-116012	East of Wormleighton	SP 45485 53589	PSC	6	16/05/14	12/06/14	1 (S)	6 (L)	0	0	0	16	120 west
030-AA-117002	North of Wormleighton	SP 45274 54167	PSC	6	07/04/14	09/06/14	11 (M)	6 (L)	0	0	0	16	< 5 west
030-AA-117003	North of Wormleighton	SP 45155 54348	P/A	4	12/05/14	03/06/14	0	0	0	0	0	16	65 west

**Key:**

PSC = Population Size Class assessment; P/A = Presence or Absence assessment

Bracketed text within species column indicates the relevant population size class for the peak count obtained as follows:

Great crested newt - (S) = Small; (M) = Medium; (L) = Large;

N.B. A full six visits are required in order to obtain a robust great crested newt population size class assessment.

Smooth & palmate newt = peak count less than 10 = Low (L); peak count 10-100 = Good (G); peak count over 100 = Exceptional (E).

Common frog = spawn clumps counted less than 50 = Low (L); 50-500 = Good (G); greater than 500 = Exceptional (E)

Common toad = peak count of less than 100 = Low (L); peak count 100-1000 = Good (G); peak count greater than 1000 = Exceptional (E).

- 4.4.3 Great crested newts have been found in two of the six water bodies surveyed (030-AA-116012 and 030-AA-117002): one of these is a medium population size class (030-AA-117002) and one is a small population size class (030-AA-116012). In addition, three of the other water bodies were found to contain other amphibians (smooth newts in two (030-AA-116006 and 030-AA-116007) and common frog in one of the water bodies (030-AA-116003).

## CFA17 Offchurch and Cubbington

### Scoping

- 4.4.4 The water bodies surveyed in 2014 were water bodies that were scoped in during the 2013 exercise<sup>9</sup> but for which no access was available to survey during 2012/13 great crested newt survey season.
- 4.4.5 For CFA17 there were a total of 23 water bodies for which surveys were proposed during 2014. Of these, 11 water bodies had no access, and a further one was scoped out following initial walkover / HSI surveys. The remaining 11 water bodies were scoped in for further assessment, as follows:
- one water bodies are within the land required for construction of the original scheme;
  - five water bodies are between the land required for construction of the original scheme and 100m;
  - three water bodies are between 100m and 250m from the land required for construction of the ;
  - two water bodies between 250m and 500m from the land required for construction of the original scheme.

## Field survey

### HSI/walkover

- 4.4.6 Following the completion of walkover surveys, incorporating a Habitat Suitability Index (HSI) survey (where appropriate), one water body, identified in Table 7, was scoped out of further assessment. All HSI surveys were undertaken during April and May 2014.

**Table 7 - Summary of locations in CFA17 where requirement for further survey was scoped out following walkover survey in 2014**

Ecology survey code	Location	OS grid reference	Brief rationale for scoping out	Distance from the original scheme (m) and orientation
030-AA-131011	West of Sutton Spinney	SP 36970 65949	Flowing water body	Within land required

### Presence/absence and population size class estimate surveys

- 4.4.7 Presence/absence surveys were undertaken at eleven water bodies within the area. In addition, one water body (030-AA-131015) was identified during a bat building and tree assessment survey, and was discovered to contain great crested newt eggs. This



water body was discovered too late in the 2014 great crested newt season to undertake follow up surveys.

- 4.4.8 The results of amphibian presence/absence and population size class estimate surveys are detailed within Table 8.

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Table 8 - Summary of results from CFA17 amphibian presence/absence and population size class estimate surveys in 2014

Ecology survey code	Location	OS grid reference	Survey type	No. of visits completed	First survey visit	Last survey visit	Peak count during single visit with single method					Distance from the original scheme (m) and orientation
							Great crested newt	Smooth newt	Palmate newt	Common frog	Common toad	
030-AA-130006	North-west of Print Wood	SP 38124 65251	P/A	5	13/05/14	16/06/14	0	8 (L)	0	0	0	275 south
030-AA-131014	South of Offchurch	SP3673864649	P/A	4	23/04/14	19/05/14	0	3 (L)	0	0	2 (L)	50 south
030-AA-131015	East of Offchurch	SP36681 65586	HIS	1	30/06/14	n/a	Egg seen					20 north
030-AA-132001	North of Offchurch	SP 36499 66017	P/A	4	23/04/14	19/05/14	0	8 (L)	0	0	0	15 west
030-AA-133002	West of River Leam	SP 36030 67725	P/A	4	23/04/14	19/05/14	0	1 (L)	0	0	0	55 north-east
030-AA-133005	West of River Leam	SP 36107 67728	P/A	4	10/04/14	19/05/14	0	0	0	Tadpoles	0	110 north
030-AA-134001	East of South Cubbington Wood	SP 35721 67960	P/A	4	16/04/14	19/05/14	0	0	0	0	0	85 north-east
030-AA-134002	North-east of South Cubbington Wood	SP 35669 68533	P/A	4	10/04/14	12/05/14	0	0	0	2 adults	0	Within land required
030-AA-134006	North-east of South Cubbington Wood	SP 35991 68380	P/A	4	09/04/14	19/05/14	0	2 (L)	0	0	0	330 east

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Ecology survey code	Location	OS grid reference	Survey type	No. of visits completed	First survey visit	Last survey visit	Peak count during single visit with single method					Distance from the original scheme (m) and orientation
							Great crested newt	Smooth newt	Palmate newt	Common frog	Common toad	
030-AA-135001	North-west of South Cubbington Wood	SP 35282 68821	PSC	6	09/04/14	08/05/14	6 (S)	6 (L)	1 (L)	2 (L)	0	150 north
030-AA-135002	North of South Cubbington Wood	SP 35450 68926	P/A	4	13/05/14	12/06/14	0	1 (L)	0	Tadpoles	0	215 north

**Key:**

PSC = Population Size Class assessment; P/A = Presence or Absence assessment

Bracketed text within species column indicates the relevant population size class for the peak count obtained as follows:

Great crested newt - (S) = Small; (M) = Medium; (L) = Large;

N.B. A full six visits are required in order to obtain a robust great crested newt population size class assessment.

Smooth & palmate newt = peak count less than 10 = Low (L); peak count 10-100 = Good (G); peak count over 100 = Exceptional (E).

Common frog = spawn clumps counted less than 50 = Low (L); 50-500 = Good (G); greater than 500 = Exceptional (E)

Common toad = peak count of less than 100 = Low (L); peak count 100-1000 = Good (G); peak count greater than 1000 = Exceptional (E)

- 4.4.9 Great crested newts have been found in two of the ten water bodies surveyed: there is one small population size class (030-AA-135001) and one for which only eggs were discovered during the HSI survey (030-AA-131015). As no additional surveys were undertaken, this water body is assumed to contain a medium population size class of great crested newts following the precautionary approach. In addition, eight of the water bodies surveyed were found to contain other amphibians (smooth newts in six of the water bodies, palmate newts in one, frogs in four and toads in one).

## **CFA 18 Stoneleigh, Kenilworth and Burton Green**

### *Scoping*

- 4.4.10 The water bodies surveyed in 2014 were water bodies that were scoped in during the 2013 exercise but for which no access was available to survey during the 2012/13 great crested newt survey season.
- 4.4.11 For CFA18 there were a total of 13 water bodies for which surveys were proposed during 2014. Of these, nine water bodies had no access. The remaining four water bodies were scoped in for further assessment, as follows:
- one water bodies are within the land required for construction of the original scheme;
  - three water bodies are between the land required for construction of the original scheme and 100m.

### **Field survey**

#### *HSI/walkover*

- 4.4.12 Following the completion of walkover surveys, incorporating a Habitat Suitability Index (HSI) survey (where appropriate), no water bodies were scoped out. All HSI surveys were undertaken during April and May 2014.

#### *Presence/absence and population size class estimate surveys*

- 4.4.13 Presence/absence surveys were undertaken at four water bodies within the area.
- 4.4.14 The results of amphibian presence/absence and population size class estimate surveys are detailed within Table 9.

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Table 9 - Summary of results from CFA18 amphibian presence/absence and population size class estimate surveys in 2014

Ecology survey code	Location	OS grid reference	Survey type	No. of visits completed	First survey visit	Last survey visit	Peak count during single visit with single method					Distance from the original scheme (m) and orientation
							Great crested newt	Smooth newt	Palmate newt	Common frog	Common toad	
030-AA-140003	North-west of A46	SP 31599 72990	PSC	6	22/04/14	09/06/14	11 (M)	11 (G)	0	1 adult	0	10 north
030-AA-141009	East of Crackley	SP 30686 73434	P/A	4	22/04/14	22/05/14	0	0	0	0	0	Within land required
030-AA-144012	North of Blind Lane	SP 28367 74614	PSC	6	22/04/14	09/06/14	1 (S)	3 (L)	0	4 adults	0	25 west
030-AA-146006	South of Burton Green	SP 26807 75439	PSC	6	22/04/14	09/06/14	13 (M)	5 (L)	0	Tadpoles	1 (L)	25 south

**Key:**

PSC = Population Size Class assessment; P/A = Presence or Absence assessment

Bracketed text within species column indicates the relevant population size class for the peak count obtained as follows:

Great crested newt - (S) = Small; (M) = Medium; (L) = Large;

N.B. A full six visits are required in order to obtain a robust great crested newt population size class assessment.

Smooth & palmate newt = peak count less than 10 = Low (L); peak count 10-100 = Good (G); peak count over 100 = Exceptional (E).

Common frog = spawn clumps counted less than 50 = Low (L); 50-500 = Good (G); greater than 500 = Exceptional (E)

Common toad = peak count of less than 100 = Low (L); peak count 100-1000 = Good (G); peak count greater than 1000 = Exceptional (E)

- 4.4.15 Great crested newts have been found in three of the four water bodies surveyed (030-AA-140003, 030-AA-144012 and 030-AA-146006): there are two medium population size classes (030-AA-140003 and 030-AA-146006) and one small population size class (030-AA-144012). The other water body contained no amphibians.

### **CFA19 Coleshill Junction**

#### *Scoping*

- 4.4.16 The water bodies surveyed in 2014 were water bodies that were scoped in during the 2013 exercise<sup>9</sup> but for which no access was available to survey during the 2012/13 great crested newt survey season.
- 4.4.17 For CFA19 there were two water bodies for which surveys were proposed during the 2014 season (030-AA-161011 and 030-AA-209005). Both water bodies had no access during the 2014 season (see Table 4) and no surveys were undertaken within this area during 2014.

### **CFA20 Curdworth to Middleton**

#### *Scoping*

- 4.4.18 The water bodies surveyed in 2014 were water bodies that were scoped in during the 2013 exercise<sup>9</sup> but for which no access was available to survey during the 2012/13 great crested newt survey season.
- 4.4.19 For CFA20 there were a total of 18 water bodies for which surveys were proposed during 2014. Of these, five water bodies had no access, and a further two were scoped out following initial walkover / HSI surveys. The remaining 11 water bodies were scoped in for further assessment, as follows:
- three water bodies are within the land required for construction of the original scheme;
  - six water bodies are between the land required for construction of the original scheme and 100m;
  - two water bodies are between 100m and 250m from the land required for construction of the original scheme.

### **Field survey**

#### *HSI/walkover*

- 4.4.20 Following the completion of walkover surveys, incorporating a Habitat Suitability Index (HSI) survey (where appropriate), two water bodies identified in Table 10 were scoped out of the assessment. All HSI surveys were undertaken during April and May 2014.

**Table 10 - Summary of locations in CFA2o where requirement for further survey was scoped out following walkover survey in 2014**

Ecology survey code	Location	OS grid reference	Brief rationale for scoping out	Distance from the original scheme (m) and orientation
030-AA-169015	South-east of Hunts Green	SP 19115 96528	Flowing water body	Within land required
030-AA-169016	South of Hunts Green	SP 18670 96500	Flowing water body	Within land required

*Presence/absence and population size class estimate surveys*

- 4.4.21 Presence/absence surveys were undertaken at 11 water bodies within the area.
- 4.4.22 The results of amphibian presence/absence and population size class estimate surveys are detailed within Table 11.

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Table 11 - Summary of results from CFA2o amphibian presence/absence and population size class estimate surveys in 2014

Ecology survey code	Location	OS grid reference	Survey type	No. of visits completed	First survey visit	Last survey visit	Peak count during single visit with single method					Distance from the original scheme (m) and orientation
							Great crested newt	Smooth newt	Palmate newt	Common frog	Common toad	
030-AA-167022	North-west of Lea Marston	SP 19908 94252	P/A	4	24/04/14	15/05/14	0	23 (G)	0	1 adult	0	140 south-east
030-AA-167023	North-west of Lea Marston	SP 19859 94263	P/A	4	24/04/14	15/05/14	0	16 (G)	0	4 adults	0	150 east
030-AA-167024	North-west of Lea Marston	SP 19937 94358	P/A	4	24/04/14	15/05/14	0	0	0	0	0	40 south-east
030-AA-167025	North-west of Lea Marston	SP 19901 94349	P/A	4	24/04/14	15/05/14	0	0	0	0	0	50 south
030-AA-167031	South of M6 Toll	SP 19451 94121	P/A	4	13/05/14	27/05/14	0	9 (L)	0	1 adult	0	10 east
030-AA-168005	West of North Wood	SP 18983 95495	P/A	4	08/05/14	12/06/14	0	0	0	0	0	Within land required
030-AA-168006	West of North Wood	SP 19055 95642	P/A	4	08/05/14	12/06/14	0	1 (L)	0	0	0	10 west



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Ecology survey code	Location	OS grid reference	Survey type	No. of visits completed	First survey visit	Last survey visit	Peak count during single visit with single method					Distance from the original scheme (m) and orientation
							Great crested newt	Smooth newt	Palmate newt	Common frog	Common toad	
030-AA-169001	North of North Wood	SP 19135 95941	P/A	4	08/05/14	12/06/14	0	0	0	1 adult	0	< 5 east
030-AA-170005	South of Hunts Green	SP 18471 97299	PSC	6	23/04/14	09/06/14	4 (S)	2 (L)	0	0	1 adult	Within land required
030-AA-168029	North Wood	SP 18979 95676	P/A	4	08/05/14	12/06/14	0	0	0	0	0	Within land required
<b>030-AA-168030</b>	<b>North Wood</b>	<b>SP 19054 95526</b>	<b>P/A</b>	<b>4</b>	<b>08/05/14</b>	<b>12/06/14</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>&lt; 5 north</b>

**Key:**

PSC = Population Size Class assessment; P/A = Presence or Absence assessment

Bracketed text within species column indicates the relevant population size class for the peak count obtained as follows:

Great crested newt - (S) = Small; (M) = Medium; (L) = Large;

N.B. A full six visits are required in order to obtain a robust great crested newt population size class assessment.

Smooth & palmate newt = peak count less than 10 = Low (L); peak count 10-100 = Good (G); peak count over 100 = Exceptional (E).

Common frog = spawn clumps counted less than 50 = Low (L); 50-500 = Good (G); greater than 500 = Exceptional (E)

Common toad = peak count of less than 100 = Low (L); peak count 100-1000 = Good (G); peak count greater than 1000 = Exceptional (E)

- 4.4.23 Great crested newts have been found in one of the 11 water bodies surveyed and contains a small population size class. In addition, five of the water bodies were found to contain other amphibians (smooth newts in four of the water bodies and frogs in four).

## CFA21 Drayton Bassett, Hints and Weeford

### Scoping

- 4.4.24 The water bodies surveyed in 2014 were water bodies that were scoped in during the 2013 exercise<sup>9</sup> but for which no access was available to survey during the 2012/13 great crested newt survey season.
- 4.4.25 For CFA21 there were a total of four water bodies for which surveys were proposed during 2014. Of these, all four water bodies had access, and one was scoped out following initial walkover / HSI surveys. The remaining three water bodies were scoped in for further assessment, as follows:
- one water bodies are within the land required for construction of the original scheme;
  - one water bodies are between 100m and 250m from the land required for construction of the original scheme;
  - one water bodies between 250m and 500m from the land required for construction of the original scheme.

### Field survey

#### HSI/walkover

- 4.4.26 Following the completion of walkover surveys, incorporating a Habitat Suitability Index (HSI) survey (where appropriate), one water body, identified in Table 12, was scoped out of the assessment. All HSI surveys were undertaken during April and May 2014.

**Table 12 - Summary of locations from CFA21 where requirement for further survey was scoped out following walkover survey in 2014**

Ecology survey code	Location	OS grid reference	Brief rationale for scoping out	Distance from the original scheme (m) and orientation
030-AA-180008	South-west of Packington Moor	SK 14315 05770	Flowing water body	250 west

### Presence/absence and population size class estimate surveys

- 4.4.27 Presence/absence surveys were undertaken at three water bodies within the area.
- 4.4.28 The results of amphibian presence/absence and population size class estimate surveys are detailed within Table 13.

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Table 13 - Summary of results from CFA21 amphibian presence/absence and population size class estimate surveys in 2014

Ecology survey code	Location	OS grid reference	Survey type	No. of visits completed	First survey visit	Last survey visit	Peak count during single visit with single method					Distance from the original scheme (m) and orientation
							Great crested newt	Smooth newt	Palmate newt	Common frog	Common toad	
030-AA-172009	West of Middleton Park	SP 18697 99082	P/A	4	30/04/14	09/06/14	0	0	0	Tadpoles	0	380 east
030-AA-180001	West of Packington Moor	SK 14857 06451	P/A	4	14/04/14	09/06/14	0	51 (G)	0	1 adult	1 (L)	Within land required
030-AA-180002	South-west of Packington Moor	SK 14434 06206	P/A	4	14/04/14	09/06/14	0	20 (G)	0	0	29 (L)	100 west

**Key:**

PSC = Population Size Class assessment; P/A = Presence or Absence assessment

Bracketed text within species column indicates the relevant population size class for the peak count obtained as follows:

Great crested newt - (S) = Small; (M) = Medium; (L) = Large;

N.B. A full six visits are required in order to obtain a robust great crested newt population size class assessment.

Smooth & palmate newt = peak count less than 10 = Low (L); peak count 10-100 = Good (G); peak count over 100 = Exceptional (E).

Common frog = spawn clumps counted less than 50 = Low (L); 50-500 = Good (G); greater than 500 = Exceptional (E)

Common toad = peak count of less than 100 = Low (L); peak count 100-1000 = Good (G); peak count greater than 1000 = Exceptional (E)

- 4.4.29 Great crested newts were not found in the three water bodies surveyed. All three of the water bodies were found to contain other amphibians: smooth newts in two of the water bodies (030-AA-180001 and 030-AA-180002), frogs in two (030-AA-172009 and 030-AA-180001) and toads in two (030-AA-180001 and 030-AA-180002).

## CFA22 Whittington to Handsacre

### Scoping

- 4.4.30 The water bodies surveyed in 2014 were water bodies that were scoped in during the 2013 exercise<sup>9</sup> but for which no access was available to survey during the 2012/13 great crested newt survey season.
- 4.4.31 For CFA22 there were a total of 23 water bodies for which surveys were proposed during 2014. Of these, 15 water bodies had no access, and a further four were scoped out following initial walkover / HSI surveys. The remaining four water bodies were scoped in for further assessment, as follows:
- two water bodies are between the land required for construction of the original scheme and 100m;
  - two water bodies are between 100m and 250m from the land required for construction of the original scheme.

### Field survey

#### HSI/walkover

- 4.4.32 Following the completion of walkover surveys, incorporating a Habitat Suitability Index (HSI) survey (where appropriate), four water bodies identified in Table 14 were scoped out of the assessment. All HSI surveys were undertaken during April and May 2014.

Table 14 - Summary of locations from CFA22 where requirement for further survey was scoped out following walkover survey in 2014

Ecology survey code	Location	OS grid reference	Brief rationale for scoping out	Distance from the original scheme (m) and orientation
030-AA-183003	South-west of Whittington	SK 15042 08894	Dry water body	130 east
030-AA-184001	North of Streethay	SK 14579 10131	Dry water body	Within land required
030-AA-184010	East of Streethay	SP 14959 10219	Flowing water body	Within land required
030-AA-192013	South-east of Handsacre	SK 08798 15698	Flowing water body	165 west

### Presence/absence and population size class estimate surveys

- 4.4.33 Presence/absence surveys were undertaken at four water bodies within the area.
- 4.4.34 The results of amphibian presence/absence and population size class estimate surveys are detailed within Table 15.

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Table 15 - Summary of results from CFA22 amphibian presence/absence and population size class estimate surveys from 2014

Ecology survey code	Location	OS grid reference	Survey type	No. of visits completed	First survey visit	Last survey visit	Peak count during single visit with single method					Distance from the original scheme (m) and orientation
							Great crested newt	Smooth newt	Palmate newt	Common frog	Common toad	
030-AA-184011	North of Streethay	SK 15312 10541	P/A	4	01/05/14	29/05/14	0	0	0	Tadpoles	Tadpoles	135 north
030-AA-184012	East of Streethay	SK15233 10425	P/A	4	01/05/14	29/05/14	0	0	0	1 adult	0	135 north
030-AA-185005	North-east of Streethay	SK 14722 10796	P/A	4	12/05/14	09/06/14	0	4 (L)	0	Tadpoles	0	5 west
030-AA-192012	South-east of Handsacre	SK 09027 15662	P/A	4	22/04/14	22/05/14	0	3 (L)	0	Tadpoles	0	90 west

**Key:**

PSC = Population Size Class assessment; P/A = Presence or Absence assessment

Bracketed text within species column indicates the relevant population size class for the peak count obtained as follows:

Great crested newt - (S) = Small; (M) = Medium; (L) = Large;

N.B. A full six visits are required in order to obtain a robust great crested newt population size class assessment.

Smooth & palmate newt = peak count less than 10 = Low (L); peak count 10-100 = Good (G); peak count over 100 = Exceptional (E).

Common frog = spawn clumps counted less than 50 = Low (L); 50-500 = Good (G); greater than 500 = Exceptional (E)

Common toad = peak count of less than 100 = Low (L); peak count 100-1000 = Good (G); peak count greater than 1000 = Exceptional (E)

- 4.4.35 Great crested newts were not found in the four water bodies surveyed. All the four water bodies were found to contain other amphibians: smooth newts in two of the water bodies (030-AA-185005 and 030-AA-192012), frogs in four (030-AA-184011, 030-AA-184012, 030-AA-185005 and 030-AA-192012) and toads in one (030-AA-184011).

### Discussion of combined results

#### *CFA16 Ladbroke and Southam*

- 4.4.36 Local Wildlife Site (LWS) selection criteria for Warwickshire<sup>10</sup> were reviewed to identify any sites that may qualify under the criteria. The criteria state that water bodies with breeding populations of internationally or nationally rare species would be selected as LWS, with great crested newt being given as an example. Within this area only one water body (030-AA-117002) meets these criteria due to the presence of great crested newt eggs and a medium population size class of great crested newt. The other water body that contained a great crested newt population (030-AA-116012) was not proven to be breeding due to the lack of great crested newt eggs and only one individual great crested newt was found.
- 4.4.37 Water bodies with known presence of great crested newt populations have been separated into clusters which are likely to support metapopulations. The assumed metapopulations have been assigned from desk top study data undertaken in 2012/13 and aquatic survey results from 2012 to 2014 only; no terrestrial survey has taken place. The assumed metapopulations are defined as a cluster of ponds supporting great crested newt within 250 m of one another. The boundaries of the assumed metapopulations include breeding habitat and terrestrial habitat, where the latter is not separated from the breeding ponds by a barrier to newt dispersal. Water bodies which have not been surveyed but which fall within the boundary of the assumed metapopulation are included in the metapopulation descriptions in the following sections.
- 4.4.38 Table 16 summarises the assumed metapopulations that have been identified within the vicinity of the original scheme and the associated population size classes of great crested newt resulting from 2014 surveys, or 2012/2013 surveys where this provides a larger population class. Amphibian Metapopulation (AMP) 35 and AMP 36 are new metapopulations identified as a result of the 2014 surveys and are in addition to those described in the main ES.

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<sup>10</sup> Warwickshire Wildlife Trust, 1997. The Selection of Sites of Importance for Nature Conservation in Warwickshire, Warwickshire Wildlife Trust, Coventry

**Table 16 - Summary of great crested newt metapopulations assumed to occur within CFA 16 from 2014 surveys**

AMP reference	Location	Number of water bodies	Ecology survey code of water bodies within AMP (ponds containing great crested newts are indicated by an asterix)	Estimated population size class of AMP <sup>11</sup>	Distance from the original scheme (m) and orientation
AMP 35	Cluster of water bodies to the east of Wormleighton	3	030-AA-116012*, 116007, 116006	Small (peak count 1 recorded in one water body)	Within land required
AMP 36	Cluster of water bodies to the east of Wormleighton	2	030-AA-117002*, 117003	Medium (peak count 11 recorded in one water body)	Within land required

### *CFA17 Offchurch and Cubbington*

- 4.4.39 Local Wildlife Site (LWS) selection criteria for Warwickshire<sup>10</sup> were reviewed to identify any sites that may qualify under the criteria. The criteria state that water bodies with breeding populations of internationally or nationally rare species would be selected as LWS, with great crested newt being given as an example. Within this area only one water body meets these criteria due to the presence of breeding great crested newts, identified due to the presence of great crested newt eggs. This is water body (030-AA-131015) was found to contain great crested newt eggs during the HSI survey. The other water body that had a great crested newt population (030-AA-135001) was not proven to be breeding due to the lack of great crested newt eggs. However, as six individual newts were identified within the pond, both male and female, it is assumed that this is a breeding population.
- 4.4.40 Water bodies with known presence of great crested newt populations have been separated into clusters which are likely to support metapopulations. The assumed metapopulations have been assigned from desk top study data undertaken in 2012/13 and aquatic survey results from 2012 to 2014 only; no terrestrial survey has taken place. The assumed metapopulations are defined as a cluster of ponds supporting great crested newt within 250 m of one another. The boundaries of the assumed metapopulations include breeding habitat and terrestrial habitat, where the latter is not separated from the breeding ponds by a barrier to newt dispersal. Water bodies which have not been surveyed but which fall within the boundary of the assume metapopulation are included in the metapopulation descriptions in the following sections.

<sup>11</sup> The estimated population size class is the cumulative sum of the peak counts of great crested newt within the water bodies included within the metapopulation.

- 4.4.41 Table 17 summarises the likely metapopulations that have been identified within the vicinity of the original scheme and the associated population size classes of great crested newt resulting from 2014 surveys. AMP 7 was identified from 2012/2013 survey results but has been expanded due to updated survey data from 2014.

**Table 17 - Summary of great crested newt metapopulations assumed to occur within CFA 17 resulting from 2014 surveys**

AMP reference	Location	Number of water bodies	Ecology survey code of water bodies within AMP (ponds containing great crested newts are indicated by an asterix)	Estimated population size class of AMP <sup>11</sup>	Distance from the original scheme (m) and orientation
AMP 7	South Cubbington Wood	5	030-AA-135001*, 135007*, 135006*, 135008, 135002	Small (peak count of 6)	Within land required

### *CFA18 Stoneleigh, Kenilworth and Burton Green*

- 4.4.42 Local Wildlife Site (LWS) selection criteria for Warwickshire<sup>10</sup> were reviewed to identify any sites that may qualify under the criteria. The criteria state that water bodies with breeding populations of internationally or nationally rare species would be selected as LWS, with great crested newt being given as an example. Within this area only one water body (030-AA-140003) meets this criteria due to the presence of breeding great crested newts, identified due to the presence of great crested newt eggs. This water body contains a medium great crested newt population, smooth newts and common frogs. The other water bodies that supported a great crested newt population (030-AA-144012 and 030-AA-146006) were not proven to be breeding due to the lack of great crested newt eggs. However, in 030-AA-146006, as six individual newts were identified within the pond, both male and female, it is assumed that this is a breeding population. The other water body (030-AA-144012) which had unconfirmed great crested newt breeding due to the absence of eggs, only had one individual great crested newt observed so it is not possible to assume breeding.
- 4.4.43 Water bodies with known presence of great crested newt populations have been separated into clusters which are likely to support metapopulations. The assumed metapopulations have been assigned from desk top study data undertaken in 2012/13 and aquatic survey results from 2012 to 2014 only; no terrestrial survey has taken place. The assumed metapopulations are defined as a cluster of ponds supporting great crested newt within 250 m of one another. The boundaries of the assumed metapopulations include breeding habitat and terrestrial habitat, where the latter is not separated from the breeding ponds by a barrier to newt dispersal. Water bodies which have not been surveyed but which fall within the boundary of the assume metapopulation are included in the metapopulation descriptions in the following sections.
- 4.4.44 Table 18 summaries the three likely metapopulations that have been identified within the vicinity of the original scheme and the associated population size classes of great



crested newt resulting from 2014 surveys. AMP 9 was identified during the 2012/13 survey season and has been expanded due to the addition of great crested newts identified in a water body (030-AA-140003) during 2014 surveys. The other two, AMP 37 and AMP 38, are new metapopulations identified as a result of the 2014 surveys and are in addition to those described in the ES.

**Table 18 - Summary of great crested newt metapopulations assumed to occur within CFA 18 resulting from 2014 surveys**

AMP reference	Location	Number of water bodies	Ecology survey code of water bodies within AMP (water bodies containing great crested newts are indicated by an asterix)	Estimated population size class of AMP <sup>21</sup>	Distance from the original scheme (m) and orientation
AMP 9	North-west of A46	4	030-AA-140003*, 140004*, 140005*, 140006*	Large (peak count of 222 from 2013 surveys)	Within land take
AMP 37	North of Kenilworth	2	030-AA-144001, 144012*	Small (peak count of 1 from 2014 surveys)	Within land take
AMP 38	South of Burton Green	2	030-AA-146006*, 145011	Medium (peak count of 13 from 2014 surveys)	Within land take

### *CFA20 Curdworth to Middleton*

- 4.4.45 Local Wildlife Site (LWS) selection criteria for Warwickshire<sup>10</sup> were reviewed to identify any sites that may qualify under the criteria<sup>10</sup>, with great crested newt being given as an example. The criteria state that water bodies with breeding populations of internationally or nationally rare species would be selected as LWS. Within this area only one water body (030-AA-170005) meets these criteria due to the presence of breeding great crested newts, identified due to the presence of great crested newt eggs. This is water body contains a low population of great crested newts, smooth newts and common toad.
- 4.4.46 Water bodies with known great crested newt populations have been separated into clusters which are likely to support metapopulations. The assumed metapopulations have been assigned from desk top data study undertaken in 2012/13 and aquatic survey results from 2012 to 2014 only; no terrestrial survey has taken place. The assumed metapopulations are defined as a cluster of ponds supporting great crested newt within 250 m of one another. The boundaries of the assumed metapopulations include breeding habitat and terrestrial habitat, where the latter is not separated from the breeding ponds by a barrier to newt dispersal. Water bodies which have not been surveyed but which fall within the boundary of the assume metapopulation are included in the metapopulation descriptions in the following sections.

- 4.4.47 Table 19 summarises the likely metapopulation that has been identified within the vicinity of the original scheme and the associated population size class of great crested newt resulting from 2014 surveys. This AMP 39 is a new metapopulation identified as a result of the 2014 surveys and is in addition to those described in the ES.

**Table 19 - Summary of great crested newt metapopulations assumed to occur within CFA 20 resulting from 2014 surveys**

AMP reference	Location	Number of water bodies	Ecology survey code of ponds within AMP (ponds containing great crested newts are indicated by an asterix)	Estimated population size class of AMP <sup>21</sup>	Distance from the original scheme (m) and orientation
AMP 39	Cluster of water bodies at Hunts Green	6	030-AA-170005*, 170006, 170018, 170017, 170032, 170007	Small (peak count of 4 from 2014 surveys)	Within land required

#### *CFA21 Drayton Bassett, Hints and Weeford*

- 4.4.48 Local wildlife site criteria for Staffordshire were reviewed to identify any sites that would qualify as LWS under the Guidelines for the Selection of Sites of County Biological Importance in Staffordshire<sup>22</sup>. Within CFA21, no water bodies qualify as LWS because none contained either: a medium great crested newt population; five species of amphibian; or an assemblage score of 7 or more (scores obtained for different populations of the five amphibians in table 15 from the site selection guidelines<sup>22</sup>).
- 4.4.49 As no great crested newt populations were identified, no likely metapopulations have been identified within the vicinity of the original scheme resulting from 2014 surveys.

#### *CFA22 Whittington to Handsacre*

- 4.4.50 Local wildlife site criteria for Staffordshire were reviewed to identify any sites that would qualify as LWS under the Guidelines for the Selection of Sites of County Biological Importance in Staffordshire<sup>22</sup>. Within CFA22, no water bodies qualify as LWS because none contained either: a medium great crested newt population; five species of amphibian; or an assemblage score of seven or more (scores obtained for different populations of the five amphibians in Table 15 from the site selection guidelines<sup>22</sup>).
- 4.4.51 As no great crested newt populations were located, no likely metapopulations have been identified within the vicinity of the original scheme resulting from 2014 surveys.

<sup>22</sup> Staffordshire Wildlife Trust February 2008, Version 4.02 (May 2011).

## 5 Bats

### 5.1 Introduction

- 5.1.1 This section of the appendix presents details of additional baseline information relating to bats relevant to the section of the scheme that will pass through CFA 16 to 22 inclusive. This baseline information was collected during surveys of accessible land carried out in 2014.
- 5.1.2 Details of the bat trapping and radio tracking study carried out in CFA22 during 2014 are provided in a separate appendix (see SES and AP2 ES Volume 5 Appendix EC-004-003).

### 5.2 Methodology

- 5.2.1 Details of the standard methodology utilised for bat surveys are provided in the Phase One ES in Ecology technical note: Ecological field survey methods and standards (Volume 5: Appendix CT-001-000/2).
- 5.2.2 Desk study searches relevant to bats were undertaken for the published Environmental Statement.

### 5.3 Deviations, constraints and limitations

- 5.3.1 The survey methodology deviated from the standard methodology in that surveys were limited in scope to focus on surveys of potential roosts and additional transects or automated detector surveys were not undertaken. It also deviated from the standard methodology in that surveys were only undertaken where potential roosts could be affected directly by the original scheme. This included features within and directly adjacent to the land required for the construction of the original scheme. During 2014, where additional access became available, surveys of buildings and trees with potential to support roosting bats were undertaken. However, additional bat transect surveys and activity surveys using static detectors were not carried out in 2014.
- 5.3.2 Survey efforts have been limited to land where access permission has become available throughout the survey period in 2014. A full survey season has not been completed on some sites, where access could not be arranged early enough in the survey season. In 2014 surveys were undertaken in land parcels where access had become available and features that could have potential to support roosting bats (primarily trees and buildings) would fall within or directly adjacent to the land required for the construction of the original scheme.
- 5.3.3 No emergence surveys were undertaken at trees. Where trees were identified during ground level tree assessment as having moderate or high potential they were subject to tree climbing inspections.
- 5.3.4 There are a number of large areas where access was not granted and survey coverage was not possible in 2012/13. The features of potential interest for bats within these areas with no access were as follows:

- CFA16 Ladbroke and Southam – arable fields with large water bodies, surrounded by scrub and deciduous woodland; tree lined hedgerows and three parcels of deciduous woodland;
- CFA17 Offchurch and Cubbington – arable fields with tree lined hedgerows, scattered trees, ponds and ditches;
- CFA18 Stoneleigh, Kenilworth and Burton Green – arable fields with tree lined hedgerows; and
- CFA21 Drayton Bassett, Hints and Weeford – mainly mixed farming, both pasture and arable, with tree lined hedgerows, ponds and pockets of deciduous woodland.

5.3.5 Table 20 shows those land parcels for which access was requested but not granted, or not granted in time to undertake surveys, in 2014 and so surveys could not be undertaken.

**Table 20 - Land Parcels where no Access for Bat Surveys Agreed**

Land Title	CFA	Type of Survey Required
WK258982	17	Ground Level Tree Assessment and Potential Tree Climbing
WK390868	17	Ground Level Tree Assessment and Potential Tree Climbing
WK276464	18	Ground Level Tree Assessment and Potential Tree Climbing
WK278337	18	Ground Level Tree Assessment and Potential Tree Climbing
WK410190	19	Ground Level Tree Assessment and Potential Tree Climbing
WK313506	20	Ground Level Tree Assessment and Potential Tree Climbing Initial Buildings Assessment and Potential Emergence surveys
WK330586	20	Ground Level Tree Assessment and Potential Tree Climbing
WK335401	20	Ground Level Tree Assessment and Potential Tree Climbing
WK401937	20	Ground Level Tree Assessment and Potential Tree Climbing Initial Buildings Assessment and Potential Emergence surveys
SF162639	21	Ground Level Tree Assessment and Potential Tree Climbing
SF325153	21	Ground Level Tree Assessment and Potential Tree Climbing
SF513753	21	Ground Level Tree Assessment and Potential Tree Climbing
U200043	22	Ground Level Tree Assessment and Potential Tree Climbing

## Trees

5.3.6 During the 2014 surveys there were no deviations from the standard methodologies for initial assessments of trees, apart from the limitation to only survey within land required for the construction of the original scheme. Detailed inspections of trees via climb surveys were prevented in some areas due to access being refused, health and

safety concerns or due to birds building nests in the features that had been identified during the ground level tree assessment.

- 5.3.7 The number of trees not climbed in each area are presented in Table 21. The trees presented in Table 21, where for tree climbing was not possible, are separate from the land parcels listed in Table 20 above, for which there was no access for any form of survey.

**Table 21 - Number of trees on which tree climbing surveys were not possible within each area in CFA16 to 22 inclusive**

CFA	Number of Trees not Climbed and Reason Tree Climbing Not Carried Out		
	Access Refused for Tree Climbing	Health and Safety Concerns	Birds Nesting in Potential Roost Features
16	59	8	2
17	-	2	1
18	-	4	-
19	-	3	-
20	3	4	-
21	-	14	-
22	-	10	1

## Buildings and structures

- 5.3.8 In CFA17 one building was subject to partial survey only because it was not possible to complete emergence surveys before the end of August 2014 due to the timing of access being made available.
- 5.3.9 In CFA18 one building was subject to an initial assessment only because it was not possible to complete emergence surveys before the end of August 2014 due to the timing of access being made available.
- 5.3.10 In CFA19 one building was subject to an initial assessment only and one was subject to only a partial emergence survey as it was not possible to complete by the end of August 2014 due to the timing of access being made available.
- 5.3.11 In CFA22 two buildings were subject to an initial assessment only because it was not possible to complete emergence surveys before the end of August 2014 due to the timing of access being made available.

## 5.4 Baseline

### Overview

- 5.4.1 An overview of bat species recorded using habitats within the land required for the construction of the original scheme is provided in CFAs 16 to 22 mammals ecological baseline data: Ladbrooke to Handsacre (Volume 5 appendix EC-003-003, paragraphs 3.5.2.16-22.3).

- 5.4.2 An overview of bat species in each area is provided in the Environmental Statement (Volume 5 appendix EC-003-003); these overviews have not changed as a result of information collected in 2014.

### **CFA16 Ladbroke and Southam**

#### *Roosting (Trees)*

- 5.4.3 Initial assessments of trees were undertaken during detailed ground level assessments to confirm roosts and/or roosting potential. There are 260 trees, within the land required for the construction of the original scheme within this area, which were subject to initial ground level tree assessment in 2014.
- 5.4.4 During the initial assessments no confirmed roosts were identified, 27 trees were found to contain features with high potential to support roosting bats and 145 trees were found to contain features with moderate potential to support roosting bats. All other trees were considered to have low or negligible potential for roosting bats.
- 5.4.5 Where permission was granted, tree climbing was undertaken in order to carry out detailed inspections. 174 of the trees within the land required for the construction of the original scheme were subject to detailed inspection. Two of these trees were confirmed as roosts, whilst 62 of these trees were downgraded from moderate or high to low or negligible potential as a result of the tree climbing inspection.

#### *Summary*

- 5.4.6 During the 2014 surveys there were two confirmed bat roosts identified in trees within the land required for the construction of the original scheme within this area. Twenty trees were found to have high potential to support roosting bats and 88 trees were found to have moderate potential to support roosting bats.
- 5.4.7 Details of confirmed tree roosts in this area of the route are provided in Table 22.

Table 22 - Confirmed tree roosts recorded within CFA16

Ecology survey code	Location	OS grid reference	Tree species	Species confirmed as utilising roost and (peak count)	Date of peak count and nature of survey	Roost type <sup>13</sup>	Roost description	Approximate distance from the original scheme (m) and orientation
030-BT1-126006	Land at Fields Farm, west of Southam	SP 40429 61269	Ash	Species not known (Small number of droppings found but too degraded for DNA analysis, suspected to be noctule)	Climb Inspection (23rd September 2014)	T,D,S	Rot hole located at the end of lower limb with opening of approximately 7cm. Cavity present approximately 30cm deep contained a single dropping.	Within land required <sup>14</sup>
030-BT1-126018	Land at Fields Farm, west of Southam	SP 40288 61274	Ash	Species not known (Approximately 30 droppings found but too degraded for DNA analysis, suspected to be Myotis, and number indicated maternity roost)	Climb Inspection (23rd September 2014)	M	A cavity in the western stem, developing upwards to approximately 40cm deep and downwards to 20cm deep. In addition, three droppings found on entrance to woodpecker hole also located on the western stem.	Within land required
030-BS1-119008	Barn north east of Wormleighton	SP 44608 55760	Barn (disused hay barn and stables)	Common pipistrelle (6)	28 August 2014 Emergence	T / D	Roosting feature was not seen but likely to be around wooden roof beams; bats emerged from archway Single bat was also heard and seen foraging within building on several surveys.	Within land required

<sup>13</sup> Roost types are as follows: T = Transitional roost; M = Maternity roost; S = Satellite roost; H = Hibernation roost, D = Day roost; F = Feeding roost; MAT = Mating roost, N = Night roost. Definitions as provided in Hundt L (2012), Bat Surveys: Good Practice Guidelines 2nd edition, Bat Conservation Trust.

<sup>14</sup> In this table and following tables the term 'land required' is used as a shortened version of the full term 'land required for the construction of the original scheme'.

*Roosting (building and structures)*

- 5.4.8 Initial assessments of two buildings within the land required for the construction of the original scheme confirmed one building as a confirmed roost. The other building was found not to contain any features with a high or moderate potential to support roosting bats.
- 5.4.9 Emergence surveys were carried out at the building supporting a confirmed roost. Details of the confirmed roost are provided in Table 23.



**Table 23 - Confirmed bat roosts in buildings/structures in CFA16**

Ecology survey code	Location	OS grid reference	Building/ structure type	Species confirmed utilising roost and (peak count)	Date of peak count and nature of survey	Roost type <sup>15</sup>	Roost description	Approximate distance from the original scheme (m) and orientation
030-BT1-126006	Land at Fields Farm, west of Southam	SP 40429 61269	Ash	Species not known (Small number of droppings found but too degraded for DNA analysis, suspected to be noctule)	Climb Inspection (23rd September 2014)	T,D,S	Rot hole located at the end of lower limb with opening of approximately 7cm. Cavity present approximately 30cm deep contained a single dropping.	Within land required
030-BT1-126018	Land at Fields Farm, west of Southam	SP 40288 61274	Ash	Species not known (Approximately 30 droppings found but too degraded for DNA analysis, suspected to be Myotis, and number indicated maternity roost)	Climb Inspection (23rd September 2014)	M	A cavity in the western stem, developing upwards to approximately 40cm deep and downwards to 20cm deep. In addition, three droppings found on entrance to woodpecker hole also located on the western stem.	Within land required

<sup>15</sup> Roost types are as follows: T = Transitional roost; M = Maternity roost; S = Satellite roost; H = Hibernation roost, D = Day roost; F = Feeding roost; MAT = Mating roost, N = Night roost. Definitions as provided in Hundt L (2012), Bat Surveys: Good Practice Guidelines 2nd edition, Bat Conservation Trust.

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Ecology survey code	Location	OS grid reference	Building/ structure type	Species confirmed utilising roost and (peak count)	Date of peak count and nature of survey	Roost type <sup>15</sup>	Roost description	Approximate distance from the original scheme (m) and orientation
030-BS1-119008	Barn north east of Wormleight on	SP 44608 55760	Barn (disused hay barn and stables)	Common pipistrelle (6)	28 August 2014 Emergence	T / D	Roosting feature was not seen but likely to be around wooden roof beams; bats emerged from archway. Single bat was also heard and seen foraging within building on several surveys.	Within land required

### *Discussion*

- 5.4.10 Additional surveys undertaken in 2014 have found two tree roosts and one roost in a building.
- 5.4.11 In the Environmental Statement no roosting sites were noted in the area west of Southam where roosts suspected to be used by noctule and Myotis bats were found in trees in 2014. Noctule is classed as a 'rarer' bat<sup>16</sup>. However, only a small number of droppings were found. Assuming that the tree roost at Fields Farm, west of Southam (030-BT1-126006) does support a small roost of one or more noctule bats it would be a receptor of County / metropolitan value. Any Myotis species would be classed as a 'rarer' bat<sup>17</sup>. Based on the number of droppings, the surveyor considered this to be a potential maternity roost. Therefore, this would be a receptor of up to Regional value.
- 5.4.12 In the Environmental Statement the bat assemblage associated with roosting, foraging and commuting habitat around Stoneton and Wormleighton, particularly associated with the Oxford Canal and several of the hedgerows that form habitat links between the village of Wormleighton, the Oxford Canal and Newfield Pool was assessed as a receptor of up to district / borough value. The pipistrelle roost that has been identified in 2014 does not alter this valuation. While this adds knowledge regarding the bat community and will need to be taken into account in any licence application it does not alter the overall valuation of this assemblage.

### **CFA17 Offchurch and Cubbington**

#### *Roosting (trees)*

- 5.4.13 Initial assessments of trees were undertaken during detailed ground level assessments to confirm roosts and/or roosting potential. There are 135 trees, within the land required for the construction of the original scheme within this area, which were subject to initial ground level tree assessment. During the initial assessments no confirmed roosts were identified, 14 trees were found to contain features with high potential to support roosting bats and 72 trees were found to contain features with moderate potential to support roosting bats. All other trees were considered to have low or negligible potential for roosting bats.
- 5.4.14 Where permission was granted, tree climbing was undertaken in order to carry out detailed inspections. Within the land required for the construction of the original scheme, 86 trees were subject to detailed inspection. None of these trees were found to have confirmed roosts, whilst 49 of these trees were downgraded from moderate or high to low or negligible potential as a result of the inspection.

### *Summary*

- 5.4.15 During the 2014 surveys there were no confirmed bat roosts identified in trees within the land required for the construction of the original scheme within this area. Nine trees were found to have high potential to support roosting bats and 18 trees were found to have moderate potential to support roosting bats.

<sup>16</sup> Wray S, Wells D, Long E and Mitchell-Jones T. (2010) Valuing bats in ecological impact assessment. In Practice. December 2010. P23-25

<sup>17</sup> Wray S, Wells D, Long E and Mitchell-Jones T. (2010) Valuing bats in ecological impact assessment. In Practice. December 2010. P23-25

*Roosting (buildings and structures)*

- 5.4.16 Initial assessments of 10 buildings within the land required for the construction of the original scheme found no confirmed roosts. Six of the buildings were found to contain features with a high or moderate potential to support roosting bats.
- 5.4.17 A dawn re-entry survey was carried out in August 2014 at all of those buildings that were identified to have high to moderate potential for roosting bats. No bats were seen during this survey of these buildings and so no buildings were identified as having confirmed roosts in this area of the route.

*Discussion*

- 5.4.18 Additional surveys undertaken in 2014 have found no tree roosts and no building roosts.
- 5.4.19 The results of the 2014 surveys do not alter the baseline in the Phase One ES regarding the overall bat populations which have been found to be present in this area.

**CFA18 Stoneleigh, Kenilworth and Burton Green***Roosting (trees)*

- 5.4.20 Initial assessments of trees were undertaken during detailed ground level assessments to confirm roosts and/or roosting potential. There are 38 trees, within the land required for the construction of the original scheme within this area, which were subject to initial ground level tree assessment. During the initial assessments no confirmed roosts were identified, two trees were found to contain features with high potential to support roosting bats and 12 trees were found to contain features with moderate potential to support roosting bats. All other trees were considered to have low or negligible potential for roosting bats.
- 5.4.21 Where permission was granted and it was considered safe to do so, tree climbing was undertaken in order to carry out detailed inspections. There were 14 trees subject to detailed inspection. None of these trees were found to have confirmed roosts, whilst four of these trees were downgraded from moderate or high to low or negligible potential as a result of the inspection.

*Summary*

- 5.4.22 During the 2014 surveys there were no confirmed bat roosts identified in trees within the land required for the construction of the original scheme within this area. No trees were found to have high potential to support roosting bats and nine trees were found to have moderate potential to support roosting bats.

*Roosting (buildings and structures)*

- 5.4.23 Initial assessments of 18 buildings within the land required for the construction of the original scheme found no buildings to have confirmed roosts. Four of the buildings were found to contain features with a high or moderate potential to support roosting bats.

5.4.24 Emergence surveys were carried out at three of those buildings that were identified to have high to moderate potential for roosting bats. There was not enough time remaining in the 2014 survey season to undertake emergence surveys at the fourth building, which had been identified as having high potential during the initial assessments.

5.4.25 The three buildings containing features with high or moderate potential were all part of the same residential property. Bats were seen emerging from two of these buildings confirming roosts at these locations. Details of confirmed roosts in buildings/structures in this area of the route are provided in Table 24.

#### *Discussion*

5.4.26 Additional surveys undertaken in 2014 have found no tree roosts and two building roosts.

5.4.27 In the Phase One ES the assemblage of bats using roosting, foraging and commuting habitats at Stoneleigh Business Park, including the River Avon, are identified as a receptor of County / metropolitan value. The two additional roosts identified are in close proximity to this area, being north west of the River Avon, within 1km of Stoneleigh Business Park with no major barriers to bat movement such as major roads. These small roosts used by common and soprano pipistrelles are considered to form part of the Stoneleigh Business Park bat assemblage as described in the Phase One ES. While the 2014 baseline information adds knowledge regarding the bat community it does not alter the evaluation of this assemblage as reported in the Phase One ES.

Table 24 - Confirmed bat roosts in buildings/structures in CFA18

Ecology survey code	Location	OS grid reference	Building/ structure type	Species confirmed utilising roost and (peak count)	Date of peak count and nature of survey	Roost type <sup>18</sup>	Roost description	Approximate distance from the original scheme (m) and orientation
030-BS1-140007	Barnyard, Crew Lane	SP 31493 72129	Residential	Soprano pipistrelle (1)	16 July 2014 Emergence	T, M, S, H, D, MAT, but survey results suggest maternity is unlikely	Barn conversion, brick construction with tiled roof. Roof void in building. Access to roof void via lifted and missing roof tiles but roost location could not be confirmed.	Within land required
030-BS1-140009	Barnyard, Crew Lane	SP 31499 72129	Residential	Common pipistrelle (1)	16 July 2014 Emergence	T, M, S, H, D, MAT, but survey results suggest maternity is unlikely	Barn conversion, brick construction with tiled roof. Roof void in building. Access to roof void via ventilation bricks but roost location could not be confirmed.	Within land required

<sup>18</sup> Roost types are as follows: T = Transitional roost; M = Maternity roost; S = Satellite roost; H = Hibernation roost, D = Day roost; F = Feeding roost; MAT = Mating roost, N = Night roost. Definitions as provided in Hundt L (2012), Bat Surveys: Good Practice Guidelines 2nd edition, Bat Conservation Trust.

## CFA19 Coleshill Junction

### *Roosting (trees)*

- 5.4.28 Initial assessments of trees were undertaken during detailed ground level assessments to confirm roosts and/or roosting potential. There are 32 trees, within the land required for the construction of the original scheme within this area, which were subject to initial ground level tree assessment. During the initial assessments no confirmed roosts were identified, two trees were found to contain features with high potential to support roosting bats and six trees were found to contain features with moderate potential to support roosting bats. All other trees were considered to have low or negligible potential for roosting bats.
- 5.4.29 Where permission was granted and it was considered safe to do so, tree climbing was undertaken in order to carry out detailed inspections. Eight trees were subject to detailed inspection. None of these trees were found to have confirmed roosts, whilst four of these trees were downgraded from moderate or high to low or negligible potential as a result of the inspection.

### *Summary*

- 5.4.30 During the 2014 surveys there were no confirmed bat roosts identified in trees within the land required for the construction of the original scheme within this area. No trees were found to have high potential to support roosting bats and four trees were found to have moderate potential to support roosting bats.

### *Roosting (buildings and structures)*

- 5.4.31 Initial assessments of 10 buildings currently within the land required for the construction of the original scheme found one building to have a confirmed roost through the presence of droppings. One other building was found to contain features with high potential to support roosting bats.
- 5.4.32 An emergence survey was carried out at the building identified to have high potential to support roosting bats. No bats were recorded.
- 5.4.33 There was not enough time remaining in the 2014 survey season to undertake a full suite of emergence surveys at the building where droppings were found. No bats were seen emerging from this building during the surveys completed.
- 5.4.34 Details of the confirmed building roost in this area of the route are provided in Table 25

Table 25 - Confirmed bat roosts in buildings/structures in CFA19

Ecology survey code	Location	OS grid reference	Building/structure type	Species confirmed utilising roost and (peak count)	Date of peak count and nature of survey	Roost type <sup>19</sup>	Roost description	Approximate distance from the original scheme (m) and orientation
030-BS1-163083	Residential building between the A446 (Lichfield Road) and the B4117 (Gilson Road)	SP 19002 90335	Residential	Soprano pipistrelle roost (confirmed via DNA analysis of droppings)	25th June 2014 Initial building inspection	Potential for all types.	Roof void above converted attic room. Timber framed with polystyrene insulation tiles between rafters.	Within land required

<sup>19</sup> Roost types are as follows: T = Transitional roost; M = Maternity roost; S = Satellite roost; H = Hibernation roost, D = Day roost; F = Feeding roost; MAT = Mating roost, N = Night roost. Definitions as provided in Hundt L (2012), Bat Surveys: Good Practice Guidelines 2nd edition, Bat Conservation Trust.



*Discussion*

- 5.4.35 Additional surveys undertaken in 2014 have found no tree roosts and one building roost.
- 5.4.36 The building containing the roost is in close proximity to the assemblage of bats using roosting, foraging and commuting habitats north of Gilson Hall recorded as a receptor of local / parish value. The evidence indicates the presence of a small soprano pipistrelle roost, but this cannot be confirmed without emergence surveys. This species was recorded within the assemblage reported in the ES. Therefore, while the 2014 surveys adds knowledge regarding the bat assemblage it does not alter the evaluation of this assemblage as reported in the ES.

**CFA20 Curdworth to Middleton***Roosting (trees)*

- 5.4.37 Initial assessments of trees were undertaken during detailed ground level assessments to confirm roosts and/or roosting potential. There are 167 trees, within the land required for the construction of the original scheme within this area, which were subject to initial ground level tree assessment. During the initial assessments no confirmed roosts were identified, seven trees were found to contain features with high potential to support roosting bats and 51 trees were found to contain features with moderate potential to support roosting bats. All other trees were considered to have low or negligible potential for roosting bats.
- 5.4.38 Where permission was granted and it was considered safe to do so, tree climbing was undertaken in order to carry out detailed inspections. 60 were subject to detailed inspection. None of these trees were found to have confirmed roosts, whilst 33 of these trees were downgraded from moderate or high to low or negligible potential as a result of the inspection.

*Summary*

- 5.4.39 During the 2014 surveys there were no confirmed bat roosts identified in trees within the land required for the construction of the original scheme within this area. Seven trees were found to have high potential to support roosting bats and 13 trees were found to have moderate potential to support roosting bats.

*Roosting (buildings and structures)*

- 5.4.40 Initial assessments of three buildings currently within the land required for the construction of the original scheme found no buildings to have either a confirmed roost or features with high to moderate potential to support roosting bats.
- 5.4.41 One building adjacent to the land required for the construction of the original scheme was found to have a confirmed roost due to the presence of droppings. As this building was outside of the land required for the construction of the original scheme and bats using the roost are considered unlikely to be affected as a result of the Scheme, it was not subject to further survey.
- 5.4.42 Details of the confirmed roost within one of the buildings in this area of the route are provided in Table 26.

Table 26 - Confirmed bat roosts in buildings/structures in CFAzo

Ecology survey code	Location	OS grid reference	Building/structure type	Species confirmed utilising roost and (peak count)	Date of peak count and nature of survey	Roost type <sup>20</sup>	Roost description	Approximate distance from the original scheme (m) and orientation
030-BS1-169026	Maple Leaf Farm	SP 18753 96329	Residential	Suspected brown long eared (small number of droppings, DNA analysis failed)	Initial Inspection (27th June 2014). No peak count.	T / D	Roof void constructed of modern truss frame timbers with roof felt throughout. Droppings found in centre of the void where roof timbers meet and the roofing felt is folded creating a small cavity.	Adjacent to land required

<sup>20</sup> Roost types are as follows: T = Transitional roost; M = Maternity roost; S = Satellite roost; H = Hibernation roost, D = Day roost; F = Feeding roost; MAT = Mating roost, N = Night roost. Definitions as provided in Hundt L (2012), Bat Surveys: Good Practice Guidelines 2nd edition, Bat Conservation Trust.

*Discussion*

- 5.4.43 Additional surveys undertaken in 2014 have found no tree roosts and one building roost within the land required for construction of the original scheme.
- 5.4.44 A bat roost was found at Maple Leaf Farm, but this is just outside the land required for the construction of the original scheme. A brown long-eared roost was suspected, but due to the building's location and the fact that impacts on the bats would not be expected further survey was not undertaken to confirm this.
- 5.4.45 During the surveys to support Environmental Statement, nearby buildings south of Bodymoor Heath Road were found to support roosts of common pipistrelles and brown long eared bat. Due to the proximity, the roost at Maple Leaf Farm is likely to be used by the same bat assemblage. These populations were assessed as a receptor of local / parish value. The 2014 survey information adds knowledge regarding the bat assemblage although it does not alter the evaluation of the assemblage as reported in the ES.

**CFA21 Drayton Basset, Hints and Weeford***Roosting (trees)*

- 5.4.46 Initial assessments of trees were undertaken during detailed ground level assessments to confirm roosts and/or roosting potential. There are 158 trees, within the land required for the construction of the original scheme within this area, which were subject to initial ground level tree assessment. During the initial assessments no confirmed roosts were identified, 18 trees were found to contain features with high potential to support roosting bats and 45 trees were found to contain features with moderate potential to support roosting bats. All other trees were considered to have low or negligible potential for roosting bats.
- 5.4.47 Where permission was granted and it was considered safe to do so, tree climbing was undertaken in order to carry out detailed inspections. Forty six trees were subject to detailed inspection. One of these trees were found to have a confirmed roost, whilst 25 of these trees were downgraded from moderate or high to low or negligible potential as a result of the inspection.

*Summary*

- 5.4.48 During the 2014 surveys one confirmed bat roost was identified in a tree within the land required for the construction of the original scheme within this area. Eleven trees were found to have high potential to support roosting bats and 24 trees were found to have moderate potential to support roosting bats
- 5.4.49 Details of confirmed tree roosts in this area of the route are provided in Table 27.

Table 27 - Confirmed tree roosts within CFA21

Ecology survey code	Location	OS grid reference	Tree species	Species confirmed as utilising roost and (peak count)	Date of peak count and nature of survey	Roost type <sup>21</sup>	Roost description	Approximate distance from the original scheme (m) and orientation
030-BT1-177006	Job's Hill Plantation (SF189095)	SK 15099 02966	Oak	Common pipistrelle bat (single pipistrelle bat found in situ, likely to be common pipistrelle)	Tree Climb (24th September 2014)	T, D	Cavity formed in west facing knot hole on trunk of tree	Within land required for the construction of the original scheme

<sup>21</sup> Roost types are as follows: T = Transitional roost; M = Maternity roost; S = Satellite roost; H = Hibernation roost, D = Day roost; F = Feeding roost; MAT = Mating roost, N = Night roost. Definitions as provided in Hundt L (2012), Bat Surveys: Good Practice Guidelines 2nd edition, Bat Conservation Trust.

*Roosting (buildings and structures)*

- 5.4.50 There were no surveys of buildings within the land required for the construction of the original scheme within this area.

*Discussion*

- 5.4.51 Additional surveys undertaken in 2014 have found one tree roost.
- 5.4.52 During surveys for the original Environmental Statement no access was available within Job's Hill plantation to assess trees' potential to support roosting bats. As a precaution, the potential assemblage of rarer bat species associated with roosting habitat at Rookery and Job's Hill Plantation was assessed as a feature of up to Regional value. The precautionary valuation was based on the absence of access to both Job's Hill plantation and the Rookery. Due to lack of access to the Rookery during 2014 the precautionary assessment as a feature of up to Regional value remains unchanged. While this baseline information adds knowledge regarding the bat community it does not alter the evaluation of this assemblage as reported in the ES.

**CFA22 Whittington to Handsacre***Roosting (trees)*

- 5.4.53 Initial assessments of trees were undertaken during detailed ground level assessments to confirm roosts and/or roosting potential. There are 135 trees, within the land required for the construction of the original scheme within this area, which were subject to initial ground level tree assessment. During the initial assessments no confirmed roosts were identified, 20 trees were found to contain features with high potential to support roosting bats and 69 trees were found to contain features with moderate potential to support roosting bats. All other trees were considered to have low or negligible potential for roosting bats.
- 5.4.54 Where permission was granted and it was considered safe to do so, tree climbing was undertaken in order to carry out detailed inspections. Seventy trees were subject to detailed inspection. None of these trees were found to have confirmed roosts, whilst 50 of these trees were downgraded from moderate or high to low or negligible potential as a result of the inspection.

*Summary*

- 5.4.55 During the 2014 surveys there were no confirmed bat roosts identified in trees within the land required for the construction of the original scheme within this area. Seven trees were found to have high potential to support roosting bats and 25 trees were found to have moderate potential to support roosting bats.

*Roosting (buildings and structures)*

- 5.4.56 Initial assessments of 15 buildings within the land required for the construction of the original scheme found no building to have a confirmed roost. Two buildings were found to contain features with a moderate potential to support roosting bats. Emergence surveys were not undertaken at these properties during the 2014 season because access was not granted in time to follow the initial assessment with emergence surveys before the end of August 2014.

*Discussion*

- 5.4.57 Additional surveys undertaken in 2014 have found no tree roosts and no building roosts.
- 5.4.58 Two buildings were found to contain features with a moderate potential to support roosting bats.

## 6 Hazel dormouse

### 6.1 Introduction

6.1.1 This section of the appendix presents baseline data relating to hazel dormouse (*Muscardinus avellenarius*), hereafter referred to as 'dormouse', for the section of the original scheme that will pass through CFA 16 to 22 inclusive. This baseline information was collected during surveys of accessible land carried out in 2014.

### 6.2 Methodology

6.2.1 Details of the standard methodology utilised for dormouse are provided in Ecology technical note: Ecological field survey methods and standards of the Phase One Environmental Statement (Volume 5: Appendix CT-001-000/2).

6.2.2 Table 28 shows the number of dormouse tubes set out, the duration of deployment and the number of points (survey effort score) obtained for each nest tube and nest box survey undertaken. Habitat suitability assessments were carried out at all the woodlands.

**Table 28 - Methodological details for dormouse nest tube surveys conducted in 2014 within CFA 16 to 22 inclusive**

Ecology survey code	Location	Centroid grid reference	Number of tubes deployed	Survey start	Sum of indices of probability <sup>22</sup>		CFA	Map series and sheet number reference
030-HD-143004	Northern area of Crackley Wood, north-west of Crackley	SP 291 743	60 nest tubes and 5 nest boxes	April to September 2014	24		18	EC-12-097
030-HD-168002	North Wood	SP 190 958	115 nest tubes and 10 nest boxes	May to September 2014	37		20	EC-12-113 and EC-12-114

### 6.3 Deviations, constraints and limitations

6.3.1 There are areas of habitat which were not accessible in 2012/13 but which were identified as requiring surveys for hazel dormouse in the main ES. A more detailed desk based exercise, taking account of desk study information and survey data set out in Ecological baseline data (CFA16 to CFA22): mammals (Volume 5: Appendix EC-003-003), was carried out for these sites in 2014. It was concluded that some of the

<sup>22</sup> Sum of the index of probability scores obtained for the months tubes were deployed, adjusted based on the number of tubes deployed in comparison with the standard of 50 tubes.

sites previously scoped in for survey can be removed from the list of sites requiring further dormouse survey:

- A small area of woodland surrounding the fish ponds at Lower Radbourne in CFA16 was previously recommended for dormouse survey in 2012/13, although this area was not accessible for survey in 2012/13 or 2014. Following further scoping of this area and finding it very limited in extent and isolated from other woodland areas. . There are no previous records of dormice in this area and the species is considered very unlikely to be present in this area;
- Bascote Heath Wood, south of Long Itchington and Ufton Woods SSSI, in CFA16 will be retained in the original scheme as the route will be in tunnel at this point, and no dormice have been found in the adjacent survey area;
- North Cubbington Wood in CFA17 will be retained in the original scheme and is adjacent to existing survey sites in South Cubbington Wood. The habitat is less suitable for dormice than South Cubbington Wood, which was surveyed in 2012/13;
- Snakeshill Wood, north-west of Hints in CFA21 will be retained within the original scheme, and no dormice have previously been found in this area. Woodland near to Snake's Hill Wood but which is within or adjacent to the original scheme has been surveyed for dormouse in 2012/ 13, with none found, and further surveys will be carried out on nearby Rookery wood, if access is available.

6.3.2 Within the woodland south of the Grand Union Canal (030-HD-129002) in CFA17 (map series and sheet number reference: EC-12-087) surveyors could not set out nest tubes and boxes due to water courses preventing safe access to the site. A Habitat Suitability Assessment, only, could be carried out.

6.3.3 There are two remaining areas of land in CFA16-22 scoped in for dormouse survey but where no access has previously been available. These areas are shown in Table 29.

**Table 29 - Survey areas with potential for dormouse to be present, but survey access was not granted**

Ecology survey code	Location	Centroid grid reference	CFA	Distance from the land required for construction of the original scheme <sup>23</sup> (m)	ES Map series and sheet number reference
030-HD-176002	Rookery (wood), south of Hints	SK 156 026	21	Within land required  Despite being adjacent to existing survey area it has greater potential that surrounding habitat to support dormice.	EC-12-120
030-HD-190002	Vicar's Coppice	SK 111 138	22	Within the land required	EC-12-128 and EC-12-129

<sup>23</sup> Hereafter the term 'land required' is used as a shortened version of the full term 'land required for the construction of the original scheme'.



## 6.4 Baseline

- 6.4.1 Two areas of woodland (Burnt Firs wood and the sliver of wood to the south of it) within CFA17 in the southern area of 030-HD-131002 were scoped out from further survey following an initial habitat assessment due to the lack of suitability for dormouse.
- 6.4.2 Detailed dormouse surveys have been carried out within six areas within CFA16, CFA17, CFA18 and CFA20 in 2014. No dormice or evidence of the species have been found.
- 6.4.3 Based on all survey and desk study results to date, as set out in this report and in the main ES, it is unlikely that dormice are present within the areas affected by the original scheme in CFA16-22.

# 7 Otter

## 7.1 Introduction

7.1.1 This section of the appendix presents baseline information relating to otter (*Lutra lutra*) for the section of the scheme that will pass through CFA 16 to 22 inclusive. This baseline information was collected during surveys of accessible land carried out in 2014.

## 7.2 Methodology

7.2.1 Details of the standard methodology utilised for the scoping exercise and otter surveys are provided in the Technical Note HS2 Ecological Surveys: Field Survey Methods and Standards (Volume 5: Appendix CT-001-000/2).

7.2.2 Table 30 details the watercourses, water bodies and terrestrial sites surveyed in 2014.

**Table 30 - Summary of water courses, water bodies and terrestrial sites subject to otter survey in 2014**

Ecology survey code	Watercourse or water body name	Feature type	OS grid reference (start and finish) <sup>24</sup>	Level of access within required survey extent	Survey dates	CFA	Distance from the original scheme (m) and orientation
030-OT2-116001	Berryhill Plantation	Terrestrial site	SP4632653964	Full (100%)	30 May 2014	16	Adjacent to original scheme
030-OT2-120001	Unnamed tributary watercourse of the River Itchen	Ordinary Watercourse	SP4375456474 to SP4457156487	None (access to area west of survey extent)	7 August 2014	16	Crossed by the route of the original scheme
030-OT1-129001	Unnamed tributary watercourse of the River Leam	Ordinary Watercourse	SP3779563837 to SP3882864104	Majority (75-99%)	3 June 2014	17	Crossed by the route of the original scheme
030-OT2-129004	Grand Union Canal woodland	Terrestrial site	SP3822863895	None (access to south of woodland)	3 June 2014	17	Crossed by the route of the original scheme
030-OT1-129005	Pond to south of Grand Union Canal near Welsh Road Bridge	Pond	SP3849163869	Full (100%)	3 June 2014	17	Within the original scheme

<sup>24</sup> Grid references for terrestrial sites are central rather than start and finish points.

SES and AP2 ES Appendix EC-001-003

Ecology survey code	Watercourse or water body name	Feature type	OS grid reference (start and finish) <sup>24</sup>	Level of access within required survey extent	Survey dates	CFA	Distance from the original scheme (m) and orientation
030-OT1-129006	Pond to south of Grand Union Canal near Longhole Bridge	Pond	SP3813163836	Full (100%)	3 June 2014	17	Within the original scheme
030-OT1-135001	Pingle brook	Ordinary Watercourse	SP3463068410 to SP3469468702	Full (100%)	9 July 2014	17	Adjacent to the original scheme
030-OT1-136001	Unnamed tributary watercourse A of River Avon	Ordinary Watercourse	SP3457869996 to SP3485569742	Full (100%)	9 July 2014	17	Within the original scheme
030-OT1-136002	Unnamed tributary watercourse B of River Avon	Ordinary Watercourse	SP3457869996 to SP3528669496	Majority (75-99%)	9 July 2014	17	Within the original scheme
030-OT2-136003	Unnamed tributary watercourse of River Avon	Ordinary Watercourse	SP3405070828 to SP3457869996	Full (100%)	7 August 2014	17	Within the original scheme
030-OT1-168002	Unnamed Stream (Tributary of Middleton Hall Catch (tributary of Langley Brook))	Ordinary watercourse	SP1908995175 to SP1940395496	Full (100%)	15 May 2014	20	Crossed by the route of the original scheme
030-OT1-168003	Unnamed Stream at Middleton House Farm (Tributary of Middleton Hall Catch (tributary of Langley Brook))	Ordinary Watercourse	SP1866996133 to SP1937296134	Majority (75-99%)	15 May 2014	20	Crossed by the route of the original scheme
030-OT2-168007	North Wood	Terrestrial site	SP1906995741	Full (100%)	15 May 2014	20	Crossed by the route of the original scheme
030-OT1-168008	Drains in North Wood	Drain	SP1917096002	Full (100%)	15 May 2014	20	Adjacent to the original scheme

SES and AP2 ES Appendix EC-001-003

Ecology survey code	Watercourse or water body name	Feature type	OS grid reference (start and finish) <sup>24</sup>	Level of access within required survey extent	Survey dates	CFA	Distance from the original scheme (m) and orientation
030-OT1-169001	Unnamed Stream at Maple Leaf Farm (Tributary of Middleton Hall Catch (tributary of Langley Brook))	Ordinary Watercourse	SP1953096908 to SP1829896817	Majority (75-99%)	15 May 2014	20	Crossed by the route of the original scheme
030-OT1-169002	Unnamed Stream at Pool House Farm (Tributary of Langley Brook)	Ordinary Watercourse	SP1947497042 to SP1829896817	Majority (75-99%)	15 May 2014	20	Crossed by the route of the original scheme
030-OT1-169003	Pond to north of Maple Leaf Farm	Pond	SP1872196489	Full (100%)	15 May 2014	20	Approximately 50 m west of the original scheme
030-OT1-184001	Unnamed tributary watercourse of Mare Brook	Main river	SK1521510886 to SK1404009635	Moderate (25-75%)	11 September 2014	22	Crossed by the route of the original scheme
030-OT2-185001	Mare brook	Ordinary Watercourse	SK1521510886 to SK1383511231	Majority (75-99%)	11 September 2014	22	Crossed by the route of the original scheme
030-OT1-186007	Pond A to west of unnamed watercourse at Fradley Business Park	Pond	SK1398911962	Full (100%)	22 July 2014	22	Within the original scheme
030-OT1-186008	Pond B to west of unnamed watercourse at Fradley Business Park	Pond	SK1404212008	Full (100%)	22 July 2014	22	Within the original scheme
030-OT2-188012	Woodland pond at Woodend Common Barn	Pond	SK1284014116	Full (100%)	11 September 2014	22	Approximately 250 m north east of the original scheme
030-OT2-188013	Woodland at Woodend Common Barn	Terrestrial site	SK1284014116	Full (100%)	11 September 2014	22	Approximately 180 m north east of the original scheme

Ecology survey code	Watercourse or water body name	Feature type	OS grid reference (start and finish) <sup>24</sup>	Level of access within required survey extent	Survey dates	CFA	Distance from the original scheme (m) and orientation
030-OT2-190007	Vicars Coppice	Terrestrial site	SK1107813815	Little (<25%)	11 September 2014	22	Adjacent to the original scheme

## 7.3 Deviations, constraints and limitations

7.3.1 The watercourses and water bodies where no surveys were possible due to access limitations are presented in Table 31.

Table 31 - Watercourses/water bodies with no access for otter survey in CFA16 to CFA22 inclusive

Ecology survey code	Water course or water body name	Feature type	OS grid reference (start and finish)	CFA number
030-OT-119001	Unnamed Drain at Church Farm (Drains to Tributary of Itchen)	Drain	SP4472556025 to SP4464955720	16
030-OT-120002	River Itchen (source to conf with R Stowe)	Ordinary watercourse	SP4438757138 to SP4364656760	16
030-OT-120003	Chapel Bank Cottage ponds	Terrestrial site and ponds	SP4416557027	16
030-OT-122001	Unnamed tributary watercourse of the River Itchen at Ladbroke	Ordinary watercourse	SP4276658348 to SP4346358780	16
030-OT-122002	Unnamed Drain at Ladbroke (Drains to Tributary of Itchen)	Drain	SP4282858339 to SP4284858169	16
030-OT-122003	Ladbroke Fox Covert	Terrestrial site	SP4299758236	16
030-OT-122006	Pond to immediate north of Ladbroke Fox Covert	Pond	SP4295358368	16
030-OT-122007	Pond to northwest of Ladbroke Fox Covert	Pond	SP4285458348	16
030-OT-123004	Pond A to east of Banbury Road, Ladbroke	Pond	SP4180159555	16
030-OT-123005	Pond B to east of Banbury Road, Ladbroke	Pond	SP4184459624	16
030-OT-126002	Unnamed tributary watercourse of the River Itchen associated with landfill site	Ordinary watercourse	SP4002561355 to SP3989561331	16
030-OT-126003	Unnamed tributary watercourse of the River Itchen at Lower Farm	Ordinary watercourse	SP3976761613 to SP4006661459	16
030-OT-126005	Field pond near to tributary of the River Itchen	Pond	SP3976761613	16
030-OT-127003	Unnamed tributary watercourse of the River Itchen at Bascote Heath	Ordinary watercourse	SP3961562443 to SP4004962596	16
030-OT-127004	Thorpe Rough (Fox Covert)	Terrestrial site	SP4002762520	16

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Ecology survey code	Water course or water body name	Feature type	OS grid reference (start and finish)	CFA number
030-OT-127005	Drain south of Long Itchington Wood	Drain	SP3914062418 to SP3896462353	16
030-OT-129003	Unnamed tributary watercourse of the River Leam at Lower Print Farm	Ordinary watercourse	SP3863664030 to SP3863764401	17
030-OT-132001	Unnamed Drain (Draining to the Leam) at Manor Farm, Offchurch	Drain	SP3604766311 to SP3648565959	17
030-OT-133002	Pond to north of River Leam at Lower Grange, Cubbington	Pond	SP3552267450	17
030-OT-135004	North Cubbington Wood	Terrestrial site	SP3509769356	17
030-OT-136004	Unnamed tributary watercourse of River Avon at Cotton Mill Spinney	Ordinary watercourse	SP3339369930 to SP3388169593	17
030-OT-136006	Pond at Furzen Hill Farm	Pond	SP3456370059	18
030-OT-141009	Unnamed woodland associated with Finham Brook	Terrestrial site	SP3111673565	18
030-OT-143003	Pond in Crackley Wood	Pond	SP2905974332	18
030-OT-161006	Unnamed woodland associated with the River Cole	Terrestrial site	SP1901089192	19
030-OT-168010	Drain associated with Kingsbury Water Park	Drain	SP2006595765 to SP2008796215	20
030-OT-170004	Pond at Middleton Quarry	Pond	SP1896297155	20
030-OT-171003	Pool head plantation and Middleton pool	Terrestrial site	SP1899198205	20
030-OT-173010	Pond to south of Shirral Drive, Drayton Bassett	Pond	SK1721700088	21
030-OT-183004	Pond to north of Wyrley and Essington Canal, Whittington	Pond	SK1495909493	22
030-OT-183005	Pond to north of Wyrley and Essington Canal, Whittington	Pond	SK1500009516	22
030-OT-184002	Pond in Fulfen Wood, Whittington	Pond	SK1466809656	22
030-OT-184003	Pond A to east of Fulfen Wood	Pond	SK1483709824	22
030-OT-184004	Pond B to east of Fulfen Wood	Pond	SK1486709718	22
030-OT-185002	2 x large ponds to north of Mare Brook, Streethay	Ponds	SK1412111478	22
030-OT-188005	Big Lyntus Wood	Terrestrial site	SK1312412976	22
030-OT-189007	Unnamed Drain (Becomes a tributary of the Pyford Brook Catchment (tributary of River Trent))	Drain	SK1201014287 to SK1245214676	22
030-OT-190009	Marina	Pond	SK1133814751	22
030-OT-190010	St John's Gorse	Terrestrial Site	SK1070914122	22

Ecology survey code	Water course or water body name	Feature type	OS grid reference (start and finish)	CFA number
030-OT-192002	Pond associated with unnamed drain, Handsacre	Pond	SK0963615398	22

## 7.4 Baseline

7.4.1 Current trends indicate continued re-colonisation of watercourses by otter nationally and in Warwickshire and Staffordshire and thus unless watercourses are specifically deemed to be unsuitable, baseline presence is assumed on the watercourses within this area.

7.4.2 Where particular water bodies or water courses within the area have been scoped out of the assessment following a 2014 visits then a brief rationale for these decisions should also be presented here.

Table 32 - Summary of holts, potential holts and couches recorded during 2014 surveys of CFA 16 to 22 inclusive

Ecology survey code	Water course or water body name	OS grid reference	Nature of record	CFA	Approximate distance from original scheme (m) and orientation
No holts, potential holts or couches were recorded during 2014 surveys of CFA 16 to 22 inclusive					

### CFA16 Ladbroke and Southam

7.4.3 There are eight watercourses and 12 water bodies within the Ladbroke and Southam area.

7.4.4 Three watercourses and two water bodies were surveyed previously during surveys undertaken in 2012/13, including the Oxford Canal (030-OT2-118001) and the River Itchen (030-OT2-126001).

7.4.5 The following watercourse has been surveyed for otter in 2014: unnamed tributary watercourse of the River Itchen (030-OT2-120001).

7.4.6 No holts, potential holts or couches were recorded during 2014 in CFA16.

7.4.7 No evidence of otter (such as spraints, sightings or footprints) was found during the 2014 survey of a reach of the River Itchen (030-OT2-120001) over 400 m west of the original scheme. The survey results indicated that the watercourse was suitable for commuting otters and small patches of woodland and dense scrub located adjacent to the watercourse along the reach surveyed could provide potential for otter resting sites and holts. No resting sites or holts were present within the reach of watercourse accessed

7.4.8 The reach of the River Itchen to be crossed by the original scheme has not been subject to survey. However, based on the direct connectivity with the River Itchen (030-OT2-126003) and the Oxford Canal (030-OT2-118001) it is considered likely that otters would utilise this watercourse as a commuting, foraging and refuge resource

and thus presence is assumed as stated in the ES. The potential for foraging resource is further elevated due to the presence of Chapel Bank Cottage Ponds (030-OT-120003) which due to their size are likely to be fish stocked.

7.4.9 Six terrestrial sites were identified within the Ladbroke and Southam area which have the potential to offer breeding habitat for otter. These sites comprise:

- Berry Hill plantation (030-OT2-116001) located partially within the land required for the construction of the original scheme;
- fish ponds at Chapel Bank Cottage near Lower Radbourne (030-OT-120003) also located partially within the land required for the construction of the original scheme;
- Ladbroke Fox Covert (030-OT-122003) located partially within the land required for the construction of the original scheme;
- Hill Farm Wood associated with the River Itchen near Thorpe Bridge (030-OT2-126004) located partially within the land required for the construction of the original scheme;
- Thorpe Rough (Fox Covert) (030-OT-127004) located outside of the land required for the construction of the original scheme; and
- Ladbroke Fox covert (030-OT-122003) located partially within the land required for the construction of the original scheme.

7.4.10 Of these, Berry Hill plantation (030-OT2-116001) was surveyed in 2014. This woodland is sycamore dominant and is located to the south of the Oxford Canal (030-OT2-118001). This woodland was classed as having a low suitability for potential breeding habitat due to its lack of suitable cover and its distance from the closest high quality food supply (the Oxford Canal approximately 800 m north).

7.4.11 Hill Farm Wood (030-OT2-126004) was assessed during the 2012/13 surveys. There has been no access to the other four terrestrial sites within this area.

### **CFA17 Offchurch and Cubbington**

7.4.12 There are 10 watercourses and four water bodies within the Offchurch and Cubbington area.

7.4.13 Four watercourses were surveyed previously during surveys undertaken in 2012/13, including the Grand Union Canal (030-OT2-129002) and the River Leam (030-OT2-132002).

7.4.14 The following watercourses have been surveyed for otter in 2014:

- Unnamed tributary of the River Leam (030-OT1-129001);
- Pingle Brook (030-OT1-135001);
- Unnamed tributary watercourse A of River Avon (030-OT1-136001);
- Unnamed tributary watercourse B of River Avon (030-OT1-136002); and



- Unnamed tributary watercourse of River Avon (030-OT2-136003).
- 7.4.15 Two water bodies (pond to south of the Grand Union Canal near Welsh Road Bridge 030-OT1-129005 and pond to south of the Grand Union Canal near Longhole Bridge 030-OT1-129006) were also surveyed in 2014.
- 7.4.16 No holts, potential holts or couches were recorded during 2014 survey of CFA17.
- 7.4.17 No evidence of otter (such as spraints, sightings or footprints) was found during the 2014 surveys.
- 7.4.18 The unnamed tributary watercourse of the River Leam (030-OT1-129001) was deemed to offer some limited suitability for otters although no evidence of otters was found during the field survey. Based on the immediate locality and connectivity of these watercourses with the Grand Union Canal it is considered likely that otters would utilise at least the closest reaches of this watercourse as a refuge due to its well vegetated banks. The watercourse offers very limited potential as a foraging resource due to its small size, low flow and silt substrate offering few refuges for prey species.
- 7.4.19 The Pingle Brook (030-OT1-135001) was deemed to offer very limited suitability for otters and the reach surveyed found to be dry at the time of survey. The Pingle Brook has connectivity with the River Leam but offers limited connectivity to any further watercourse, water body or terrestrial resource.
- 7.4.20 The network of drainage channels comprising: Unnamed tributary watercourse A of River Avon (030-OT1-136001), Unnamed tributary watercourse B of River Avon (030-OT1-136002) and Unnamed tributary watercourse of River Avon (030-OT2-136003) all offer very limited suitability for otters. This is due to their relative isolation, comprising small field and roadside drains. There is also limited connectivity between these watercourses and the River Avon as a result of reaches of the Unnamed tributary watercourse of River Avon (030-OT2-136003) passing in small pipe culverts which otters would be unable to navigate. Other reaches of the Unnamed tributary watercourse of River Avon (030-OT2-136003) were previously surveyed in 2012/13 and were found to offer some limited suitability for otter.
- 7.4.21 The Unnamed tributary watercourse of the River Leam at Lower Print Farm (030-OT-129003) and Unnamed tributary watercourse of River Avon at Cotton Mill Spinney (030-OT-136004) have not been subject to survey. Based on the immediate locality and connectivity of 030-OT-129003 with the Grand Union Canal it is considered likely that otters would utilise at least the closest reaches of these watercourses as a foraging and refuge resource. The Unnamed tributary watercourse of River Avon at Cotton Mill Spinney 030-OT-136004 has connectivity with the River Avon, although offers limited connectivity to any further watercourse, water body or terrestrial resource.
- 7.4.22 No evidence of otter was found at the two water bodies surveyed in 2014 (pond to south of the Grand Union Canal near Welsh Road Bridge 030-OT1-129005, pond to south of the Grand Union Canal near Longhole Viaduct 030-OT1-129006) and both were found to be dry at the time of survey.

7.4.23 Water bodies within the Offchurch and Cubbington area (pond to south of the Grand Union Canal near Welsh Road Bridge 030-OT1-129005, pond to south of the Grand Union Canal near Longhole Viaduct 030-OT1-129006 and pond to north of the River Leam at Lower Grange, Cubbington 030-OT-133002) are unlikely to be utilised by otter other than as an occasional seasonal foraging resource due to their small size and as they are not stocked with fish.

7.4.24 Three terrestrial sites were identified within this area, which have potential to offer breeding habitat for otter. These sites are all within the land required for construction of the original scheme and comprise:

- Grand Union Canal woodland (030-OT2-129004);
- Ash Beds Wood (030-OT2-132003); and
- North Cubbington Wood (030-OT-135004).

7.4.25 The Grand Union Canal woodland was viewed along its southern boundary from an adjacent arable field during the survey of watercourse 030-OT2-129001 in 2014. The woodland is broadleaved with an ash and oak canopy, a hazel and hawthorn understorey and nettle and bramble ground cover. There was no access into the woodland itself but there were few areas of dense cover providing limited opportunities for otter resting sites. The Grand Union Canal, located immediately adjacent to the woodland provides a good food resource. However both a footpath passing immediately adjacent to the woodland, the canal and its towpath all elevate levels of human disturbance. Overall the woodland was assessed as having low to moderate suitability for potential otter breeding.

Ash Beds Wood (030-OT2-132003) was assessed during the 2012/13 surveys. There has been no access to North Cubbington Wood.

### **CFA18 Stoneleigh, Kenilworth and Burton Green**

7.4.26 No surveys were undertaken in CFA18 in 2014.

### **CFA19 Coleshill Junction**

7.4.27 No surveys were undertaken in CFA19 in 2014.

### **CFA20 Curdworth to Middleton**

7.4.28 There are 10 watercourses and 18 water bodies within the Curdworth to Middleton area.

7.4.29 Eight watercourses and 13 water bodies were surveyed previously during surveys undertaken in 2012/13, including the River Tame (030-OT2-164002), Birmingham and Fazeley Canal (030-OT2-167001), Langley Brook (030-OT2-171001) and Gallows Brook (030-OT2-172002).

7.4.30 The following watercourses have been surveyed for otter in 2014:

- Unnamed Stream (Tributary of Middleton Hall Catch (tributary of Langley Brook)) (030-OT1-168002);

- Unnamed Stream at Middleton House Farm (Tributary of Middleton Hall Catch (tributary of Langley Brook)) (030-OT1-168003);
  - Drains in North Wood (030-OT1-168008);
  - Unnamed Stream at Maple Leaf Farm (Tributary of Middleton Hall Catch (tributary of Langley Brook)) (030-OT1-169001); and
  - Unnamed Stream at Pool House Farm (Tributary of Langley Brook) (030-OT1-169002).
- 7.4.31 The pond north of Maple Leaf Farm (030-OT1-169003) was also surveyed in 2014.
- 7.4.32 No holts, potential holts or couches were recorded during 2014 survey of CFA20.
- 7.4.33 No evidence of otter (such as spraints, sightings or footprints) was found during the 2014 surveys.
- 7.4.34 Survey of the section of 030-OT1-168002 to be crossed by the original scheme indicated that this stretch of the watercourse had limited suitability for otter to use as a foraging or refuge resource due to the exposed nature of its channels and banks. This watercourse offers a lack of refuge for otter prey species due to its low flow, exposed nature of its channel and banks and its silt substrate. However this watercourse does offer a commuting pathway between the Birmingham and Fazeley Canal (030-OT2-167001) with potential foraging resource at pools at Cuttle Mill Fisheries Ponds (three ponds 030-OT2-168004, 030-OT2-168005 and 030-OT2-168006).
- 7.4.35 Surveys of the three unnamed streams (an unnamed stream, tributary of Middleton Hall at Middleton house Farm 030-OT1-168003, an unnamed stream, tributary of Middleton Hall at Maple Leaf Farm 030-OT1-169001 and an unnamed stream at Pool House Farm 030-OT1-169002) indicated that these watercourses offered limited foraging and refuge suitability for otter. However both the unnamed stream, tributary of Middleton Hall at Middleton house Farm 030-OT1-168003 and the unnamed stream at Pool House Farm 030-OT1-169002 do provide connective pathways to potential refuge and terrestrial/ breeding sites at North Wood (030-OT2-168007) and Middleton Hall Farm Quarry Site (030-OT2-170001) respectively and thus otter presence is assumed.
- 7.4.36 The drain in North Wood 030-OT1-168008 and the pond north of Maple Leaf Farm 030-OT1-169003 were considered unlikely to be utilised by otter other than occasional seasonal foraging resource due to their small size and not being stocked with fish.
- 7.4.37 Five terrestrial sites with the potential to offer breeding habitat for otter were identified within the area:
- Cuttle Mill Fisheries and Mill Plantation (030-OT2-168009) located adjacent to the land required for the construction of the original scheme;
  - North Wood (030-OT2-168007) which is crossed by the original scheme;
  - Middleton Hall Farm Quarry site (030-OT2-170001) which falls partially within

the land required for the construction of the original scheme;

- Pool Head Plantation and Middleton Pool (030-OT-171003) adjacent to the land required for the construction of the original scheme; and
- Walkers Spinney (030-OT2-171004) partially within the land required for construction of the original scheme.

7.4.38 Detailed terrestrial assessments of Cuttle Mill Fisheries and Mill Plantation (030-OT2-168009), Middleton Hall Farm Quarry (030-OT2-170001) and Walkers Spinney (030-OT2-171004) were undertaken during 2012/13.

7.4.39 North wood (030-OT2-168007) was subject to terrestrial assessment in 2014. It is a mature broadleaved oak and ash woodland with a hazel understorey and a ground cover of nettles and cleavers. The woodland did not have any large areas of dense vegetation but is close to numerous good food supplies (Birmingham and Fazeley Canal and stocked ponds at Cuttle Mill Fisheries). Overall the woodland was assessed as having low to moderate suitability for otter breeding.

7.4.40 There has been no access to Pool Head Plantation and Middleton Pool (030-OT-171003).

### **CFA21 Drayton Bassett, Hints and Weeford**

7.4.41 No surveys were undertaken in CFA21 in 2014.

### **CFA22 Whittington to Handsacre**

7.4.42 There are nine watercourses within the Whittington to Handsacre area, plus 24 water bodies.

7.4.43 All nine watercourses as well as five drains and eight ponds were surveyed previously during surveys undertaken in 2012/13.

7.4.44 Additional reaches of the following watercourses have been surveyed for otter in 2014:

- Unnamed tributary watercourse of the Mare Brook (030-OT1-184001); and
- Mare Brook (030-OT2-185001).

7.4.45 Two water bodies; pond A to west of unnamed watercourse at Fradley Business Park (030-OT1-186007) and pond B to west of unnamed watercourse at Fradley Business Park (030-OT1-186008) were also surveyed in 2014.

7.4.46 A further Woodland pond at Woodend Common Barn (030-OT2-188012) was also surveyed in 2014. Although over 100 m from the original scheme, this water body will be directly affected by the Manchester Spur and otter presence was confirmed on the nearby Trent and Mersey Canal and assumed on the nearby Curborough Brook during 2012/13 surveys.

7.4.47 No holts, potential holts or couches were recorded during 2014 survey of CFA22.

- 7.4.48 Water bodies where surveys have confirmed the presence of otter through identification of field signs (such as spraints, sightings or footprints) are as follows:
- Woodland pond at Woodend Common Barn 030-OT2-188012 - three spraints (two dry intact and one dry fragmented) at SK 12891 14147 and SK 12896 14113.
- 7.4.49 The woodland pond is large and likely to be stocked with fish; it is likely to provide a foraging resource for the local otter population.
- 7.4.50 The reach of the Mare Brook (030-OT2-185001) surveyed in 2014 had limited suitability for otter to use as foraging or refuge resource due to the lack of refuge potential for otter prey species, its low flow and its silt substrate. Despite no evidence of otter on the Mare Brook during the surveys in 2012, 2013 and further survey of closer reaches crossed by the original scheme in 2014, desk study records from 2006 indicate the presence of otter on the Mare Brook approximately 1.8km from the land required for the construction of the original scheme so their presence is assumed.
- 7.4.51 Further water course reaches of the unnamed tributary watercourse of the Mare Brook (030-OT1-184001) were also subject to further surveys 2014 and were considered to offer very limited suitability for otter due to large reaches of this watercourse passing in culvert either side of the land required for the construction of the original scheme. Otters are therefore considered to be currently absent from this watercourse despite offering some suitable habitat for this species.
- 7.4.52 Two water bodies (ponds to the west of the unnamed watercourse at Fradley Business Park 030-OT1-186007 and 030-OT1-186008) were not present (discussions with landowner clarified that these ponds had not existed for many years) and were therefore scoped out of further assessment and have no suitability for otter.
- 7.4.53 Unnamed drain becomes a tributary of Pyford Brook Catchment 030-OT-189007, two ponds to the north of Wyrley and Essington Canal 030-OT-183004 and 030-OT-183005 and a pond to the east of Fulfen Wood 030-OT-184004) were not subject to survey. These water bodies are unlikely to be utilised by otter other than occasional seasonal foraging resource due to their small size and not being stocked with fish.

- 7.4.54 Six terrestrial sites were identified within the land required for construction of the original scheme in this area, which have potential to offer breeding habitat for otter:
- Fradley Wood (030-OT2-188004);
  - Big Lyntus Wood (030-OT-188005);
  - Brokendown Wood (030-OT2-188006);
  - Ravenshaw Wood (030-OT2-188011);
  - Vicars Coppice (030-OT2-190007); and
- 7.4.55 St John's Gorse (030-OT-190010).
- 7.4.56 Vicars Coppice (030-OT2-190007) was assessed in part in 2014 and was classed as having limited potential for breeding habitat due to its lack of cover and disturbed nature, despite the good foraging resource in the nearby Trent and Mersey Canal. The other areas of this woodland looked to have more dense cover from the adjacent section of woodland but access for a detailed assessment was not possible.
- 7.4.57 An additional terrestrial site (030-OT2-188013) surrounding the woodland pond at Woodend Common Barn (030-OT2-188012) was also assessed in 2014. Although over 100 m from the original scheme the presence of otter evidence in the form of spraints was found at the pond in the 2014 surveys so a terrestrial assessment was undertaken. The woodland was assessed as having moderate cover with some areas of dense bramble which could conceal an otter holt and has a high quality food source in the form of the pond itself and the nearby Trent and Mersey Canal. Overall this terrestrial site was deemed to be of high suitability for otter breeding. No confirmed breeding sites were identified.

## 8 References

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# Volume 5: Technical Appendices

CFA 16 to 22: Changes to ecology  
baseline data

# Contents

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# 1 Introduction

1.1.1 This document is an appendix which forms part of Volume 5 of the Supplementary Environmental Statement (SES) and Additional Provision 2 Environmental Statement (AP2 ES).

1.1.2 Since September 2013<sup>1</sup> a range of supplementary ecological baseline data has been collected. Table 1 presents a summary of additional ecology baseline survey data collected since September 2013 that does not lead to new or different likely significant environmental effects from those reported within the ES published in November 2013 (i.e. the main ES), for the following community forum areas (CFA):

- CFA16: Ladbroke and Southam;
- CFA17: Offchurch and Cubbington;
- CFA18: Stoneleigh, Kenilworth and Burton Green;
- CFA19: Coleshill Junction;
- CFA20: Curdworth to Middleton;
- CFA21: Drayton Bassett, Hints and Weeford; and
- CFA22: Whittington to Handsacre.

1.1.3 This document should be read in conjunction with Volume 2 (community forum area reports), Volume 3 (route-wide effects assessment) and Volume 4 (off-route effects assessment) of the SES and AP2 ES. Details of all survey work and desk study information gathered since September 2013 which is relevant to this area is provided in Volume 5: Appendix EC-001-003 (Baseline data appendix) and Volume 5 map series EC-01 to EC-010. Volume 5 Appendix EC-003-003 contains a register of local level effects.

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<sup>1</sup> The date after which it was no longer possible to include survey data for the main ES.

SES and AP2 ES Appendix EC-002-003

Table 1 – Summary of changes to ecology baseline data that do not generate new or different significant effects

CFA (number and name)	Receptor	Document and paragraph reference for relevant baseline information within the main ES	Extract of relevant baseline information reported in the main ES	Relevant additional survey undertaken since main ES	Summary of relevant supplementary ecological information	Changes to construction impacts/effects reported in the main ES	Changes to operational impacts/effects reported in the main ES	Implications for ecology mitigation/compensation provision reported in the main ES
CFA16 - Ladbroke and Southam	Assumed great crested newt (GCN) metapopulation at Wormleighton	Volume 2, CFA16, paragraph 7.3.28	Using a precautionary approach, water bodies which have not been surveyed could support breeding populations of great crested newts of medium population size class.	Population size class (PSC) assessment survey of previously unsurveyed pond north of Blind Lane	Pond (030-AA-116012) was found to contain a small PSC of GCN (peak adult count of 1 individuals).	Approximately 0.51 ha of habitat will be lost within the AMP boundary, out of a total of 19.6 ha, comprised of mostly arable fields, with 0.3 km of hedgerows.  This loss of habitat is unlikely to result in a permanent adverse effect on the conservation status of the amphibians within this AMP and will therefore not be significant.	No change	No change
CFA17 - Offchurch and Cubbington	Woodland along Grand Union Canal	Volume 2, CFA17, paragraph 7.3.11	The secondary broadleaved woodland is a small wet woodland composed almost entirely of crack willow trees. This woodland community is a young stand of the alder woodland community W6 <i>Alnus glutinosa-Urtica dioica</i> . Wet woodland is a habitat of	Ancient woodland assessment	Field maple and hairy brome which are ancient woodland indicator species were observed during June 2014. There was evidence of past coppicing in both the western and eastern ends of the woodland, but no evidence of past pollarding or historic woodland landscape features. This area of woodland is not considered to be ancient.	It does not alter the overall valuation of this woodland so no changes to main ES assessment	No change	No change

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CFA (number and name)	Receptor	Document and paragraph reference for relevant baseline information within the main ES	Extract of relevant baseline information reported in the main ES	Relevant additional survey undertaken since main ES	Summary of relevant supplementary ecological information	Changes to construction impacts/effects reported in the main ES	Changes to operational impacts/effects reported in the main ES	Implications for ecology mitigation/compensation provision reported in the main ES
			principal importance but this woodland is degraded in habitat quality. The woodland has local/parish value.					
CFA17 - Offchurch and Cubbington	Woodland continuous with Offchurch Greenway	Volume 2, CFA17, paragraph 7.3.9	Secondary broadleaved woodland and scrub habitats have developed along the Offchurch Greenway. The woodland is a species-poor ash woodland. The woodland is lowland mixed deciduous woodland, a habitat of principal importance. This habitat is of district/borough value.	Ancient woodland assessment	Five ancient woodland indicator species were recorded within the woodland strip during the site visit in June 2014. No ancient or veteran trees, evidence of past coppicing or pollarding, or historic woodland landscape features was observed. Neither this area of woodland, nor the woodland along the Offchurch Greenway, is considered to be ancient.	It does not alter the overall valuation of this woodland so no changes to main ES assessment	No change	No change
CFA17 - Offchurch and Cubbington	Assumed great crested newt (GCN) metapopulation at north of South Cubbington Wood.	Volume 2, CFA17, paragraph 7.3.24	One pond at north of South Cubbington Wood was found to support a small population of GCN. A further two ponds could not be accessed. Overall, a medium sized metapopulation is assumed to be	Population size class (PSC) assessment survey of previously unsurveyed pond at north of South Cubbington Wood	Pond (030-AA-135001) was found to contain a small PSC of GCN (peak adult count of 6 individuals).	Assumed significant adverse effect at the County level is now confirmed.	No change	No change

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CFA (number and name)	Receptor	Document and paragraph reference for relevant baseline information within the main ES	Extract of relevant baseline information reported in the main ES	Relevant additional survey undertaken since main ES	Summary of relevant supplementary ecological information	Changes to construction impacts/effects reported in the main ES	Changes to operational impacts/effects reported in the main ES	Implications for ecology mitigation/compensation provision reported in the main ES
			present.					
CFA18 - Stoneleigh, Kenilworth and Burton Green	Water body south of Burton Green containing great crested newt medium population	Volume 2, CFA18, paragraph 7.3.31	Using a precautionary approach, water bodies which have not been surveyed could support breeding populations of great crested newts of medium population size class.	Population size class (PSC) assessment survey of previously unsurveyed pond at Burton Green.	Pond (030-AA-146006) was found to contain a medium PSC of GCN (peak adult count of 13 individuals).	The water body south of Burton Green (030-AA-146006) will not be lost and there will be minimal terrestrial habitat loss within 250m of the water body, approximately 1.6 ha out of 19.6 ha, comprised mostly of arable field with 0.9km of hedgerow. This habitat loss is unlikely to result in a permanent adverse effect on the conservation status of great crested newt and will not be significant.	No change	No change
CFA18 - Stoneleigh, Kenilworth and Burton Green	Waterbody north of Blind Lane containing great crested newt of small population	Volume 2, CFA18, paragraph 7.3.31	Using a precautionary approach, water bodies which have not been surveyed could support breeding populations of great crested newts of medium population size class.	Population size class (PSC) assessment survey of previously unsurveyed pond north of Blind Lane	Pond (030-AA-144012) was found to contain a small PSC of GCN (peak adult count of 1 individual).	The water body north of Blind Lane will not be lost. However, approximately 3.2 ha, out of 19.6 ha, of habitat will be lost within 250m of the water body, comprised mostly of arable field, with 0.1 ha of woodland and 0.6 km of	No change	No change

SES and AP2 ES Appendix EC-002-003

CFA (number and name)	Receptor	Document and paragraph reference for relevant baseline information within the main ES	Extract of relevant baseline information reported in the main ES	Relevant additional survey undertaken since main ES	Summary of relevant supplementary ecological information	Changes to construction impacts/effects reported in the main ES	Changes to operational impacts/effects reported in the main ES	Implications for ecology mitigation/compensation provision reported in the main ES
						hedgerows. However, 0.5 ha of habitat is for woodland creation and so will not be permanent loss and will only create some disturbance during planting. This habitat loss is unlikely to result in a permanent adverse effect on the conservation status of great crested newt and will not be significant.		
CFA18 - Stoneleigh, Kenilworth and Burton Green	Assumed bat assemblage at Stoneleigh Business Park	Volume 2, CFA18, paragraph 7.3.31	Assemblage of bats using roosting, foraging and commuting habitats at Stoneleigh Business Park, including the River Avon. Evaluated at county/metropolitan value	Bat emergence surveys of previously unsurveyed buildings	Two confirmed building roosts were identified during the 2014 emergence surveys. They are residential buildings which are part of the same property at Barnyard, Crew Lane. A small common pipistrelle roost was found within one building and a small soprano pipistrelle roost within the other. These roosts are north west of the River Avon, within 1 km of Stoneleigh Business Park and not separated from it by major roads such as motorways; they are therefore presumed to be part of the	The two additional building roosts identified in 2014 as part of this assemblage are not due to be demolished, although bats using the roosts may be disturbed during construction. This disturbance would not change the level of significance of effects on the assemblage as stated in the main ES.	No change	No change

SES and AP2 ES Appendix EC-002-003

CFA (number and name)	Receptor	Document and paragraph reference for relevant baseline information within the main ES	Extract of relevant baseline information reported in the main ES	Relevant additional survey undertaken since main ES	Summary of relevant supplementary ecological information	Changes to construction impacts/effects reported in the main ES	Changes to operational impacts/effects reported in the main ES	Implications for ecology mitigation/compensation provision reported in the main ES
					assemblage of bats using roosting, foraging and commuting habitats at Stoneleigh Business Park.			
CFA18 - Stoneleigh, Kenilworth and Burton Green	Hazel dormouse within northern area of Crackley Wood, north-west of Crackley	Volume 2, CFA18, paragraph 7.3.31	Potential populations using woody habitat within the area. There are no records of hazel dormouse, a species of principal importance, in the desk study or from surveys of suitable habitat within 100m of the land required for the construction of the original scheme.		Detailed dormouse surveys have been carried out within northern area of Crackley Wood (030-HD-143004) and no dormice or evidence of the species have been found.	Assumed absence is now confirmed, therefore no change to main ES assessment.	No change	No change
CFA20 - Curdworth to Middleton	Hazel dormouse within North Wood	Volume 2, CFA20, paragraph 7.3.28	Potential populations in suitable woody habitat in the Curdworth to Middleton area. No survey evidence in this area. Desk study records from Kingsbury Wood SSSI are from over 3km to the east of the land required for construction of the original scheme, but there is no	Hazel dormouse survey	Detailed dormouse surveys have been carried out within North Wood (030-HD-168002) and no dormice or evidence of the species have been found.	Assumed absence is now confirmed, therefore no change to main ES assessment.	No change	No change



SES and AP2 ES Appendix EC-002-003

CFA (number and name)	Receptor	Document and paragraph reference for relevant baseline information within the main ES	Extract of relevant baseline information reported in the main ES	Relevant additional survey undertaken since main ES	Summary of relevant supplementary ecological information	Changes to construction impacts/effects reported in the main ES	Changes to operational impacts/effects reported in the main ES	Implications for ecology mitigation/compensation provision reported in the main ES
			connecting woody habitat between Kingsbury Wood SSSI and the land required for the construction of the original scheme.					
CFA20 - Curdwrth to Middleton	Assumed bat roost at Maple Leaf Farm, south of Bodymoor Heath Lane (part of the assemblage within buildings south of Bodymoor Heath Lane)	Volume 2, CFA 20, paragraph 7.3.28	Assemblage of bats using roosts within buildings at a farm south of Bodymoor Heath Lane. Additional buildings nearby were not surveyed.	Initial building survey of previously unsurveyed building. Suspected brown long eared (small number of droppings, DNA analysis failed)	A bat roost was found at Maple Leaf Farm in 2014, just outside the land required for the construction of the original scheme. A brown long-eared roost was suspected.	It does not alter the overall valuation of this assemblage so no changes to main ES assessment.	No change	No change
CFA21 - Drayton Bassett, Hints and Weeford	Assumed bat roost/assemblage at Job's Hill Plantation	Volume 2, CFA 21, paragraph 7.3.29	Potential assemblage of rarer bat species associated with roosting habitat at Job's Hill Plantation. Up to Regional value. Activity and static surveys on the periphery confirm a range of species including common pipistrelle, soprano pipistrelle, brown long-eared bat, It is assumed that the	Bat survey of previously unsurveyed woodland	During 2014, surveys found a roost used by a single pipistrelle in Job's Hill Plantation but did not find any other confirmed roosts in the wood	It does not alter the overall valuation of this assemblage so no changes to main ES assessment.	No change	No change

SES and AP2 ES Appendix EC-002-003

CFA (number and name)	Receptor	Document and paragraph reference for relevant baseline information within the main ES	Extract of relevant baseline information reported in the main ES	Relevant additional survey undertaken since main ES	Summary of relevant supplementary ecological information	Changes to construction impacts/effects reported in the main ES	Changes to operational impacts/effects reported in the main ES	Implications for ecology mitigation/compensation provision reported in the main ES
			wood at Job's Hill could support breeding colonies of both common and 'rarer' species based upon the assemblage recorded within the area.					
CFA21 - Drayton Bassett, Hints and Weeford	Foraging and commuting bat habitat at Job's Hill Plantation	Volume 2, CFA 21, paragraph 7.3.29	Assemblage of bats using foraging and commuting habitats bounded by A5 and A543, centred on Hints (including Job's Hill Plantation and hedgerows)	Bat survey of previously unsurveyed woodland	During 2014, surveys found a roost used by a single pipistrelle in Job's Hill Plantation but did not find any other confirmed roosts in the wood	The main ES did not report the loss of roosts at Job's Hill Plantation. The localised loss of foraging and commuting habitat was predicted to have an adverse effect on the conservation status of the assemblage of bats concerned that will be significant at a district/borough level. The impacts on this assemblage will now include the loss of a known roost used by a single pipistrelle bat. This does not alter the significance of effect on this population.	No change	No change
CFA22 - Whittington to Handsacre	Harvey's Rough woodland	Volume 2, CFA22, paragraph 7.3.16	Harvey's Rough woodland was not surveyed due to access restrictions	Ancient woodland assessment	The site visit in May 2014 recorded only one ancient woodland indicator species, namely wild	It does not alter the overall valuation of this woodland so no changes to main ES	No change	No change

SES and AP2 ES Appendix EC-002-003

CFA (number and name)	Receptor	Document and paragraph reference for relevant baseline information within the main ES	Extract of relevant baseline information reported in the main ES	Relevant additional survey undertaken since main ES	Summary of relevant supplementary ecological information	Changes to construction impacts/effects reported in the main ES	Changes to operational impacts/effects reported in the main ES	Implications for ecology mitigation/ compensati on provision reported in the main ES
			but is likely to support lowland mixed deciduous woodland, habitat of principal importance. It is considered that it is of up to local/parish value.		cherry. It is considered that this woodland is well established, but not ancient.	assessment.		



# Volume 5: Technical Appendices

CFA 16 to 22: Register of local level ecological effects

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# 1 Introduction

- 1.1.1 This document is an appendix which forms part of Volume 5 of the Supplementary Environmental Statement (SES) and Additional Provision 2 Environmental Statement (AP2 ES).
- 1.1.2 Since the main ES published in November 2013 (the 'main ES') a range of supplementary ecological baseline data has been collected. Table 1 provides a summary of additional local/parish level adverse effects on ecological receptors that in light of the new data and/or design changes are considered likely to arise from the construction and operation of the HS2 scheme for the following community forum areas (CFAs):
- CFA16: Ladbroke and Southam;
  - CFA17: Offchurch and Cubbington;
  - CFA18: Stoneleigh, Kenilworth and Burton Green;
  - CFA19: Coleshill Junction;
  - CFA20: Curdworth to Middleton;
  - CFA21: Drayton Bassett, Hints and Weeford; and
  - CFA22: Whittington Heath to Handsacre.
- 1.1.3 Due to the realignment of the AP2 revised scheme in CFA22: Whittington Heath to Handsacre the details in Table 1 for this CFA are a complete replacement for the entries in Volume 5: Appendix EC-005-003 of the main ES; not merely a summary of additional local/parish level adverse effects, as for the remainder of the route.
- 1.1.4 The document should be read in conjunction with Volume 2 (CFA reports), Volume 3 (route-wide effects assessment) and Volume 4 (off-route effects assessment) of the SES and AP2 ES. In addition as this document focuses solely on new information obtained since publication of the main ES it should be read in conjunction with the corresponding Volume 5 Technical Appendix of the main ES (Volume 5: Appendix EC-005-003).

Table 1: Summary of additional local/parish level adverse effects arising from the construction/operation of the HS2 scheme within CFA16 to CFA22 inclusive

CFA	Arising from SES changes or AP2 amendments ? <sup>1</sup>	Habitat, species or species/group	Receptor/location	Effect arising from construction or from operation?	Description of effect prior to 'other mitigation'	Effect addressed by mitigation and/or compensation proposed? (Yes/No)
CFA17	AP2 amendments	Breeding birds on a precautionary basis	Assumed notable bird species using woodland and scrub habitat associated with Offchurch Greenway Cycle Bridge (AP2-C223-066)	Construction	Permanent displacement due to loss of approximately 0.75ha of woodland and scrub habitat providing breeding and wintering habitat. Noise/visual disturbance from construction activities to breeding and wintering birds.	Yes
CFA17	AP2 amendments	Bats on a precautionary basis	Assumed assemblage of bats using foraging and commuting habitats at Offchurch Greenway Cycle Bridge (AP2-C223-066)	Construction	Temporary severance of assumed commuting route along Offchurch Greenway due to loss of approximately 0.75ha woodland and scrub habitat.	Yes
CFA17	AP2 amendments	Badger on a precautionary basis	Assumed badger social territory that includes Offchurch Greenway Cycle Bridge (AP2-C223-066)	Construction	Permanent loss and/or temporary disturbance of active setts if present, and temporary reduction in foraging habitat due to loss of approximately 0.75ha woodland and scrub habitat.	Yes
CFA17	AP2 amendments	Reptiles on a precautionary basis	Assumed reptile population using woodland and scrub habitat associated with Offchurch Greenway Cycle Bridge (AP2-C223-066)	Construction	Permanent loss of approximately 0.75ha of woodland and scrub habitat with limited potential to support common reptile species.	Yes
CFA19	SES changes	Breeding birds	Breeding bird assemblage using habitats within Coleshill Sewage Treatment Works	Construction	Permanent loss of a mosaic of habitats within the Coleshill Sewage Treatment Works, as well as noise and visual disturbance during construction, could result in loss of one or more breeding bird territories from the assemblage using these habitats.	No
CFA19	SES changes	Populations of Warwickshire notable plants: blue fleabane, common cudweed and common meadow-rue	Habitats within Coleshill Sewage Treatment Works	Construction	Permanent loss of mosaic of habitats within the Coleshill Sewage Treatment Works which supports these species.	No
CFA21	AP2 amendments	Watercourse habitat	Gallows Brook near Drayton Lane (AP2-012-21.1)	Construction	Permanent loss of habitat (approximately 50m) and severance of watercourse and its corridor through culvert placement.	No
CFA22	AP2 amendments	Broadleaved plantation woodland	South-west of East Hill, Fradley Business Park	Construction	Under the original scheme, a loss of 1.3 ha of broadleaf woodland was reported. The loss is reduced. Permanent loss of 0.4 ha of broadleaf woodland.	Yes
CFA22	AP2 amendments	Conifer plantation	West edge of Fradley Auction Centre	Construction	Under the original scheme, a loss of 0.5 ha of coniferous woodland was reported. The loss is reduced. Permanent loss of 0.1ha of coniferous woodland.	Yes
CFA22	AP2 amendments	Conifer plantation	Brokendown Wood, adjacent to the Trent and Mersey canal	Construction	Under the original scheme, a loss of 1.0 ha of coniferous woodland was reported. The loss is increased. Permanent loss of 2.1ha of coniferous woodland.	Yes
CFA22		Hedgerows	Hedgerows surveyed along the route of the original scheme	Construction	Permanent residual loss and severance from hedgerows within the area.	Yes
CFA22		Semi-improved grassland	Elfield House, off Darnford Lane	Construction	Permanent loss of 0.2ha of semi-improved grassland.	Yes
CFA22		Semi-improved grassland	Potter's Thatch, Huddlesford	Construction	Permanent loss of 1.2ha of semi-improved grassland.	Yes
CFA22	AP2 amendments	Semi-improved grassland	Field next to Brokendown Wood, Fradley, north side of the Trent and Mersey canal	Construction	Under the original scheme, a loss of 6.5 ha of semi-improved grassland was reported. The loss is reduced. Permanent loss of 1.2ha of semi-improved grassland.	Yes

<sup>1</sup> Where cells are blank this means that there are no changes in the local/parish level effects from the main ES



CFA	Arising from SES changes or AP2 amendments ? <sup>1</sup>	Habitat, species or species/group	Receptor/location	Effect arising from construction or from operation?	Description of effect prior to 'other mitigation'	Effect addressed by mitigation and/or compensation proposed? (Yes/No)
CFA22		Semi-improved grassland	Adjacent to north side of A515, Lichfield road, west of King's Bromley marina	Construction	Permanent loss of 0.1ha of semi-improved grassland.	Yes
CFA22		Semi-improved grassland	North of A515 Lichfield road, west of King's Bromley marina	Construction	Permanent loss of 3.0ha of semi-improved grassland.	Yes
CFA22		Watercourse habitat	Unnamed tributary watercourse of the Mare Brook 48m north of Fulfen Wood, 336m West of Coventry Canal	Construction	Permanent adverse effect on watercourse habitat, form and function due to loss of habitat (approximately 100m) and severance of watercourse and its corridor through culvert placement.	No
CFA22		Watercourse habitat	Mare Brook	Construction	Permanent adverse effect on watercourse habitat, form and function due to loss of habitat (approximately 80m) and severance of watercourse and its corridor through culvert placement.	No
CFA22		Watercourse habitat	Unnamed tributary watercourse of the Mare Brook 320m south west of East Hills	Construction	Temporary adverse effect on watercourse form and function due to realignment of watercourse. Adverse effect will be offset through time as new alignment channel morphology and ecology become established. Potential for betterment over existing baseline as habitats develop.	No
CFA22		Terrestrial invertebrates	Assemblages using habitats at Fradley Wood (030-IT-87001) and Brokendown Wood (030-IT-188001)	Construction	Permanent loss and fragmentation of woodland habitats. Fragmentation and isolation of sites would affect those species with poor means of dispersal. Night time construction working or safety lighting may affect night-flying invertebrates, including moths. This may encourage them to congregate around any illumination and distort natural behaviour.	Yes
CFA22		Fish	Unnamed tributary watercourse of the Mare Brook 48m north of Fulfen Wood, 336m west of Coventry Canal	Construction	Permanent loss of habitat for fish and creation of a barrier to fish movement as a result of culvert placement (approximately 100m).	No
CFA22		Fish	Unnamed tributary watercourse of the Mare Brook 320m south west of East Hill	Construction	Temporary adverse effect on fish populations due to realignment of watercourse. Adverse effect will be offset through time as new alignment channel morphology develops as fish colonisation occurs. Potential for improvement to fish populations as habitats become established.	No
CFA22		Amphibians	Water body (030-AA-182001) west of Whittington	Construction	Permanent loss of terrestrial habitat including fields and hedgerows within 500m of water body.	Yes
CFA22		Amphibians	Water body (030-AA-182002) west of Whittington	Construction	Permanent loss of terrestrial habitat including fields and hedgerows within 500m of water body.	Yes
CFA22		Amphibians	Water body (030-AA-182005) west of Whittington	Construction	Permanent loss of terrestrial habitat including fields and hedgerows within 500m of water body.	Yes
CFA22		Amphibians	Water body (030-AA-183020) south of Wyrley and Essington Canal	Construction	Permanent loss of water body.	Yes
CFA22		Amphibians	Water body (030-AA-188001) north of Big Lyntus Wood	Construction	Permanent loss of 32.3ha of woodland, field and hedgerows within 500m of water body.	Yes
CFA22		Amphibians	Water body (030-AA-188018) north west of Big Lyntus Wood	Construction	Permanent loss of terrestrial habitat including woodland, fields and hedgerows within 500m of water body.	Yes
CFA22	AP2 amendments	Amphibians	Water body (030-AA-188019) north west of Ravenshaw Wood	Construction	Permanent loss of water body.	Yes
CFA22	AP2 amendments	Amphibians	Water body (030-AA-188020) west of Ravenshaw Wood	Construction	Permanent loss of waterbody.	Yes
CFA22	AP2 amendments	Amphibians	Water body (030-AA-188029) north west of Brokendown Wood	Construction	Permanent loss of terrestrial habitat including woodland, fields and hedgerows within 500m of water body.	Yes
CFA22		Amphibians	Water body (030-AA-188030) north west of Brokendown Wood	Construction	Permanent loss of terrestrial habitat including woodland, fields and hedgerows within 500m of water body.	Yes
CFA22		Amphibians	Water body (030-AA-189001) south of Kings Bromley Marina	Construction	Permanent loss of water body.	Yes
CFA22	AP2 amendments	Amphibians	Water body (030-AA-189005) west of Ravenshaw Wood	Construction	Permanent loss of water body.	

CFA	Arising from SES changes or AP2 amendments ? <sup>a</sup>	Habitat, species or species/group	Receptor/location	Effect arising from construction or from operation?	Description of effect prior to 'other mitigation'	Effect addressed by mitigation and/or compensation proposed? (Yes/No)
CFA22		Amphibians	Water body (030-AA-189013) west of Ravenshaw Wood	Construction	Permanent loss of terrestrial habitat including woodland, fields and hedgerows within 500m of water body.	Yes
CFA22		Amphibians	Water body (030-AA-189016) west of Ravenshaw Wood	Construction	Permanent loss of water body.	Yes
CFA22		Amphibians	Water body (030-AA-189018) south- east of Kings Bromley Marina	Construction	Permanent loss of terrestrial including woodland, fields and hedgerows within 500m of water body.	Yes
CFA22		Amphibians	Water body (030-AA-189024) south- west of Kings Bromley Marina	Construction	Permanent loss of terrestrial habitat including woodland, fields and hedgerows within 500m of water body.	Yes
CFA22	AP2 amendments	Amphibians	Water body (030-AA-189027) south- west of Kings Bromley Marina	Construction	Permanent loss of water body.	Yes
CFA22		Amphibians	Water body (030-AA-189029) south- west of Kings Bromley Marina	Construction	Permanent loss of water body.	Yes
CFA22	AP2 amendments	Amphibians	Water body (030-AA-189039) south- west Ravenshaw Wood	Construction	Permanent loss of water body.	Yes
CFA22	AP2 amendments	Amphibians	Water body (030-AA-189041) south- west of Ravenshaw Wood	Construction	Permanent loss of water body.	Yes
CFA22		Amphibians	Water body (030-AA-190002) at Vicars Coppice	Construction	Permanent loss of terrestrial habitat including woodland, fields and hedgerows within 500m of water body.	Yes
CFA22		Amphibians	Water body (030-AA-190022) at Vicars Coppice	Construction	Permanent loss of terrestrial habitat including woodland, fields and hedgerows within 500m of water body.	Yes
CFA22		Amphibians	Water body (030-AA-190023) north of Vicars Coppice	Construction	Permanent loss of water body.	Yes
CFA22		Amphibians	Water body (030-AA-190025) west of Kings Bromley Marina	Construction	Permanent loss of water body.	Yes
CFA22		Amphibians	Water body (030-AA-190026) west of Kings Bromley Marina	Construction	Permanent loss of water body.	Yes
CFA22		Amphibians	Water body (030-AA-190028) west of Vicars Coppice	Construction	Permanent loss of water body.	Yes
CFA22		Amphibians	Water body (030-AA-191002) north- east of Harveys Rough	Construction	Permanent loss of terrestrial habitat including woodland, fields and hedgerows within 500m of water body.	Yes
CFA22	AP2 amendments	Amphibians	Water body (030-AA-191005) north-east of Harveys Rough	Construction	Permanent loss of terrestrial habitat including woodland, fields and hedgerows within 500m of water body.	Yes
CFA22	AP2 amendments	Amphibians	Water body (030-AA-191028) south of Tuppenhurst	Construction	Permanent loss of small section of ditch.	Yes
CFA22	AP2 amendments	Amphibians	Water body (030-AA-191031) north of Hanch	Construction	Isolation of water body in small parcel of woodland surrounded by railway lines.	Yes
CFA22	AP2 amendments	Amphibians	Water body (030-AA-191033) north-east of Hanch	Construction	Permanent loss of water body.	Yes
CFA22	AP2 amendments	Amphibians	Water body (030-AA-192002) south-east of Handsacre	Construction	Permanent loss of terrestrial habitat including woodland, fields and hedgerows within 500m of water body.	Yes
CFA22		Reptiles	Common lizard population at Whittington Heath Golf Course	Construction	Permanent partial loss of land supporting a low population size class of common lizards.	Yes
CFA22		Breeding and wintering birds	Dunnock, stock dove, song thrush using Ravenshaw, Black Slough and Slaish SBI	Construction	Permanent displacement due to loss of breeding habitat for common notable woodland species within Ravenshaw, Black Slough and Slaish SBI. Noise and visual disturbance from construction activities to both breeding and wintering birds.	Yes
CFA22		Breeding and wintering birds	Notable species using Fradley Wood SBI	Construction	Permanent displacement due to loss of breeding habitat for common notable woodland species within Fradley Wood SBI. Noise and visual disturbance from construction activities to both breeding and wintering birds. Bullfinch, dunnock, green woodpecker, mistle thrush, redwing (winter only), stock dove, spotted flycatcher (breeding only), song thrush, woodcock (winter only) and willow warbler (breeding only)	Yes

CFA	Arising from SES changes or AP2 amendments ? <sup>1</sup>	Habitat, species or species/group	Receptor/location	Effect arising from construction or from operation?	Description of effect prior to 'other mitigation'	Effect addressed by mitigation and/or compensation proposed? (Yes/No)
CFA22		Breeding and wintering birds	Assumed notable species using Vicar's Coppice BAS	Construction	Permanent displacement due to loss of breeding and wintering habitat for common notable woodland species within Vicar's Coppice BAS. Noise and visual disturbance from construction activities to both breeding and wintering birds. This area of woodland to be lost consists of degraded edge habitat. It was not surveyed for birds, but is likely to support low numbers of common notable woodland species.	Yes
CFA22	AP2 amendments	Breeding and wintering birds	Assumed notable species using Fulfen Wood	Construction	Permanent displacement due to loss of breeding and wintering habitat within Fulfen Wood. Noise and visual disturbance from construction activities to both breeding and wintering birds. This area of woodland was not surveyed for birds, but is likely to support low numbers of common notable woodland species.	Yes
CFA22		Breeding and wintering birds	Dunnock, stock dove, and song thrush using Ravenshaw, Black Slough and Slaish SBI	Operation	Permanent but discontinuous impact of noise from passing trains may displace some notable species, reducing breeding density	Yes
CFA22	AP2 amendments	Breeding and wintering birds	Notable species using Fradley Wood SBI	Operation	Permanent but discontinuous impact of noise from passing trains may displace some notable species, reducing breeding density	Yes
CFA22	AP2 amendments	Breeding and wintering birds	Notable species using Fulfen Wood	Operation	Permanent but discontinuous impact of noise from passing trains may displace some notable species, reducing breeding density	Yes
CFA22		Bats	Bat assemblage using habitats associated with Fulfen Wood, Coventry Canal and Watery Bridge	Construction	Permanent loss and severance of habitats within the land required for construction of the original scheme. Surveys found overall low levels of activity by common pipistrelle and soprano pipistrelle, both of these are commoner species. Individual passes by noctule, Leisler's, serotine, and <i>Myotis</i> species were also recorded occasionally throughout the survey periods; indicative of passage or transient use rather than core foraging or commuting habitats for these species, which are rarer within the UK. Connectivity along the Coventry Canal will be retained.	Yes
CFA22		Bats	Assemblage of bats using habitats associated with the urban and arable habitats south east of Handsacre between Lichfield Road and Tuppenhurst Lane	Construction	Permanent loss and severance of habitats within the land required for construction of the original scheme. Surveys found overall low levels of activity of common and soprano pipistrelle and <i>Myotis</i> species associated with arable field boundaries. Individual passes by noctule, Leisler's and serotine were recorded occasionally during static surveys indicative of passage or transient use rather than core foraging or commuting habitat for these species.	Yes
CFA22		Bats	Population of brown long-eared using a building roost	Construction	Temporary disturbance to a summer (non-breeding) roost used by small numbers of brown long-eared bat from vibration and noise during construction. Found at a residential building along the outskirts of Handsacre, probably used by males and/or non-breeding females. Brown long-eared droppings (100+ droppings) were identified during inspection survey.	Yes
CFA22	AP2 amendments	Bats	Population of soprano pipistrelle using unidentified tree in the southern section of Black Slough Wood	Construction	Temporary disturbance to a summer (non-breeding) roost used by small numbers of soprano pipistrelle bats from noise and vibration during construction. Found at an unidentified tree along the edge of Black Slough Wood. Five soprano pipistrelles were recorded to return to the tree during one emergence survey.	Yes
CFA22	AP2 amendments	Badger	At least eight social groups with territories located wholly within or partly within the original scheme	Construction	Permanent loss of two active main setts, one active outlier sett and seven partially active outlier setts.	Yes
CFA22	AP2 amendments	Badger	At least eight social groups with territories located wholly within or partly within the original scheme	Operation	Permanent loss of individual badgers due to collision with trains	Yes



# Volume 5: Technical Appendices

## CFA22: Bat Trapping/Radio Tracking Study

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# 1 Introduction

- 1.1.1 This document is an appendix which forms part of Volume 5 of the Supplementary Environmental Statement (SES) and Additional Provision 2 Environmental Statement (AP2 ES). It details supplementary ecological baseline data relating to trapping and radio tracking of bats in Community Forum Area (CFA) 22 Whittington to Handsacre, which has been conducted since the publication of the main ES in November 2013 (the 'main ES').
- 1.1.2 The document should be read in conjunction with Volume 2, CFA22, Section 7 of the Phase One main Environmental Statement (ES)<sup>1</sup> and Volume 2, CFA22, Section 7 of the SES. In addition, as it focuses solely on new information obtained since the main ES it should be read in conjunction with the following corresponding Volume 5 Technical Appendices of the main ES:
- Habitat survey results in Volume 5 Appendix EC-001-003; and
  - Bat survey results in Volume 5 Appendix EC-003-003.
- 1.1.3 This report details trapping and radio tracking works undertaken to investigate the distribution of bats within, and in the vicinity of, Ravenshaw Wood, Black Slough and the Slaish woodlands centred on OS Grid Reference SK11873 14012 in Staffordshire.
- 1.1.4 The focus of the work was identifying habitat use by the diverse bat populations present. All species of bat are fully protected under The Conservation of Habitats and Species Regulations 2010 (as amended)<sup>2</sup> through their inclusion on Schedule 2.
- 1.1.5 Field surveys were completed within and surrounding Ravenshaw Wood, Black Slough and the Slaish and the adjacent Trent and Mersey Canal during 2012 and 2013 to support the main ES. These surveys, which included static detector, transect, tree climbing and backtracking surveys, confirmed the presence of a diverse assemblage of bat species including: Leisler's bat, noctule, brown long-eared bat, Daubenton's bat, Natterer's bat, common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle and serotine<sup>3</sup>.
- 1.1.6 Tree roosts were confirmed within the woodlands during the 2012/2013 field surveys. One tree roost within Black Slough, in land required for construction of the original scheme, was found to support roosting noctule bats. A further two tree roosts at Black Slough (species unknown), could support individuals of Daubenton's bat, Natterer's bat, Leisler's bat, noctule, Nathusius' pipistrelle or serotine.

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<sup>2</sup> The Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora (the Habitats Directive), is the means by which the European Community meets its obligations as a signatory of the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention). The provisions of the Directive require Member States to introduce a range of measures including the protection of species listed in the Annexes; to undertake surveillance of habitats and species and produce a report every six years on the implementation of the Directive.

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<sup>3</sup> Identified in the main ES (Volume 2, CFA22, Chapter 7, Table 12) as 'an Assemblage of bats using Trent and Mersey Canal and adjacent woodlands (Ravenshaw Wood, Black Slough, the Slaish and Fradley Wood)'. Detailed bat survey results from 2012/13 are presented in the main ES (Volume 5: Appendix EC-003-003).

- 1.1.7 Both the original scheme and the AP2 revised scheme would affect confirmed roosts within, and in the immediate vicinity of, the woodlands, as well as a number of trees with high and moderate potential to be used by roosting bats. Given the number of trees to be removed, this could remove a large proportion of the available roosting resource for the bat assemblage.
- 1.1.8 The 2012/13 field surveys also identified commuting and foraging habitat connectivity along the Trent and Mersey Canal and around the woodlands. Connectivity along the Trent and Mersey Canal will be retained although woodland clearance will result in effects on key bat foraging habitat and the severance of commuting routes along woodland edges and connecting hedgerows.
- 1.1.9 The main ES identified that there could be an increased risk of collision of bats with trains in the vicinity of Ravenshaw Wood and Black Slough, where the railway will be on low embankment immediately adjacent to retained section of woodland. This would be as a result of bats gliding at low height from roost sites and following established commuting routes along woodland edges crossed by the route of the original scheme. Low flying *Myotis* species, brown long-eared bats and noctules leaving roost sites at low height would be particularly at risk.
- 1.1.10 Although the field techniques used in 2012 and 2013 identified key areas used by a diverse assemblage of roosting, foraging and commuting bats, the survey techniques limited the scope to link individual roosting bats with the key commuting and foraging areas. As a consequence the main ES was based on a precautionary assessment of potential impacts in this area. Therefore the trapping and radio-tracking work aimed to provide further information on habitat use by bats to inform the detailed design and relevant protected species licence applications.
- 1.1.11 The trapping and tracking work was carried out with reference to the original scheme. Therefore, within this appendix, where references are made to the route they refer to the original route. The effects of the AP2 amendments are described in Volume 2, CFA22, Section 7 of the SES.
- 1.1.12 The study area for the tagging and radio-tracking work is shown on Figure EC-19-001.



## 2 Methodology

### 2.1 Data gathering

2.1.1 Initially an assessment of potential use of habitats by all species of bats within the vicinity of Ravenshaw Wood, Black Slough and the Slaish was made utilising data from the following sources: Ordnance Survey maps, aerial photography, Staffordshire Biological Records Centre, Phase 1 habitat surveys carried out in support of the assessment (main ES Volume 5, Appendix EC-001-003, Section 4); and from detailed bat surveys carried out in support of the assessment (main ES Volume 2: CFA22 Whittington to Handsacre, Section 7 Ecology; and Volume 5: EC-003-003).

### 2.2 Trapping

2.2.1 A licence was granted by Natural England (Licence Number 2014/SCI/0415) in May 2014 to radio-tag a maximum of five bats of each bat species caught.

2.2.2 Trapping was carried out in various locations within and adjacent to Ravenshaw Wood, Black Slough and the Slaish, as well as locations along the Trent and Mersey Canal.

2.2.3 Trapping locations were selected to include a range of habitat types associated with the woodlands. Locations on the interior of the woodland were selected with the aim of capturing bats which use the wood for foraging, such as brown long-eared bat and Natterer's bat. Woodland edge locations were selected with the aim of capturing both edge specialists, such as common and soprano pipistrelle, and bats which use the woodland edges for commuting. The canal side locations were selected to target commuting bats in order to allow the importance of this corridor to be assessed, as well as capture species which are commonly associated with aquatic habitats such as Daubenton's bat and Nathusius pipistrelle. Woodland edge habitat along the canal was targeted as optimal habitat for serotine. The overall aim was to ensure that the range of trapping locations would cover the diversity of habitats present and also provide opportunity to capture key target species such as Nathusius pipistrelle and serotine.

2.2.4 Trapping was carried out during three sessions, with between three and four nights trapping in each session:

- session 1: 29-31 May 2014 (three nights);
- session 2: 28-31 July 2014 (three nights); and
- session 3: 23-24 and 26-27 August 2014 (four nights).

2.2.5 Trapping locations are shown on Figure EC-20-001 and detailed in Table 1.

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Table 1 - Details of trapping locations used during the surveys

Date	Trapping locations and trap details <sup>4</sup>	Location/Description	Weather Conditions
29/05/2014	T1 (6m, mid) SK11994, 14003 T2 (6m, mid) SK11994,14003 T3 (9m, triple high) SK11994,14003 T4 (2m, mid) SK12000,14011 T5/6 (6m, high & low) SK12000,14011 T7 (9m wide, mid) SK12000,14011 T8 (Harp trap, no lure) SK12000,14011	Woodland between Ravenshaw wood and the Slaish. Trapping locations were between Ravenshaw Cottage and the Trent and Mersey Canal. Woodland interior.	11.4°C at start with no wind and up to 100% cloud cover; no rain during the trapping period.
30/05/2014	T1 (6m, mid) SK12448,13744 T2 (6m, mid & high) SK12448,13744 T3/T4 (2m, low and 6m, high) SK12448,13744 T5 (9m, high) SK12453 13757 T6 (6m, mid) SK12459,13821 T7 (Harp trap, no lure) SK12056 14017	Ravenshaw wood. Trapping locations were to the north of the wood including within the land required for construction of the original scheme with a trap closer to the Trent and Mersey Canal which runs along the northern boundary. Woodland interior and edge.	12.3°C at start with no wind and up to 50% cloud cover; no rain during the trapping period.
31/05/2014	T1 (6m, mid) SK11682,13946, T2 (2m, mid and 9m triple high) SK11712,13947 T3 (6m, mid) SK11727,13961 T4 (6m, high) SK11622,14307 T5 (6m, low) SK11623,14303 T6 (9m, mid) SK11621,14257 T7 (6m, low) SK11645,14243 T8 (6m, high) SK11654,14239 T9 (Harp trap with Apodemus lure) SK11626,14249	The Slaish and Black Slough woods. Trapping locations were along the western boundaries with arable land. Woodland edge.	15°C at start with no wind and 25-90% cloud cover; no rain during the trapping period.
28/07/2014	T1 (Harp trap with Apodemus lure) SK1230213563 T2 (6m, low) SK1229813590 T3 (9m, triple high) SK122731367 T4 (3m, high) SK1228913670 T5 (9m, mid) SK1226713678 T6 (9m, low) SK12261 13686	Two trapping areas. Area 1 is woodland between Ravenshaw wood and the Slaish. Trapping locations were along the southern boundary with arable land. Woodland edge.  Area 2 is within the arable land to the immediate west of Ravenshaw wood.	17°C at start with no wind and 25% cloud cover; no rain during the trapping period.

<sup>4</sup> All traps were mist nets unless stated otherwise. Numbers in brackets refer to width of trap and height, therefore (6m, mid) refers to a 6m wide net position at head height or above. Nets set at a low height were generally below head height and nets set high were generally at tree canopy height. 'Triple high' denotes three nets on the same poles set at low, mid and high height.

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Date	Trapping locations and trap details <sup>4</sup>	Location/Description	Weather Conditions
	<p>T7 (9m, triple high with AT100 lure) SK1229813590</p> <p>T8 (9m, mid) SK12320 13808</p>		
29/07/2014	<p>T1 (9m mid) SK1212513933</p> <p>T2 (6m low) SK1212113933</p> <p>T3 (9m triple high + AT100 lure) SK1202113930</p> <p>T4 (9m low) SK1200113910</p> <p>T5 (6m mid) SK1199613894</p> <p>T6 (6m mid) SK1196713851</p> <p>T7 (Harp trap + Apodemus lure) SK 12126 13934</p>	<p>Woodland between Ravenshaw Wood and Slaish. Trapping locations are along the southern edge boundary with arable land. Woodland edge.</p>	<p>16°C at start with light wind and 25% cloud cover; no rain during the trapping period.</p>
30/07/2014	<p>T1 (6m mid) SK1232913821</p> <p>T2 (9m triple high + AT100 lure) SK1228813836</p> <p>T3 (9m mid) SK1223713802</p> <p>T4 (6m mid) SK1218613833</p> <p>T5 (9m low) SK1217613873</p> <p>T6 (Harp Trap and Apodemus lure) SK 12182 13894</p> <p>T7 (6m low) SK1214013755</p>	<p>Woodland between Ravenshaw wood and the Slaish. Trapping locations are on the southern boundary with the adjacent arable field. Woodland edge.</p>	<p>15°C at start with light wind and 15% cloud cover; no rain during the trapping period.</p>
31/07/2014	<p>T1 (Harp Trap and Apodemus lure) SK1299713288</p> <p>T2 (9m mid) SK1301313283</p> <p>T3 (3m mid) SK1301913279</p> <p>T4 (2m low) SK1302213283</p> <p>T5 (9m low) SK1300313310</p> <p>T6 (6m low) SK1300613312</p>	<p>Woodland to the north of the Trent and Mersey Canal, on the bend to the south-east of Woodend Lock. Trapping locations were within the woodland and along the towpath. Woodland interior and Canal side.</p>	<p>17.1°C at start with no wind and 10-95% cloud cover; no rain during the trapping period.</p>
23/08/2014	<p>T1 (9m mid) SK1268613696</p> <p>T2 (12m mid) SK1268013705</p> <p>T3 (6m mid) SK1263213613</p> <p>T4 (6m mid) SK1262513682</p> <p>T5 (6m triple high (2 nets) + AT100 lure) SK1258913664</p> <p>T6 (6m mid) SK1257313657)</p> <p>T7 (9m mid) SK1254493640)</p> <p>T8 (Harp Trap and Apodemus lure) SK 12675 13713</p>	<p>Ravenshaw wood. Trapping locations are along the north-eastern boundary with arable lane. Two traps situated along the Trent and Mersey Canal. Woodland edge and Canal side.</p>	<p>12°C with light wind and 0-30% cloud cover; no rain during the trapping period.</p>

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Date	Trapping locations and trap details <sup>4</sup>	Location/Description	Weather Conditions
24/08/2014	T1 (rope 2m low/mid) SK1180714289 T2(12m mid) SK1181914272 T 3 (6m low) SK1182514257 T 4 (9m mid) SK1184714219 T5 ( triple high and AT100 lure (2 nets)) SK1184714219 T6 (6m mid) SK1186814190 T 7 (Harp trap and Apodemus lure) SK118141	Rices Coppice to the north of the Trent and Mersey Canal. Trapping locations were along the towpath beside this woodland. Canal side.	13.3°C at start with light wind and 80-87% cloud cover; no rain during the trapping period.
26/08/2014	T1 (6m mid) SK1160813665 T2 (2m mid) SK1161813671 T 3 (6m mid) SK1162813680 T4 (3m mid) SK1167013750 T5 (triple high + AT100 lure) SK1167913735 T6 (9m mid) SK1172413730 T 7 (6m mid) SK1161313704 T 8 (Harp trap and Apodemus lure) SK 1166013804	South-western corner of Black Slough wood. Trapping locations were along the edges of the woodland with arable beyond. Woodland Edge.	11.9°C at start with no/light wind and 0-30% cloud cover; no rain during the trapping period.
27/08/2014	T1 (6m mid) SK1218913507 T2 ( 6m mid) SK1218513537 T3 (6m mid) SK1219313535 T4 (9m mid) SK1225513521 T5 (12m mid) SK1229513534 T6 (9m mid) SK1230013556 T7 (triple high + AT100 lure) SK1229413547 T8 (6m high) SK1230913549 T 9 (Harp trap and Apodemus lure) SK1220213482	Projection of woodland which extends from the south-western edge of Ravenshaw wood. Trapping locations were along the northern edge of this projection with arable beyond. Woodland edge.	17.3°C at start with no/light wind and 30-50% cloud cover; slight drizzle for a few minutes at 23:30.

2.2.6 Trapping effort included the use of between five and eight mist nets plus one harp trap on each trapping evening. A range of mist net sizes were used (2m, 3m, 6m, and 9m, with a 50 denier, 38mm mesh size) and a single 2m by 2m harp trap was used (Faunatech Austbat 2 bank). An ultrasonic lure (Apodemus BatLure) was used in combination with the harp trap at the majority of trapping locations and on some trapping evenings a second sonic lure (Binary Acoustic Technology AT100 Ultrasonic Transmitter) was used in conjunction with a triple-high mist net. The lures were programmed to play a combination of social calls to attract flying bats and increase the likelihood of catching bats.

- 2.2.7 Trapping commenced at sunset and terminated between 23:30 and 00:30. Conditions were suitable throughout the trapping sessions with temperatures remaining above 8°C and without heavy rain or wind.
- 2.2.8 Upon capture, bats were removed from the traps under the supervision of the licence holder and by ecologists with a Natural England bat licence or a suitably experienced and qualified person (under the direction of the licence holder) and transferred to a clean cloth bag. The bats were then sexed, weighed, forearm measured, reproductive status ascertained and any other general health observations noted.
- 2.2.9 Body mass and forearm length were measured respectively with a digital scale to the nearest 0.1g and a calliper to the nearest 0.1mm. Sex was assessed by inspecting genitalia (Racey, 1988<sup>5</sup>; Haarsma, 2008<sup>6</sup>), and wings were trans-illuminated to distinguish juveniles from adults, the former showing cartilage epiphyseal plates in finger bones and more tapered finger joints (Anthony, 1988<sup>7</sup>). Reproductive status was assessed according to Racey (1988; Haarsma, 2008).
- 2.2.10 Any bats selected for radio-tagging were retained to have a radio-transmitter attached and all other bats were released as soon as possible during the hours of darkness on the trapping evening. Only bats considered suitably healthy and of a minimum weight were selected for radio-tagging; the weight of the radio-tag needing to be less than 5% of the animals weight. Female bats, and in particular reproductive females, were radio-tagged in preference to male bats to identify important breeding colonies. The tagging of heavily pregnant females was avoided.
- 2.2.11 Transmitters were attached dorsally between the shoulder blades, after clipping a small amount of fur from this area, using Torbot Ostomy Skin Bonding Adhesive Cement Glue<sup>12</sup> (Torbot Group. Inc., Cranston (RI), USA). The animals fitted with radio-transmitters were released immediately on the same night of capture once the transmitter was made secure.
- 2.2.12 Bat droppings collected during the processing of individual small *Myotis* bats (whiskered/Brandt's/Alcathoe) were transferred to a sterile sample pot for subsequent DNA analysis, in order to determine the potential presence of these cryptic species in the study area.

## 2.3 Radio-tracking

- 2.3.1 Once trapped and tagged the released bats were immediately radio tracked using receiver equipment. Each individual bat was tracked overnight between dusk and dawn, terminating between 00:00 and dawn. A combination of homing, close-

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<sup>5</sup> Racey, P.A., 1988. Reproductive assessment in bats. In: Kunz, T.H. (Ed.), *Ecological and Behavioural Methods for the Study of Bats*. Smithsonian Institution Press, Washington DC and London, pp.31–45.

<sup>6</sup> Haarsma A-J., 2008. Manual for assessment of reproductive status, age and health in European Vespertilionid bats. Electronic publication Version 1. First released 12-09-2008. Hillegom (Holland)

<sup>7</sup> Anthony, E.L.P., 1988. Age determination in bats. In: Kunz, T.H. (Ed.), *Ecological and Behavioural Methods for the Study of Bats*. Smithsonian Institution Press, Washington DC and London, pp.47–58.

approach and sequential triangulation methods were used<sup>8,9,10</sup> depending on accessibility.

- 2.3.2 The bats were tracked as close as possible by car and on foot using a Biotrack 'Sika' receiver and a Yagi 3-element antenna and/or a dipole antenna attached to a car roof. To determine the direction in which to follow bats strongest signal strength was used. The surveyor then recorded the time, compass bearing, GPS reading and signal strength onto data sheets in the field.
- 2.3.3 The assumed activity by the bat was recorded. Rapid, directional movements between distant sites were classified as commuting; a bat which kept flying within a defined area of variable size was recorded as foraging. In areas where it was not possible to use the close approach method the surveyors carrying out the tracking used the local road network to circle around the area in which the tagged animal was assumed to be and repeated bearings (sequential triangulation), using the direction of the strongest signal, were taken. Each new location was at least 50m apart and a new bearing taken approximately every ten minutes. If the signal could not be heard or was lost then the surveyor would move on foot or by car around the study area until a signal was picked up.
- 2.3.4 The directional receivers were also used to determine the position of radio-tagged bats during the day (daytime roost locations). The position of bats was located using the homing methodology (Russo et al., 2002<sup>11</sup> and Entwistle et al. 2006<sup>12</sup>). The location of each tree roost was recorded using a GPS and, where possible, the roost cavity was identified using the directional antenna and using binoculars from the ground.
- 2.3.5 Emergence surveys were carried out on Ivy Leigh Cottage adjacent to the Trent and Mersey Canal and at a farm shed at Black Slough Farm.

## 2.4 Bat box checks

- 2.4.1 During the initial radio-tracking surveys a key foraging area for Daubenton's bat was identified at Fradley Reservoir and it was noted that there were several bat boxes which had been erected on trees in the woodlands surrounding the reservoir. The bat licence was amended such that any bats encountered in these boxes during a bat box check could be radio-tagged (as this would have been less disturbing to bats than trapping).
- 2.4.2 The 29 boxes were checked on 23 August 2014 by bat licensed ecologists, accompanied by an ecologist from the Canals and Rivers Trust who own the land at Fradley Reservoir. Any bats found were identified and then immediately returned to

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<sup>8</sup> White GC & Garrott RA (1990) Analysis of wildlife radio tracking data. Academic Press, San Diego, California, USA

<sup>9</sup> Razgour, O. Hanmer, J. and Jones, G. (2011) Using multi-scale modelling to predict habitat suitability for species of conservation concern: The grey long-eared bat as a case study

<sup>10</sup> Parsons, K.N. and Jones, G. (2003) Dispersion and habitat use by *Myotis daubentoni* and *Myotis Nattereri* during the swarming season: implications for conservation

<sup>11</sup> Russo D., Jones G. & Migliozzi A. (2002), *Habitat selection by the Mediterranean horseshoe bat, Rhinolophus euryale* (Chiroptera: Rhinolophidae) in a rural area of southern Italy and implications for conservation. Biological Conservation 107: 71-81.

<sup>12</sup> Entwistle, A.C. Racey, P.A. Speakman, J.R (1996), *Habitat exploitation by a gleaning bat, Plecotus auritus*. Physiological Transactions of the Royal Society of London 351B: 921-931.

the same bat box from which they were taken. No bats suitable for radio tagging were found.

## 2.5 Culvert roost checks

- 2.5.1 A night roost was identified in a brick lined culvert beneath the Trent and Mersey Canal, carrying the Curborough Brook, during a trapping session in July. This was initially assessed by the licence holder and the species and roost status identified. This roost was subsequently checked on the 3rd August at 23.53, the 12th August at 23:09 and the 8th September at 22.25 by licenced bat workers using a torch to undertake a count of the number of bats roosting within the culvert.

## 2.6 Limitations

- 2.6.1 The accuracy of the GPS unit used to record the locations of the traps was often not precise due to the dense cover of woodland at trapping sites. Maps were made of the trap positions by hand during the surveys and, where the GPS locations for traps had low accuracy the location of the traps was plotted by hand.
- 2.6.2 Habitats over 100m from the land required for construction of the original scheme had restricted access which included assumed core foraging habitats for a number of bats. Restricted access affected the accuracy of some of the bearings obtained during the radio tracking. A number of roosts to the south of the Scheme could not be accessed for further investigations; these include those associated with Hall Farm, Elmhurst (SK 11008 12400 and SK 11078 12354); the Craft Centre at Curborough (SK12507 11969); and a tree roost associated with Lichfield Golf Course (SK10340 13304).
- 2.6.3 Surveyors very rarely made visual contact with the bats they were tracking which limited information on behaviour such as flight height and exact route of commuting corridors.
- 2.6.4 Radio tracking surveys commenced on 29 May 2014 and continued until 11 September 2014. This covers the maternity season for bats which is when the breeding females are occupying the roosts which are of highest conservation value to the population. As the population dynamics for each species varies through the year, trapping during this period may have affected which species were caught. The reproductive status and the ratio of males to females caught may also have been affected by timing of trapping period, as these factors may vary during the spring or autumn transitional periods.
- 2.6.5 The signal strength from the radio tag can vary according to the terrain and height of the tagged bat as well as according to its distance from the receiver. Therefore, signal strength is not a straightforward measure of distance from the bat and the accuracy of identifying the location bats through radio-tracking is limited.
- 2.6.6 Two bats (Bat 4 and Bat 7) had radio tags which emitted signals at very similar frequencies and this sometimes prevented the signal being attributed confidently to one bat or the other. This limitation did not affect the identification of the roosting sites as an emergence survey was conducted to confirm the species which emerged.

## 3 Results

### 3.1 Trapping

- 3.1.1 A total of 67 bats were caught during the three trapping sessions. The full details of the trapping survey results are given in Table 2. Seventeen of the bats caught during the trapping sessions had radio tags fitted and were tracked during the period 29 May 2014 to 11 September 2014. These bats are detailed in Table 2.
- 3.1.2 The trapping locations along the edge of Ravenshaw Wood provided the largest number of bat captures with 14 bats each on two separate nights. Other woodland edge and canal side locations were the next most successful with between three and seven bats captured on a number of occasions. Locations within the interior of woodland habitat were generally less successful, with nil captures being recorded on some nights.
- 3.1.3 Ten samples of *Myotis* sp. droppings, were collected during the processing of 11 possible Brandt's/whiskered bats to distinguish between these species which can be difficult to identify in the hand. DNA samples were sent to the University of Warwick for analysis. Where the samples were successfully processed, the identification is reflected in the species list in Table 2.

Table 2 - Details of bats trapped and tagged during the surveys

Date	Time of capture	Net location	Species	Sex (Male/Female)	Age (Adult/Juvenile)	Reproductive status <sup>33</sup>	Weight (g)	Forearm length (mm)	Notes <sup>34</sup>
30 May 2014	21.40	T4	<i>Plecotus auritus</i>	Female	Adult	Non-breeding	7.5	39.9	Kept in case no other bats caught - released without tag.
30 May 2014	21.40	T2 (low)	<i>Pipistrellus pygmaeus</i>	Male	Adult	Swollen epididymis, testes (1), orange buccal glands (1)	4.5	30.8	
30 May 2014	22.35	T4	<i>Myotis brandtii</i>	Male	Adult	Swollen epididymis	11	34.9	Tagged (Bat 1). 5cm removed from antenna length leaving 15cm. Dropping collected for DNA analysis.

<sup>33</sup> Epididymis (part of male reproductive system) swelling indicates male in breeding condition. Where numbers are given in brackets these indicate a relative size of swollen testes or epididymis as subjectively ascribed by the licence holder where 0 is not visible and 3 is largest. Nipple parous indicates a female bat which has given birth one or more times. Buccal glands are in the corners of the mouth; these swell in the mating season and their colour can aid species identification. Post-lactating indicates a female which has given birth and suckled young.

<sup>34</sup> (Bat #) – Indicates ID given to bat for tracking survey



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Date	Time of capture	Net location	Species	Sex (Male/Female)	Age (Adult/Juvenile)	Reproductive status <sup>23</sup>	Weight (g)	Forearm length (mm)	Notes <sup>24</sup>
30 May 2014	22.40	T2	<i>Myotis nattereri</i>	Female	Adult	Heavily pregnant	-	-	Heavily pregnant - released without processing
30 May 2014	23.10	T1	<i>Myotis mystacinus/Myotis brandtii</i>	Female	Adult	Previous breeder, not currently lactating, possibly pregnant	7	36	Tagged (Bat 2). 5cm removed from antenna length leaving 15cm. Dropping collected for DNA analysis (sample inconclusive/failed).
31 May 2014	22.10	T7	<i>Pipistrellus pygmaeus</i>	Male	Adult	-	5	31.3	Yellow penis
31 May 2014	21.45	T6	<i>Pipistrellus pygmaeus</i>	Male	Adult	Large testes, breeding	5	32.5	
28 July 2014	21:55	T7	<i>Pipistrellus pipistrellus</i>	Male	Adult	Large swollen testes, cream buccal glands	5.5	31.3	
28 July 2014	22:15	T3	<i>Myotis nattereri</i>	Male	Adult	Invisible epididymis and testes	8	38.3	Tagged (Bat 3)
28 July 2014	22:15	T3	<i>Myotis nattereri</i>	Male	Juvenile	Invisible epididymis and testes	7	38.8	
28 July 2014	22:20	T2	<i>Pipistrellus pygmaeus</i>	Male	Adult	Black epididymis, small	5	30.7	
28 July 2014	22:21	T3	<i>Pipistrellus pygmaeus</i>	Male	Adult	Very large testes	5	31.1	
28 July 2014	22:25	T1	<i>Pipistrellus pygmaeus</i>	Male	Adult	Very large testes	4.5	31	
28 July 2014	23:55	T4	<i>Pipistrellus pygmaeus</i>	Male	Adult				Considered to be same bat caught at 22:20

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Date	Time of capture	Net location	Species	Sex (Male/Female)	Age (Adult/Juvenile)	Reproductive status <sup>23</sup>	Weight (g)	Forearm length (mm)	Notes <sup>24</sup>
29 July 2014	21.50	T3	<i>Myotis brandtii</i>	Male	Adult	Slight swollen epididymis	6	35.6	Tagged (Bat 4). 5cm removed from antenna length leaving 15cm. Droppings taken for DNA analysis.
29 July 2014	22.05	T1	<i>Myotis nattereri</i>	Male	Adult	Testes very small	8	27.6	
29 July 2014	22.25	T7	<i>Plecotus auritus</i>	Male	Adult	Small testes	8	36.5	Tagged (Bat 5).
29 July 2014	22.40	T1	<i>Nyctalus noctula</i>	Female	Adult	Large buccal glands, large nipples	35	54.4	Tagged (Bat 6).
29 July 2014	23.30	T2	<i>Pipistrellus pipistrellus</i>	Male	Adult	Small testes	4.75	31.15	
30 July 2014	22.30	T2	<i>Nyctalus noctula</i>	Female	Adult	Nipple parous	28	53.7	Tagged (Bat 7).
30 July 2014	23.45	T 2	<i>Pipistrellus pygmaeus</i>	Female	Adult	-	-	32.6	Bat escaped
30 July 2014	23.45	T 2	<i>Plecotus auritus</i>	Male	Adult	Pale epididymis	7	38	
31 July 2014	21.45 - 22.05	T2	<i>Pipistrellus pygmaeus</i>	Male	Adult		3.5	29.7	
31 July 2014	21.45 - 22.05	T2	<i>Pipistrellus pygmaeus</i>	Female	Adult	Nipple parous, post-lactating	4.5	32.7	
31 July 2014	21.45 - 22.05	T2	<i>Myotis daubentonii</i>	Male	Adult	Swollen testes (1)	12	37.3	
31 July 2014	21.45 - 22.05	T2	<i>Myotis daubentonii</i>	Female	Adult	Nipple parous	9	37.4	Tagged (Bat 8). 5cm removed from antenna length leaving 15cm.

SES and AP2 ES Appendix - EC-004-003

Date	Time of capture	Net location	Species	Sex (Male/Female)	Age (Adult/Juvenile)	Reproductive status <sup>23</sup>	Weight (g)	Forearm length (mm)	Notes <sup>24</sup>
31 July 2014	21.45 - 22.05	T2	<i>Myotis daubentonii</i>	Male	Adult	Large swollen testes (3)	8	36.9	Tagged (Bat 9). 5cm removed from antenna length leaving 15cm.
31 July 2014	21.45 - 22.05	T2	<i>Myotis daubentonii</i>	Male	Adult	Large swollen testes (2)	7.5	37.3	
31 July 2014	23.10	T3	<i>Pipistrellus pygmaeus</i>	Male	Adult	Large swollen testes (2)	4.5	31.4	
23 August 2014	21.00	T3	<i>Pipistrellus pipistrellus</i>	Female	Adult	Non-breeding	5.5	32	
23 August 2014	21.00	T2	<i>Pipistrellus pygmaeus</i>	Male	Adult	Swollen testes	5	30	
23 August 2014	21.00	T2	<i>Pipistrellus pygmaeus</i>	Female	Adult	-	6	31.5	
23 August 2014	21.05	T2	<i>Pipistrellus pygmaeus</i>	Male	Adult	Swollen testes and epididymis	4.5	29.5	
23 August 2014	21.15	T2	<i>Myotis daubentonii</i>	Female	Adult	Non-breeding	9	37.2	Tagged (Bat 10). 5cm removed from antenna length leaving 15cm.
23 August 2014	22.20	T5	<i>Nyctalus noctula</i>	Female	Adult	Non-breeding	27.4	52.6	Tagged (Bat 11).
23 August 2014	22.35	T5	<i>Nyctalus noctula</i>	Male	Adult	Swollen epididymis (3)	21	51.6	
23 August 2014	22.50	T5	<i>Pipistrellus pygmaeus</i>	Female	Adult	-	4.5	30	
23 August 2014	22.50	T2	<i>Nyctalus noctula</i>	Female	Adult	-	28	53.3	Tagged (Bat 12).

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Date	Time of capture	Net location	Species	Sex (Male/Female)	Age (Adult/Juvenile)	Reproductive status <sup>23</sup>	Weight (g)	Forearm length (mm)	Notes <sup>24</sup>
23 August 2014	22.50	T5	<i>Pipistrellus pygmaeus</i>	Female	Adult	Nipple parous	5	32.2	
23 August 2014	23.20	T8	<i>Myotis mystacinus</i>	Female	Adult	-	5.5	33.3	Dropping taken for DNA analysis, too light to tag
23 August 2014	23.30	T8	<i>Pipistrellus pygmaeus</i>	Female	Adult	Non-breeding	5.75	31.3	
23 August 2014	00.15	T5	<i>Myotis mystacinus/Myotis brandtii</i>	Female	Adult	-	5.25	34.7	Dropping taken for DNA analysis (sample inconclusive/failed)
23 August 2014	00.15	T5	<i>Myotis daubentonii</i>	Male	Adult	Slightly swollen testes (1) but epididymis not swollen (0)	9	36.8	Tagged (Bat 13). 5cm removed from antenna length leaving 15cm.
24 August 2014	21.05	T5	<i>Myotis brandtii</i>	Female	Adult	Unknown	6.5	34.7	Tagged (Bat 14). 5cm removed from antenna length leaving 15cm. Droppings taken for DNA analysis.
24 August 2014	21.40	T5	<i>Nyctalus noctula</i>	Female	Adult		33.5	52.8	
24 August 2014	22.20	T5	<i>Nyctalus noctula</i>	Male	Adult	Swollen testes (2) and epididymis (3)	30	51.6	
24 August 2014	22.20	T5	<i>Nyctalus noctula</i>	Female	Adult		28.6	53.8	
24 August 2014	22.20	T5	<i>Nyctalus noctula</i>	Female	Adult	Nipple parous	29	53.9	

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Date	Time of capture	Net location	Species	Sex (Male/Female)	Age (Adult/Juvenile)	Reproductive status <sup>23</sup>	Weight (g)	Forearm length (mm)	Notes <sup>24</sup>
24 August 2014	22.50	T5	<i>Pipistrellus pipistrellus</i>	Male	Adult	Slightly swollen testes (1)	5.5	31.7	
26 August 2014	21.45	T5	<i>Nyctalus noctula</i>	Male	Adult	Swollen testes (3) and epididymis (3)	35	54.2	
26 August 2014	22.10	T4	<i>Nyctalus noctula</i>	Male	Adult	Swollen testes (2) and epididymis (4)	34.8	53.5	
26 August 2014	22.10	T5	<i>Nyctalus noctula</i>	Female	Adult		26.2	54.4	
26 August 2014	22.45	T8	<i>Myotis brandtii</i>	Male	Adult	Slightly swollen testes (1)	5.5	35.1	Too small to tag. Droppings taken for DNA analysis.
26 August 2014	23.30	T7	<i>Nyctalus noctula</i>	Male	Adult	Slightly swollen testes (1) and epididymis (2)	25	53	
26 August 2014	00.00	T5	<i>Myotis mystacinus</i>	Male	This year's juvenile	Slightly swollen testes (1)	5	36.2	This year's juvenile - too small to tag. Droppings taken for DNA analysis.
27 August 2014	20.35	T2	<i>Myotis mystacinus/Myotis brandtii</i>	Male	Adult	-	6.8	35.4	Droppings taken for DNA analysis (sample inconclusive/failed).
27 August 2014	20.40	T7	<i>Plecotus auritus</i>	Female	Adult	Nipple parous	8	38.7	Tagged (Bat 15). 5cm removed from antenna length leaving 15cm.
27 August 2014	21.10	T5	<i>Nyctalus noctula</i>	Male	Juvenile	Slightly swollen testes (1) and swollen epididymis (3)	26	51.6	

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Date	Time of capture	Net location	Species	Sex (Male/Female)	Age (Adult/Juvenile)	Reproductive status <sup>23</sup>	Weight (g)	Forearm length (mm)	Notes <sup>24</sup>
27 August 2014	21.40	T5	<i>Pipistrellus pygmaeus</i>	Male		Slightly swollen testes (2) and slightly swollen epididymis (1)	5.5	31	
27 August 2014	21.50	T7	<i>Pipistrellus pipistrellus</i>	Female		-	6	32.4	
27 August 2014	21.50	T7	<i>Myotis mystacinus/Myotis brandtii</i>	Female	Adult	Nipple parous	8.5	36.6	Droppings taken for DNA analysis (sample inconclusive/ failed).
27 August 2014	21.40	T7	<i>Myotis mystacinus/Myotis brandtii</i>	Female	Adult	-	7.25	34.7	No droppings could be collected taken for DNA analysis - suspected Brandt's
27 August 2014	21.40	T2	<i>Myotis nattereri</i>	Male	Adult	Slightly swollen testes (1)	6.5	38.1	Tagged (Bat 16). 5cm removed from antenna length leaving 15cm.
27 August 2014	22.00	T7	<i>Plecotus auritus</i>	Male	Adult	Slightly swollen testes (1)	6.75	39	
27 August 2014	23.10	T8	<i>Pipistrellus pipistrellus</i>	Male	Adult	Slightly swollen testes (2) and slightly swollen epididymis (1)	5.5	31.5	
27 August 2014	23.00	T8	<i>Nyctalus noctula</i>	Male	Adult	Slightly swollen testes (1) and slightly swollen epididymis (1)	26	54	
27 August 2014	23.00	T8	<i>Nyctalus noctula</i>	Female	Adult	-	28	54.4	
27 August 2014	23.00	T8	<i>Myotis daubentonii</i>	Male	Adult	Slightly swollen testes (1)	8	38	

Date	Time of capture	Net location	Species	Sex (Male/Female)	Age (Adult/Juvenile)	Reproductive status <sup>33</sup>	Weight (g)	Forearm length (mm)	Notes <sup>24</sup>
27 August 2014	23.00	T4	<i>Pipistrellus pygmaeus</i>	Female	Adult	-	6	32.4	Tagged (Bat 17). 7cm removed from antenna length leaving 13cm.

## Roosts

- 3.1.4 During the check of the 29 bat boxes in the woodland around Fradley Reservoir, nine bats were found in six boxes, all soprano pipistrelle. None were tagged as they were unlikely to weigh enough and were not considered to be a key species for study. Eight other bat boxes contained bat droppings but no bats.
- 3.1.5 Locations of roosts found during the radio tracking study are shown on Figure EC-21-001 and in Table 3.

Table 3 - Summary of roosts identified through radio tracking surveys

Ecology ID. (Bat ID)	Sex and Species of Tagged Bat(s)	Location	Description	Accuracy	Roost Status	Location in relation to land required for construction of the original scheme <sup>25</sup>
030-BS-188001 (Bat 01)	Male Brandt's bat	SK12778 13517	Roost in Wood End Lock Cottage. The roost is situated close to both the bats core and occasional foraging habitats.	Precise	Unknown	Outside of land required
030-BS-187001 (Bats 02, 14 and 17)	Female whiskered/ Brandt's bat, female Brandt's and female soprano pipistrelle	SK14111 14069	Roost of approximately 427 bats, predominantly soprano pipistrelle but also Myotis sp. and common pipistrelle at Ivy Leigh Cottage. Bats recorded emerging from two different exit points on this building; one from beneath a soffit in the north-eastern corner and another beside a free-standing chimney stack (see Table 4).	Precise	Soprano pipistrelle maternity roost. Roost status unconfirmed for other species	Outside of land required
030-BT-188169 (Bat 03)	Male Natterer's bat	SK12406 13757	Oak tree roost in Ravenshaw Wood	Precise	Unknown	Within land required

<sup>25</sup> In this table and following tables the term 'land required' is used as a shortened version of the full term 'land required for the construction of the Original Scheme'.

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Ecology ID. (Bat ID)	Sex and Species of Tagged Bat(s)	Location	Description	Accuracy	Roost Status	Location in relation to land required for construction of the original scheme <sup>15</sup>
030-BS-188004 (Bat 04)	Male Brandt's bat	SK12116 13319	Shed/outbuilding associated with Black Slough Farm	Precise	Suspected to be a small non-breeding summer roost	On edge of land required
030-BT-189002 (Bat 05)	Male brown long-eared bat	SK11986 14031	Oak tree roost in the Slaish, close to the northern edge of the wood (likely to be roosting in rot holes).	Precise	Unknown	Outside of land required
030-BT-189005 (Bat 06)	Female noctule bat	SK10340 13304	Tree roost within the southern portion of the woodland adjacent to Lichfield Golf Course to the north of Seedy Mill Lane	Approximate - within 50m of central location	Unknown	Outside of land required
030-BT-189001 (Bat 07)	Female noctule bat	SK11976 14070	Oak tree roost in Slaish Wood, roost in dead main leader	Precise	Unknown	Outside of land required
030-BT-188171 (Bat 08)	Female Daubenton's bat	SK12438 13689	Tree roost in Ravenshaw Wood, 15m from the tree in which Bat 3 was located	Precise	Unknown	Outside of land required
030-BT-187034 (Bat 08)	Female Daubenton's bat	SK14258 14164	Mature tree overhanging Fradley Reservoir, which was one of the core foraging areas recorded for this bat.	Precise	Unknown	Outside of land required
Bat 09	Male Daubenton's bat	-	No roosts identified	-	-	-
030-BT-188172 (Bat 10 and 13)	Male and non-breeding female Daubenton's bats	SK12629 13749	Oak tree roost in Ravenshaw Wood, close to the edge of the Trent and Mersey Canal	Precise	Likely to be a non-breeding summer roost	Within land required
030-BS-189001 (Bat 11)	Female noctule bat	SK11008 12400	Building associated with Hall Farm, Elmhirst	Approximate - within 30m of central location	Unknown	



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Ecology ID. (Bat ID)	Sex and Species of Tagged Bat(s)	Location	Description	Accuracy	Roost Status	Location in relation to land required for construction of the original scheme <sup>15</sup>
030-BT-187035 (Bat 11)	Female noctule bat	SK13083 13159	Ash tree in woodland block between Trent and Mersey Canal and Big Lyntus	Precise	Unknown	Edge of land required
030-BT-187036 (Bat 11)	Female noctule bat	SK13113 13196	Ash tree in woodland block between Trent and Mersey Canal and Big Lyntus	Precise	Night roost	Edge of land required
030-BS-188003 (Bats 11 and 15)	Female noctule bat and female brown long-eared bat	SK12507 11969	Roosting in the Curborough Craft Centre	Approximate - within 10m of central location	Unknown	Outside of land required
Bat 12	Female noctule bat	-	No roosts identified	-	-	
030-BT-188174 (Bat 15)	Female brown long-eared bat	SK12392 13749	Oak tree roost in Ravenshaw Wood (roost in decay features)	Precise	Unknown	Within land required
030-BT-188173 (Bat 15)	Female brown long-eared bat	SK12437 13548	Silver birch tree roost in Ravenshaw Wood	Precise	Unknown	Outside of land required
030-BT-189003 (Bat 16)	Male Natterer's bat	SK11078 12354	Tree roost within a group of trees to the north-east of Hall Farm, Elmhurst	Approximate - within 40m of central location	Unknown	Outside of land required
030-BT-189004 (Bat 16)	Male Natterer's bat	SK12120 13694	Pedunculate oak tree roost along a hedge line between Black Slough and Ravenshaw Wood. The pedunculate oak had woodpecker holes which are thought to be the roosting feature, along with other potential features associated with lifted bark and limb decay.	Precise	Unknown	Within land required
030-BT-188175 (Bat 17)	Female common pipistrelle bat	SK12400 13754	Oak tree roost in Ravenshaw Wood; to be associated with features created by broken limbs	Precise	Unknown	Within land required

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Ecology ID. (Bat ID)	Sex and Species of Tagged Bat(s)	Location	Description	Accuracy	Roost Status	Location in relation to land required for construction of the original scheme <sup>15</sup>
030-BS-188002  (Not tagged)	Daubenton's Bats	SK13017 13270	Conduit which takes the Curborough Brook beneath the Trent and Mersey Canal	Precise	Night roost	Edge of land required

3.1.6 No roosts were found for two of the tagged bats: a female noctule (Bat 12) and a male Daubenton's (Bat 9).

3.1.7 A night roost was identified in the brick-line culvert which takes Curborough Brook beneath the Trent and Mersey Canal. This was initially recorded anecdotally when the bats were observed beside the location of the traps on 31 July 2014. Up to six Daubenton's bats were observed free-hanging from the ceiling of the culvert during subsequent checks.

3.1.8 The results of the emergence surveys and inspection of the culvert adjacent to the Trent and Mersey Canal are shown in Table 4.

Table 4 - Results of emergence surveys and dawn return surveys on roosts identified through radio tracking

Date	Survey Type	Tagged Bat	Roost	Results
03.06.14	Dusk emergence	Whiskered bat/Brandt's bat (Bat 2)	Ivy Leigh Cottage (030-BS-187001)	21:30 - 22:07: emergence of 343 bats, predominantly soprano pipistrelle along with a small number of Myotis sp. and common pipistrelle.
06.06.14	Dusk emergence	Whiskered bat/Brandt's bat (Bat 2)	Ivy Leigh Cottage (030-BS-187001)	21:15 - 22:30: emergence of approximately 427 bats, predominantly soprano pipistrelle along with 7 Myotis sp. and 2-3 common pipistrelle.
02.09.14	Dusk emergence	Brandt's bat and soprano pipistrelle (Bats 14 and 17)	Ivy Leigh Cottage (030-BS-187001)	20:05 - 20:33: emergence of 169 bats, predominantly soprano pipistrelle along with a small number of Myotis sp. and common pipistrelle.
06.08.14	Dusk Emergence	Brandt's bat (Bat 4)	Shed at Black Slough Farm (030-BS-188004)	21:25 emergence of 2 Myotis bats from the shed
12.8.14 - 08.09.14	Night Roost Inspection	Myotis bats (untagged)	Curborough Brook culvert (030-BS-188002)	03.08.14 at 23:53 - 6 bats night-roosting 12.8.14 at 23:09 - 3 bats night-roosting 08.09.14 at 22:35 - 5 bats night-roosting

## 3.2 Foraging areas

- 3.2.1 Key foraging areas for bats have been identified from the radio tracking data. In general, core foraging areas were identified as a mappable habitat unit, such as a woodland block or aquatic feature, where an individual bat was recorded foraging on three or more occasions, whilst occasional foraging areas were identified as those locations where an individual was recorded foraging on only one or two occasions. A further definition of 'infrequent' foraging areas was reserved for habitat where an individual bat, which was usually strongly associated with its core foraging area, was recorded on a single occasion. However, the tracking results for each species were considered separately and professional judgement was made within these criteria to reflect the variation in frequency and duration of contact with individual bats throughout the radio-tracking exercise based on knowledge of bat ecology and knowledge of the within the Study Area.
- 3.2.2 Core commuting routes were identified as connective landscape features, such as a canal, which linked the confirmed roost of an individual with its core foraging area. This was usually supported by a record of the bat moving along this feature during the radio-tracking exercise. However, in some instances direct 'observation' of a bat in motion between the two locations was not available. In these instances, in accordance with the precautionary principle, a commuting route along the connective feature between a roost and a core foraging area was inferred where supported by the timings of emergence/foraging records and the accepted behavioural ecology of the species in question.
- 3.2.3 The results did identify core foraging habitats, as shown on Figures EC-22-001 to 003 covering the three sessions of radio tracking. The activity from the radio-tracking results for each tagged bat is discussed below, grouped by species.

### Brandt's (Bats 1, 4 and 14)

- 3.2.4 Bats 1 and 4 were most frequently recorded foraging in Ravenshaw Wood, Black Slough and Slaish woods within 500m-1km of their roosts. This appears to represent the core foraging habitat for these individuals. Occasional peripheral foraging habitat was associated with a copse to the north of the canal around Cranberry; the fields immediately to the north of Woodend Lock on the Trent and Mersey Canal; and the two fields immediately to the south of Ravenshaw Wood. These areas are up to 1.3km from their roosts.
- 3.2.5 Bat 14 roosted in Ivyleigh Cottage, to the north-east of Bats 1 and 4, and its core foraging habitats were those closest to the roost including Fradley Reservoir and the stretch of the Trent and Mersey Canal which passes through Fradley Junction. Woodlands within 500m of the roost, associated with Middle Lock, Pool Wood and the land to the north of Fradley reservoir were all recorded as occasional habitat, along with fields to the east of Woodend Lock and the canal immediately to the south at a distance of 1.2km from the roost. Infrequent foraging was recorded within fields and associated with small copses within land to the northeast of the roost at distances up to 1.8km.

### **Whiskered/Brandt's (Bat 2)**

- 3.2.6 The core foraging areas for this bat were woodland and aquatic habitats close to the roost consisting of Fradley Wood to the south of the Trent and Mersey Canal; Middle Lock Wood to the immediate west of Fradley Junction; and Fradley Reservoir to the immediate east of Fradley junction. All of these habitats are within 1km of the roost. The bat was also recorded at more distant habitats on individual nights. These include the fields between Barn Farm and Rice's Spinney which lay approximately 1.9km northwest of the roost; and the fields to the immediate east of Fullbrook Farm and to the south of Wood End Lane, approximately 2.4km southwest of the roost site.

### **Natterer's (Bats 3 and 16)**

- 3.2.7 The core foraging area for both bats was Ravenshaw Wood and Black Slough which are within 500m of their roosts. The Slaish to the west was also used frequently, and Bat 3 was recorded foraging along the Trent and Mersey Canal adjacent to Ravenshaw Wood. Occasional peripheral foraging habitat was associated with copses to the north of the canal around Cranberry, around 1km to the east of the roost in Ravenshaw.
- 3.2.8 The behaviour of Bat 16 changed in the second week of tracking as it moved south-west to use a roost around Hall Farm, Elmhurst. Subsequent foraging continued to include Ravenshaw as a core foraging area but also included fields around the new roost as well as fields to the west of the sewerage works, fields to the south of Woods Farm, fields to the north of the Trent and Mersey Canal around Cranberry and around the Curborough Sprint Course and the adjacent Big Lyntus woodland. These foraging areas are up to 1.8km from the confirmed roost site.

### **Brown long-eared (Bats 5 and 15)**

- 3.2.9 These two bats (Bats 5 and 15) roosted within Ravenshaw Wood and Slaish and their core foraging areas were Ravenshaw Wood, Black Slough and Slaish.
- 3.2.10 Bat 5 was recorded using a number of foraging areas in the wider countryside including land around Vicar's Coppice and land around Tomhay Wood 800m to the southwest of the roost; land to the south of Fullbrook Farm 1.5km to the south; and land associated with copses to the north of the canal at Cranberry and around Fradley Junction, 1.5km and 2.1km to the east of the roost respectively. This bat was recorded commuting along the Trent and Mersey Canal which indicates that this may be used for movement between the roost and foraging locations to the east and west.
- 3.2.11 Bat 15 used a third roost associated with Curborough Hall Farm and the bat was frequently recorded foraging within the fields to the north-west of the sewerage works which lie between the Ravenshaw and Curborough roosts. Occasional foraging was recorded within fields and hedgerows to the north of Curborough, within 500m of this roost. Infrequent foraging was recorded over the fields associated with Fullbrook Farm, fields to the north of the Trent and Mersey Canal around Cranberry, Fradley Wood and the Canal through Fradley Junction. These areas are up to 1.5km from a confirmed roost.

### **Noctule (Bats 6, 7, 11 and 12)**

- 3.2.12 These four bats were found to have little overlap in their foraging areas.

- 3.2.13 Bat 6 was predominantly recorded foraging within the grounds of Lichfield Golf Club and the woodland in which its roost is located to the north of Seedy Mill Lane. Occasional foraging was identified within Black Slough and Ravenshaw Wood, situated 1.4km and 200m respectively to the north-east of the roost site.
- 3.2.14 Bat 7 was predominantly recorded foraging around the lake and open habitats to the west of Fradley South, some 3km to the east of the identified roost site. Occasional foraging was identified within an area of land focussed on Big Lyntus woodland around 1.3km to the southeast of the roost.
- 3.2.15 Bat 11's core foraging habitat was around Fradley Wood and the land to the north of the canal beside Woodend Lock. These areas are within 1km of the roost to the north of Big Lyntus wood. The bat was recorded utilising a wide range of habitats and sites within 2.5km of its roost. These include fields to the west of Alrewas Hayes, fields to the east of Fradley Junction and fields to the south-west of Black Slough wood; the habitats associated with the canal and woodlands at Fradley Junction; the lake and waste ground to the east of Fradley South and fields and woodlands around Little Lyntus. A second roost was identified at the Curborough Craft Centre and the bat was recorded foraging around fields to the north and west of this roost.
- 3.2.16 Bat 12 was recorded very briefly for only two days after its release which may indicate that the core range for this individual was outside of the study area or that the radio-tracking tag failed. The foraging areas recorded were the eastern edge of Ravenshaw Wood and the fields and copses to the north of the Trent and Mersey Canal around Cranberry; however, it is not possible to qualify the relative importance of these foraging areas.

### **Daubenton's (Bats 8, 9, 10 and 13)**

- 3.2.17 The core foraging habitat for Bats 8 and 10 were Fradley Reservoir, the stretch of the Trent and Mersey Canal which runs through Fradley Junction; and the smaller woodland lake around 400m to the northwest of Fradley Reservoir. This was up to 1.5km from the roost sites of these two bats. Both bats were also recorded foraging around Ravenshaw Wood and the stretch of the Canal which runs along the northern boundary of the wood. Bat 9 was recorded foraging within woodland and fields to the south of the canal at Fradley Wood and around Shade House Lock and the fields to the north of the canal around Cranberry. These additional foraging areas lie adjacent to the canal which is used as a commuting route and links the roost with Fradley Junction and Fradley Reservoir.
- 3.2.18 Bat 9 was recorded only briefly on release and was not detected again throughout the radio tracking surveys. Bat 13 was recorded for only a single day after its release. The bat was recorded foraging along the Trent and Mersey Canal adjacent to Woodend Lock within 500m of its roost, however it is not possible to qualify the relative importance of this foraging areas.

### **Soprano pipistrelle (Bat 17)**

- 3.2.19 The core foraging areas recorded are Fradley Reservoir and stretches of the Trent and Mersey Canal which connects the reservoir to the confirmed roost in Ravenshaw Wood, 2km to the west. Occasional foraging was identified in Ravenshaw Wood itself as well as woodlands to the north and south of the core foraging area; the copses

around Cranberry to the north and Fradley Wood to the south. Habitats more distant from the canal were also infrequently visited including the lake and waste ground to the east of Fradley South and the sewerage works to the south of Ravenshaw Wood. These habitats took the bat up to 2.5km away from the roost.

## 4 Discussion

### 4.1 Assemblage of bats

- 4.1.1 Static, transect and tree climbing surveys were undertaken within and surrounding Ravenshaw Wood, Black Slough and the Slaish and the adjacent Trent and Mersey Canal in support of the main ES. These identified the presence of a diverse assemblage of bat species including: Leisler's bat, noctule, brown long-eared bat, Daubenton's bat, Natterer's bat, common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, serotine and Myotis sp.
- 4.1.2 Trapping was carried out across ten nights between May and September 2014 and 67 bats of eight different species caught. Species trapped include Daubenton's bat, whiskered bat, Natterer's bat, Brandt's bat, noctule, brown long-eared bat, common pipistrelle and soprano pipistrelle.
- 4.1.3 No serotines or Nathusius pipistrelles were identified during the trapping exercise, which indicates that these two species may make transient use of the habitats within the Study Area rather than representing a permanent component of the species assemblage. Records of these two species from static and transect surveys in 2012/13 were infrequent, which would support this hypothesis.
- 4.1.4 The trapping exercise captured three juvenile bats in the second and third (July and August) trapping sessions. The adult bats consisted of breeding and non-breeding males and females with approximately 50% more males than females. This pattern differed little throughout the different trapping sessions although a larger number of female bats were captured on two consecutive trapping sessions on 23 and 24 July.
- 4.1.5 The capture success rate increased sequentially between trapping sessions; with five bats in the first session, 22 in the second session and 40 in the third. The juveniles recorded in later trapping sessions were identified only in low numbers, which would not account for this difference. The increase may represent an improvement in the selection of trapping locations as the positions were modified based on the success rates of previous positions.
- 4.1.6 The trapping locations during the first session were located within the interior of woodland. On the first night, trapping was within Ravenshaw Wood in an area where the shrub layer was dominated by rhododendron. There were no captures in this location and no bats were heard on detectors within the woodland interior, despite weather conditions being suitable for bat activity. The capture rate within the woodland interiors in Black Slough and the Slaish were also very low and very little activity was heard on bat detectors. The second and third trapping sessions were generally in woodland edge or canal side habitats, with much higher bat activity and trapping rates.

### 4.2 Roosts

- 4.2.1 Radio tracking survey results from 17 tagged bats of seven different species identified a total of 21 day roosts. Eight tree roosts were identified within Ravenshaw, Black Slough and the Slaish woods with a further six tree roosts located in other locations including small woodlands, copses and hedge lines. Five building roosts were

identified associated with Fradley Junction, the canal towpath, Black Slough Farm and buildings near Curborough and Elmhurst.

4.2.2 Two night roosts were identified. An ash tree used by a noctule bat was identified in close proximity to one of its day roosts and a *Myotis* night roost was identified incidentally when trapping was undertaken adjacent to the conduit which takes the Curborough Brook beneath the Trent and Mersey Canal.

4.2.3 The majority of bats tracked used only a single roost throughout the tracking period. Five individuals recorded using two roosts and one individual recorded using three roosts as well as a night roost.

### 4.3 Foraging habitat

4.3.1 The collation of survey results has enabled identification of assumed core foraging areas for a sample of bats in the local area during the maternity season.

4.3.2 Ravenshaw Wood, and to a lesser extent the Slaish and Black Slough wood, were identified as core foraging habitat for a number of bats including brown long-eared bat, Brandt's bat and Natterer's bat which were roosting in or close to the woodlands. These woodlands are also peripheral foraging habitat for a large number of other tracked bats including noctule, Daubenton's bat and soprano pipistrelle. This use by a wide range of individuals and species, to varying degrees, identifies this as a habitat of key importance to the local bat population. A number of bats, such as a Natterer's bat (Bat 3), were found to roost and forage almost exclusively within Ravenshaw Wood. Other bats, such as Daubenton's bat (Bats 8 and 10) roosted within Ravenshaw Wood and commuted east along the adjacent Trent and Mersey Canal to reach their core foraging areas.

4.3.3 Fradley Wood, to the south of the Trent and Mersey Canal is identified as a core foraging area for an individual noctule bat as well as occasional foraging habitat for other species including Daubenton's and brown long-eared bats. The less frequent use of this woodland, by a smaller number of individual bats, indicates a lower level of importance than Ravenshaw, Black Slough and the Slaish for the individuals tracked in this study.

4.3.4 Habitats associated with Fradley Junction, including the Canal, Fradley Reservoir and the associated woodlands were found to be a core foraging area for a number of bats, some of which roosted within Ravenshaw Wood which lies 1.5km to the west. A large soprano pipistrelle roost was identified here in Ivyleigh Cottage, also used by *Myotis* species and common pipistrelle. This is considered to represent habitat of key importance to the local bat populations.

4.3.5 The majority of bat activity appears to be centred between Ravenshaw, Black Slough and the Slaish woodlands and Fradley Junction with the canal being used as a commuting and foraging route between these habitats. However, the radio-tracking work did identify occasional and infrequent foraging habitats to the south and west of these woodlands; these include:

- Whiskered/Brandt's at WoodEnd Farm and Hillbrook Farm;
- Brown long-eared bat tracked in July - August had infrequent foraging areas in woodlands including woodland surrounding Fradley Reservoir, Brokendown



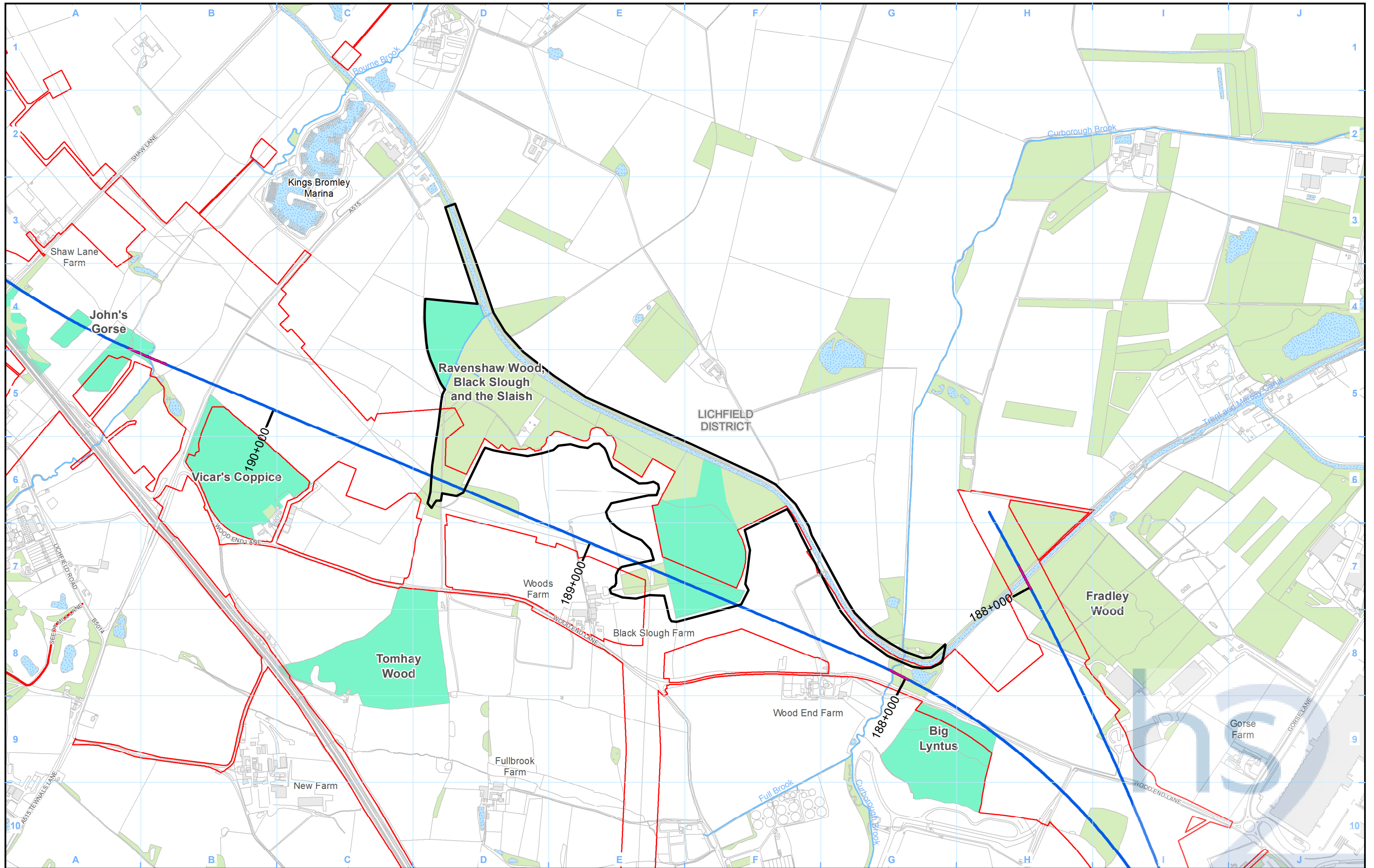
Wood and near Curborough Brook to the north and east and Vicar's Coppice, Tomhay Wood and the existing East Coast Main Line. The brown long-eared bat tracked in August - September had a core foraging area in Ravenshaw Wood and another near Full Brook, and infrequent foraging areas scattered in the wider countryside, including a core commuting route near Woodend Farm;

- Natterer's bat in August - September had a core foraging area in Ravenshaw Wood, with Black Slough and the East Coast Main Line being used occasionally, and infrequent use of habitats mainly south of the woodlands;
- Noctule tracked in July - August had a core foraging area between the Coventry Canal and Fradley Park, some way from the trapping site at Ravenshaw Wood. Noctule also had a core foraging area near Bourne Brook west of the East Coast Main Line, and occasional foraging areas around Big Lyntus. In August - September noctule infrequently used foraging areas to the north and south of the original route; and
- The soprano pipistrelle, which was only tracked in August - September, had infrequent foraging areas in woodlands around Fradley Reservoir and Fradley Park with one foraging area near Full Brook.

## **4.4 Commuting habitat**

- 4.4.1 Given the limitations in tracking tagged bats only a few key commuting routes were identified.
- 4.4.2 The Trent and Mersey Canal was identified as an important commuting corridor and as a core foraging habitat for several species, in particular Daubenton's bat and soprano pipistrelle. The Canal is identified as an important connective corridor between the key sites of Ravenshaw, Black Slough and the Slaish; and the habitats associated with Fradley Junction.
- 4.4.3 The radiotracking of two individual Daubenton's bats indicates that the Curborough Brook may provide connectivity from the Trent and Mersey Canal in a southerly direction and is likely to be a key commuting route for the species.
- 4.4.4 The brown long-eared bat tracked in August - September had scattered infrequent foraging areas, including a core commuting route near Woodend Farm.

# 5 Figures



Legend	
	Route on embankment
	Route on viaduct
	Land potentially required during construction
	Community forum boundary
	County boundary
	District/Borough boundary
	Watercourse
	Water body
	Ancient woodland
	Study area (covered under licence)

Map Number	EC-19-001
Map Name	Study Area
Community Forum Area CFA22: Whittington to Handsacre	

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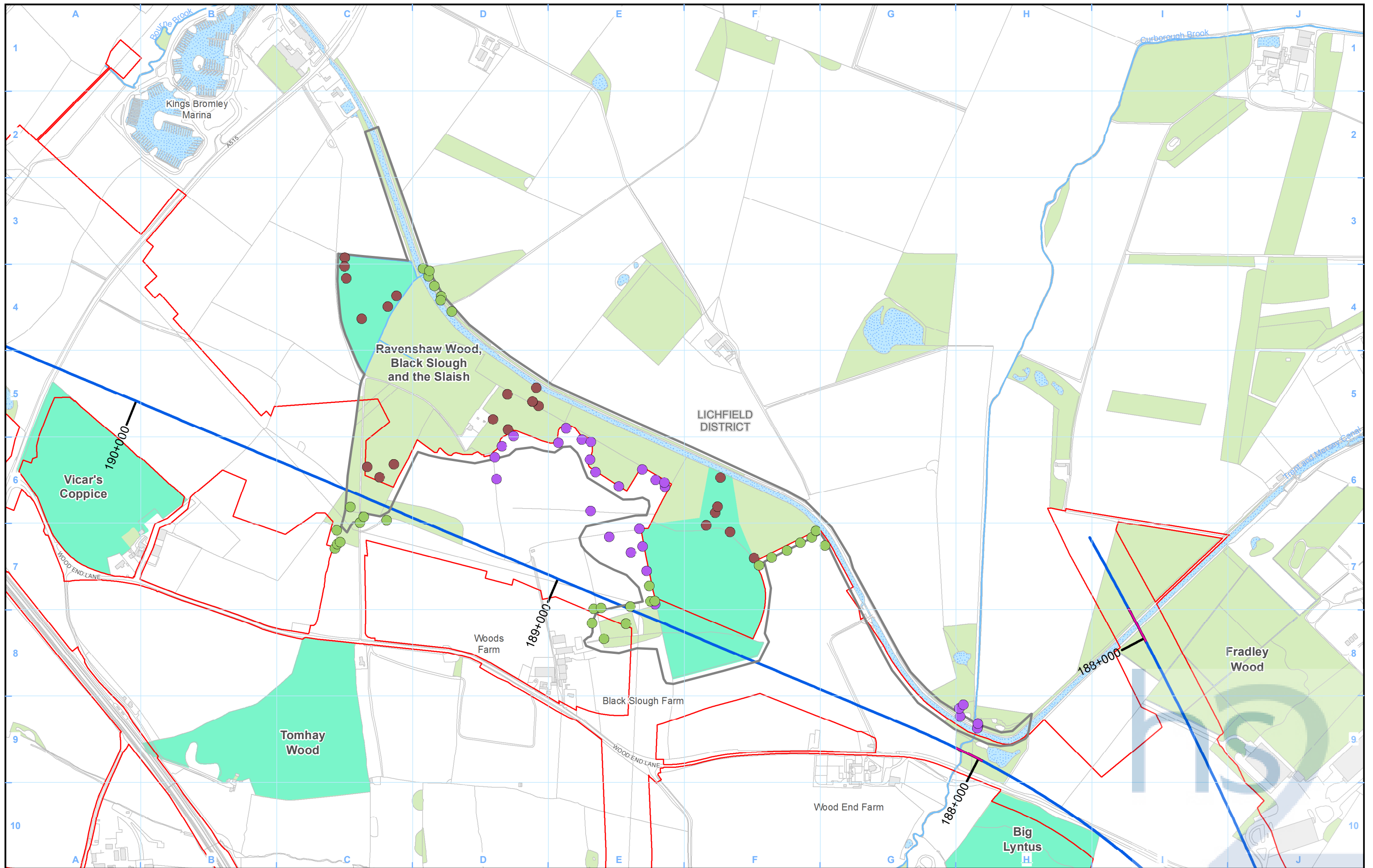
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Date: 01/05/15



**Legend**

- Route on embankment
- Route on viaduct
- Land potentially required during construction
- Community forum boundary
- County boundary
- District/Borough boundary
- Watercourse
- Water body
- Ancient woodland
- Study area (covered under licence)

**Bat trapping location by session:**

- May
- July
- August

No surveys carried out with bat detectors in this area during 2014

Map Number **EC-20-001**

Map Name  
**Trapping Site and Areas Surveyed by Bat Detector**

Community Forum Area CFA22:  
Whittington to Handsacre

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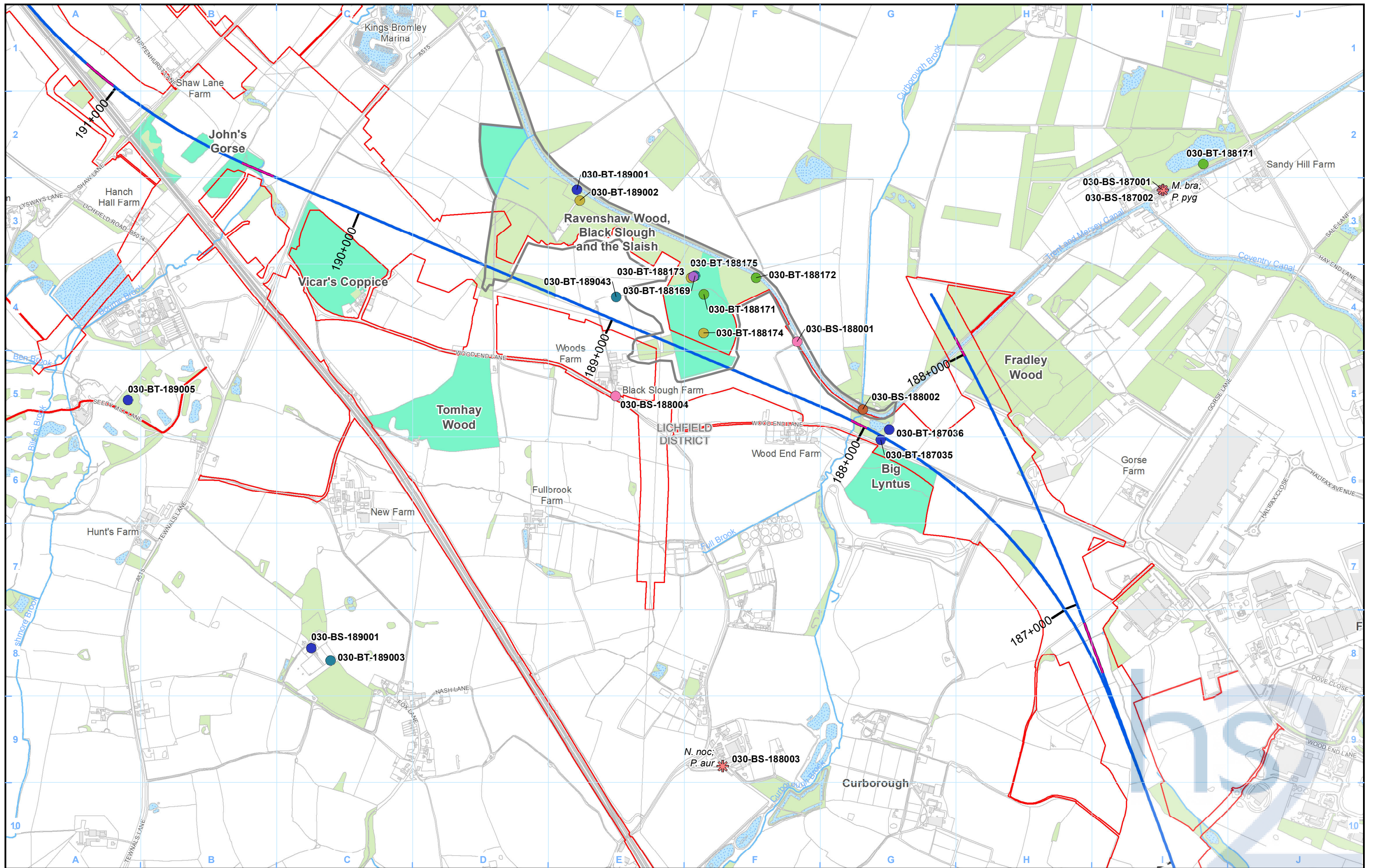
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**Legend**

Route on embankment	Watercourse	Bat species roost location: Whiskered bat/Brandt's	Soprano pipistrelle	<b>Bat species labels (abbreviation / common name)</b> <i>M. myt/M. bra</i> / Whiskered bat/Brandt's <i>M. dau</i> / Daubenton's bat <i>M. nat</i> / Natterer's bat <i>M. sp.</i> / Myotis sp. <i>N. noc</i> / Noctule <i>P. aur</i> / Brown long eared bat <i>P. pyg</i> / Soprano pipistrelle
Route on viaduct	Water body	Daubenton's bat	Multiple species	
Land potentially required during construction	Ancient woodland	Natterer's bat		
Community forum boundary	Study area	Myotis sp.		
County boundary		Noctule		
District/Borough boundary		Brown long eared bat		

Map Number: EC-21-001

Map Name: Location of Roosts

Community Forum Area CFA22:  
Whittington to Handsacre

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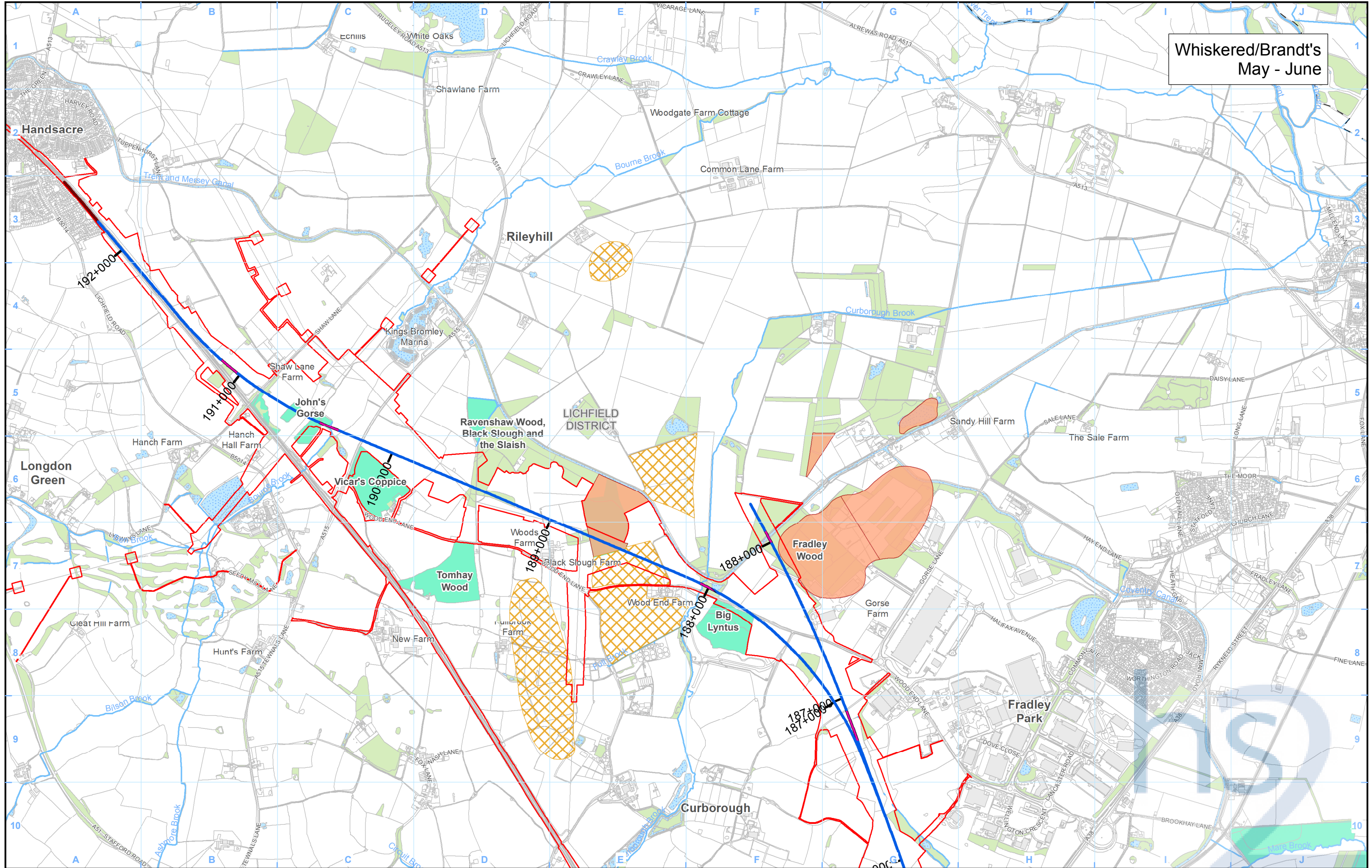
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Doc Number: C253-ATK-EV-MAP-030-001641-P03.00

Date: 24/06/15

Whiskered/Brandt's  
May - June



**Legend**

- Route on embankment
- Route in retaining wall
- Route on viaduct
- Land potentially required during construction
- Community forum boundary
- County boundary
- District/Borough boundary
- Watercourse
- Water body
- Ancient woodland

**Radio tracking activity summary:**

- Core foraging area
- Occasional foraging area

Map Number: EC-22-001

Map Name: Areas of Bat Activity Identified During Radio Tracking

Community Forum Area CFA22: Whittington to Handsacre

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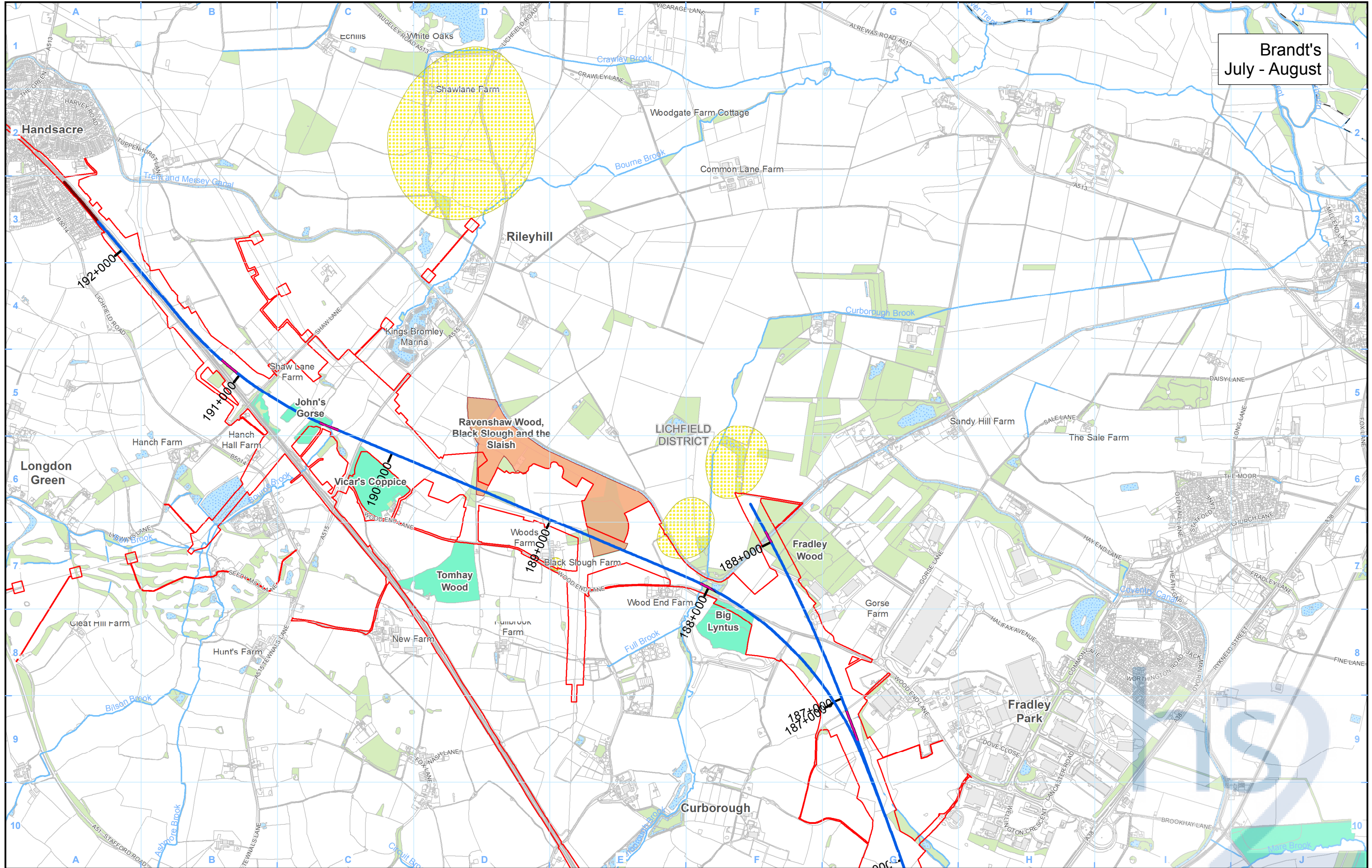
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Date: 01/05/15



**Legend**

- Route on embankment
- Route in retaining wall
- Route on viaduct
- Land potentially required during construction
- Community forum boundary
- County boundary
- District/Borough boundary
- Watercourse
- Water body
- Ancient woodland

**Radio tracking activity summary:**

- Core foraging area
- Infrequent foraging area

Map Number **EC-22-002**

Map Name  
**Areas of Bat Activity Identified During Radio Tracking**

Community Forum Area CFA22:  
Whittington to Handsacre

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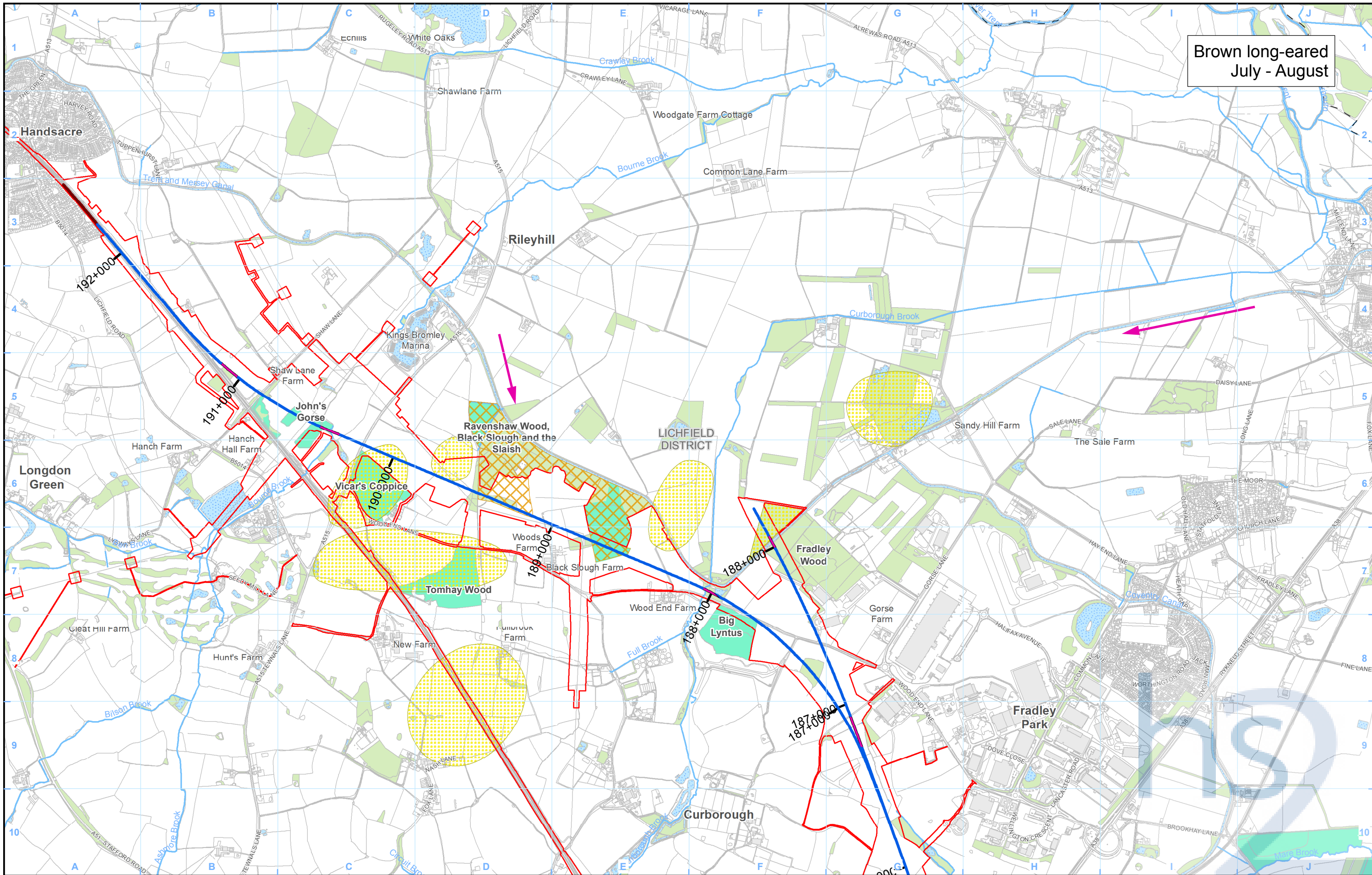
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Metres

**Doc Number:** C253-ATK-EV-MAP-030-001643-P02.00 **Date:** 01/05/15

Brown long-eared  
July - August



- Legend**
- Route on embankment
  - Route in retaining wall
  - Route on viaduct
  - Land potentially required during construction
  - Community forum boundary
  - County boundary
  - District/Borough boundary
  - Watercourse
  - Water body
  - Ancient woodland

- Radio tracking activity summary:**
- Occasional foraging area
  - Infrequent foraging area
  - Commuting route

Map Number EC-22-003

Map Name  
**Areas of Bat Activity Identified During Radio Tracking**

Community Forum Area CFA22:  
Whittington to Handsacre

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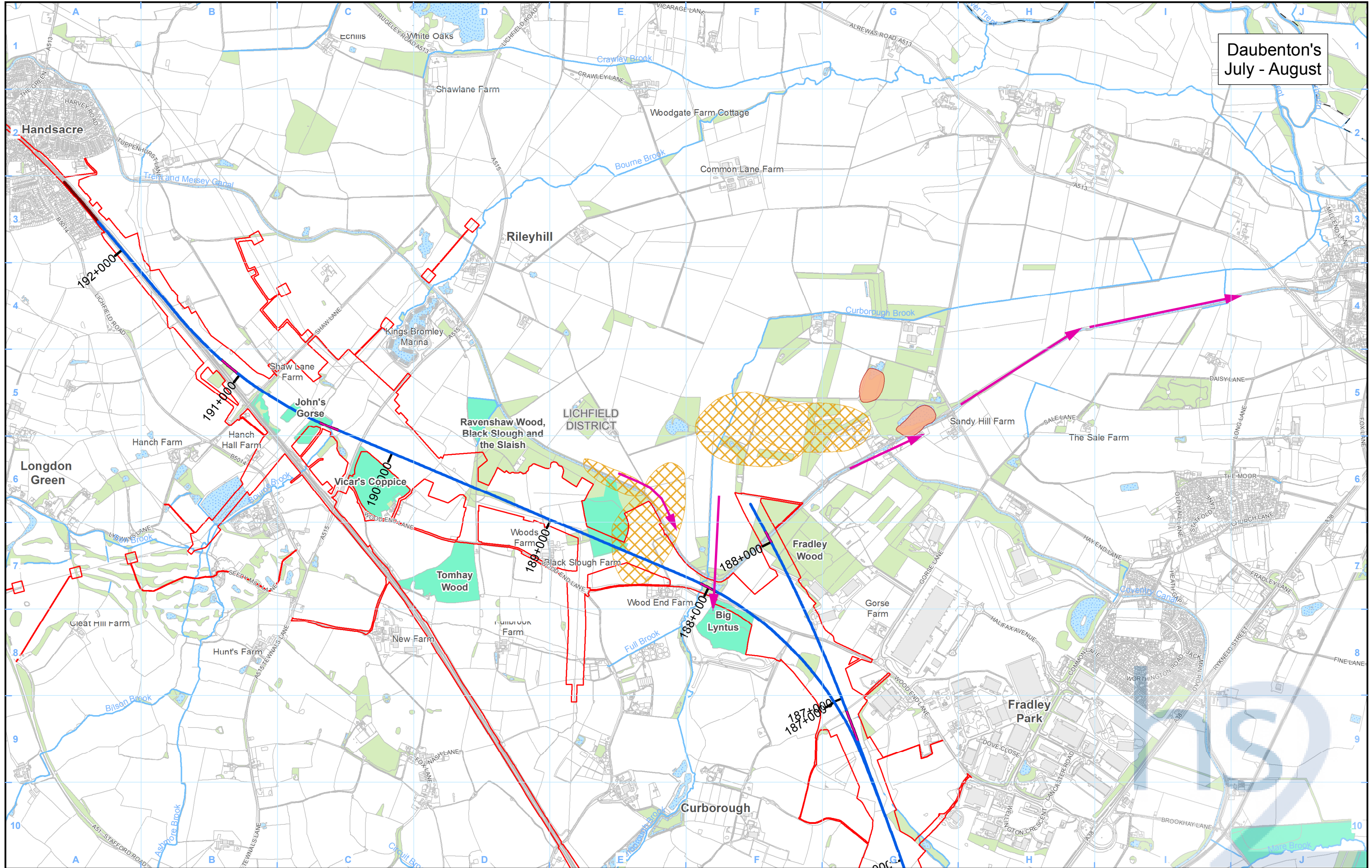
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Date: 01/05/15





**Legend**

- Route on embankment
- Route in retaining wall
- Route on viaduct
- Land potentially required during construction
- Community forum boundary
- County boundary
- District/Borough boundary
- Watercourse
- Water body
- Ancient woodland

**Radio tracking activity summary:**

- Core foraging area
- Occasional foraging area
- Commuting route

Map Number **EC-22-004**

Map Name  
**Areas of Bat Activity Identified During Radio Tracking**

Community Forum Area CFA22:  
Whittington to Handsacre

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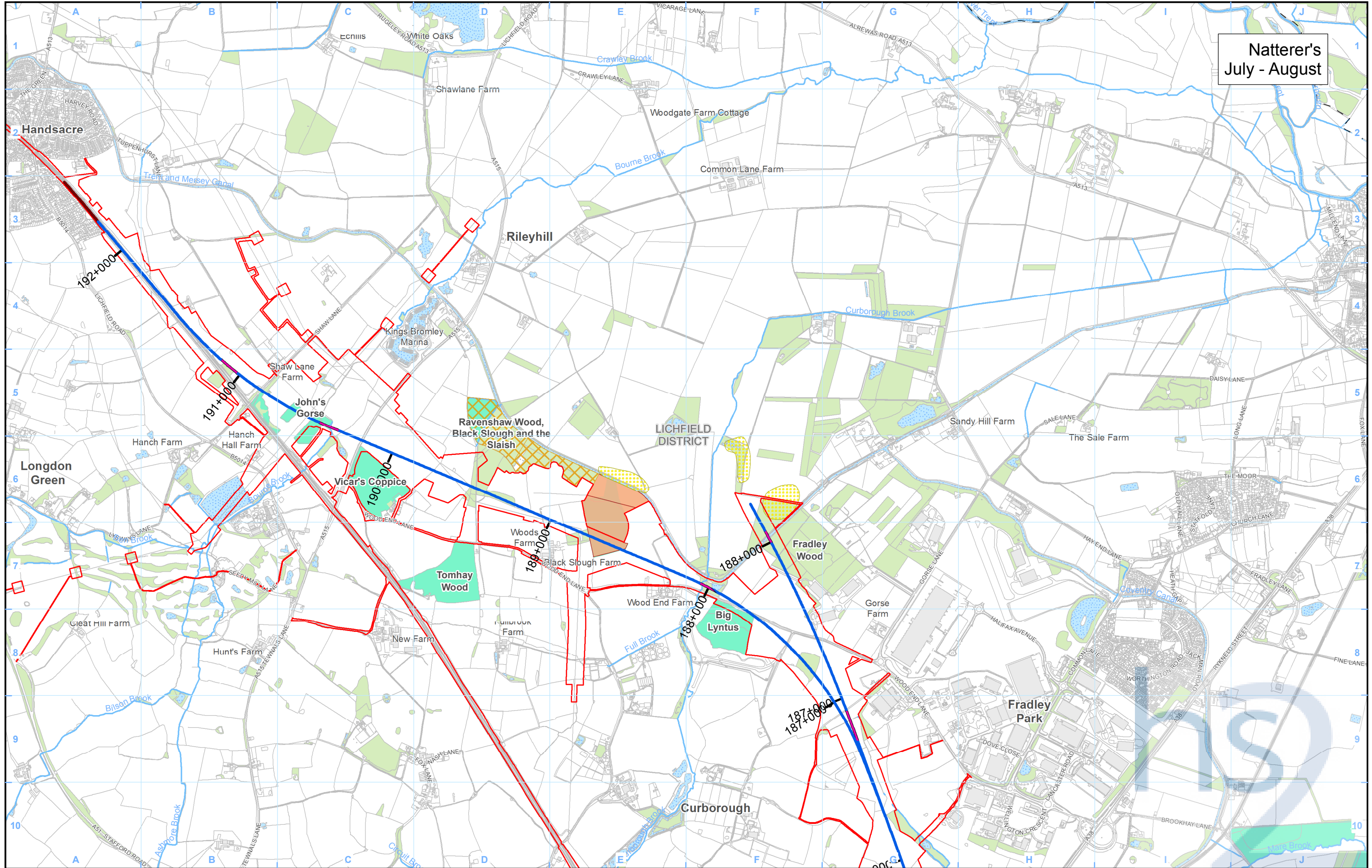
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**Legend**

- Route on embankment
- Route in retaining wall
- Route on viaduct
- Land potentially required during construction
- Community forum boundary
- County boundary
- District/Borough boundary
- Watercourse
- Water body
- Ancient woodland

**Radio tracking activity summary:**

- Core foraging area
- Occasional foraging area
- Infrequent foraging area

Map Number EC-22-005

Map Name  
**Areas of Bat Activity Identified During Radio Tracking**

Community Forum Area CFA22:  
Whittington to Handsacre

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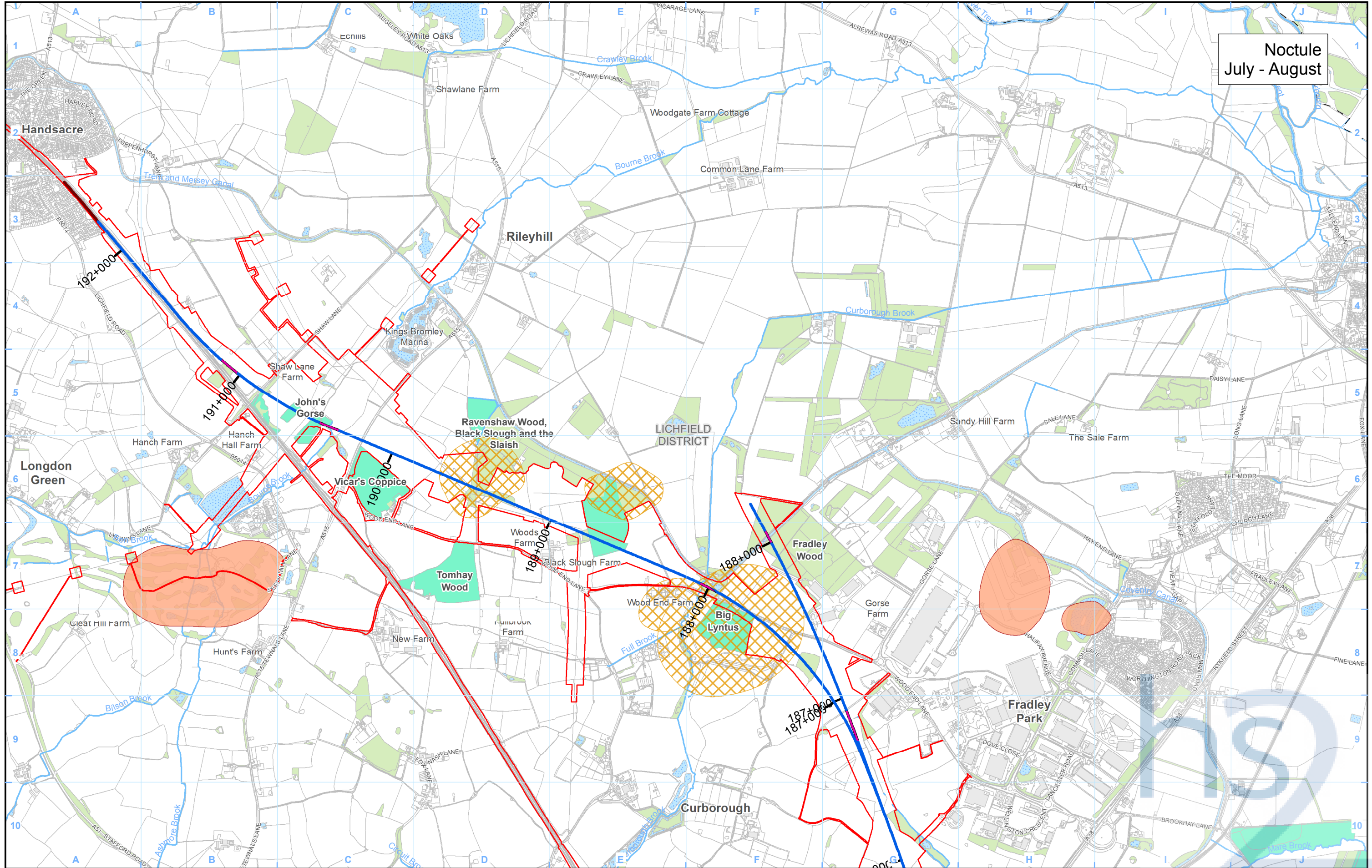
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Noctule  
July - August



**Legend**

- Route on embankment
- Route in retaining wall
- Route on viaduct
- Land potentially required during construction
- Community forum boundary
- County boundary
- District/Borough boundary
- Watercourse
- Water body
- Ancient woodland

**Radio tracking activity summary:**

- Core foraging area
- Occasional foraging area

Map Number **EC-22-006**

Map Name  
**Areas of Bat Activity Identified During Radio Tracking**

Community Forum Area CFA22:  
Whittington to Handsacre

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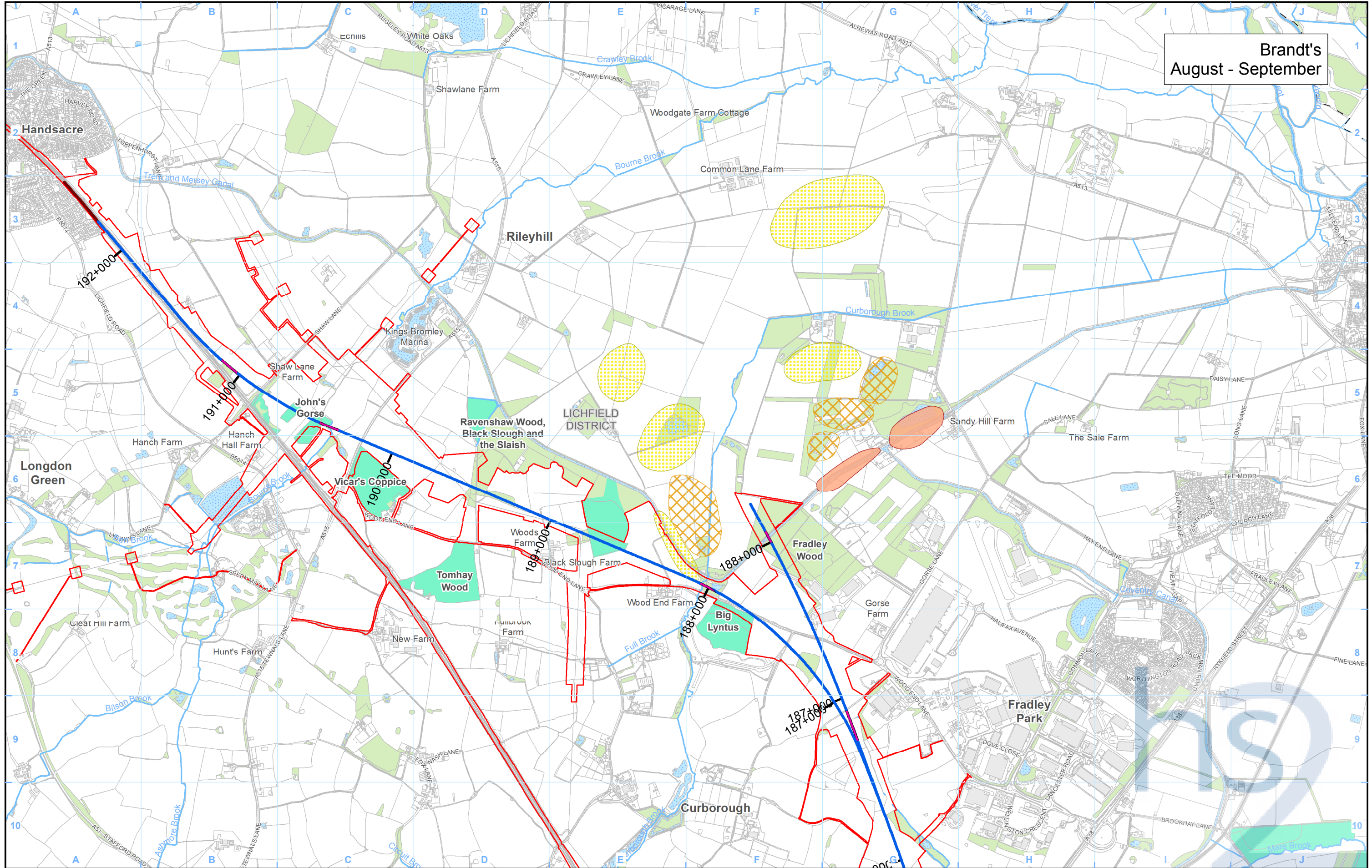
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**Legend**

Route on embankment	District/Borough boundary	<b>Radio tracking activity summary:</b>
Route in retaining wall	Watercourse	Core foraging area
Route on viaduct	Water body	Occasional foraging area
Land potentially required during construction	Ancient woodland	Infrequent foraging area
Community forum boundary		
County boundary		

Map Number **EC-22-007**

Map Name  
**Areas of Bat Activity Identified During Radio Tracking**

Community Forum Area CFA22:  
Whittington to Handsacre

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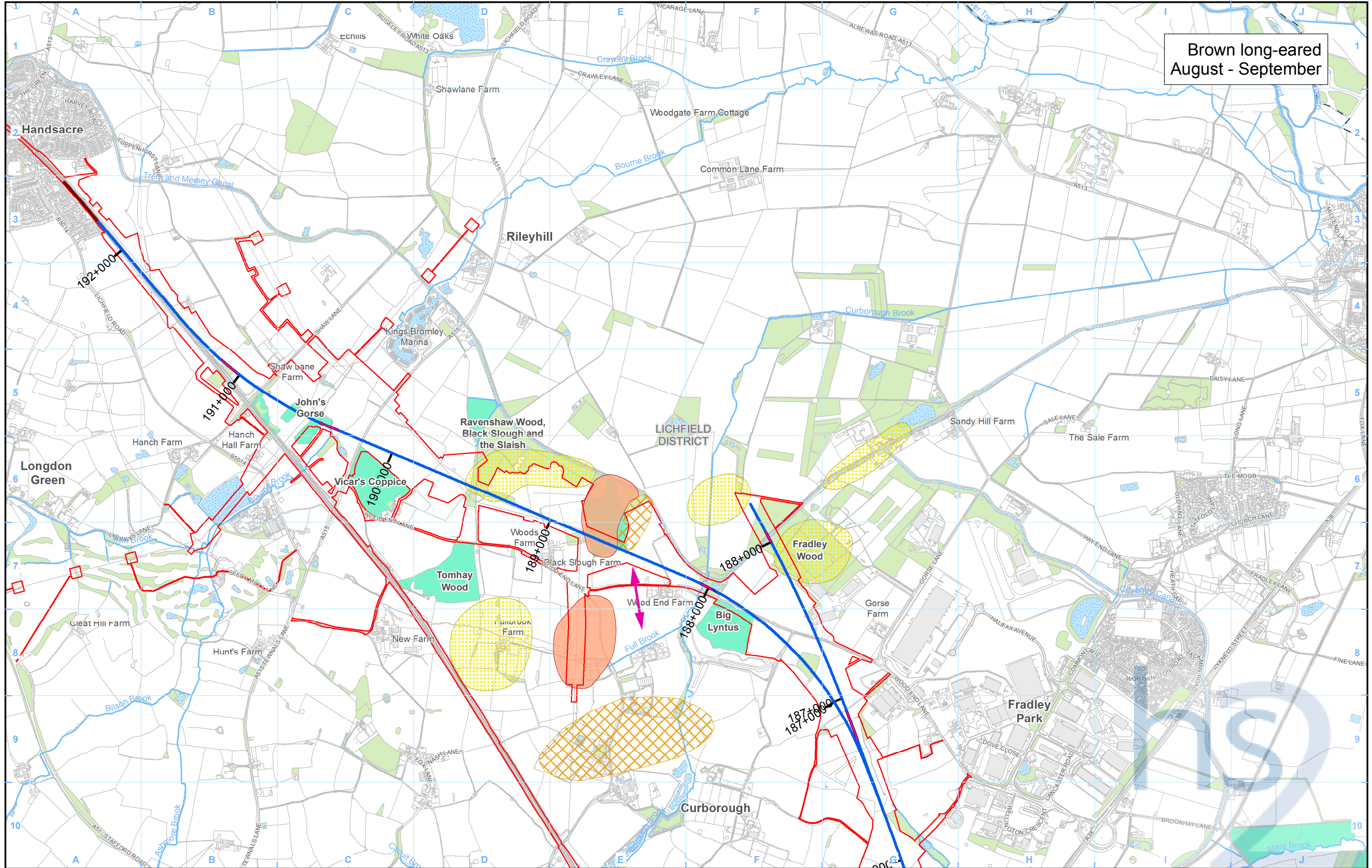
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Brown long-eared  
August - September



- Legend**
- Route on embankment
  - Route in retaining wall
  - Route on viaduct
  - Land potentially required during construction
  - Community forum boundary
  - County boundary
  - District/Borough boundary
  - Watercourse
  - Water body
  - Ancient woodland

- Radio tracking activity summary:**
- Core foraging area
  - Occasional foraging area
  - Infrequent foraging area
  - Commuting route

Map Number **EC-22-008**

Map Name **Areas of Bat Activity Identified During Radio Tracking**

Community Forum Area CFA22:  
Whittington to Handsacre

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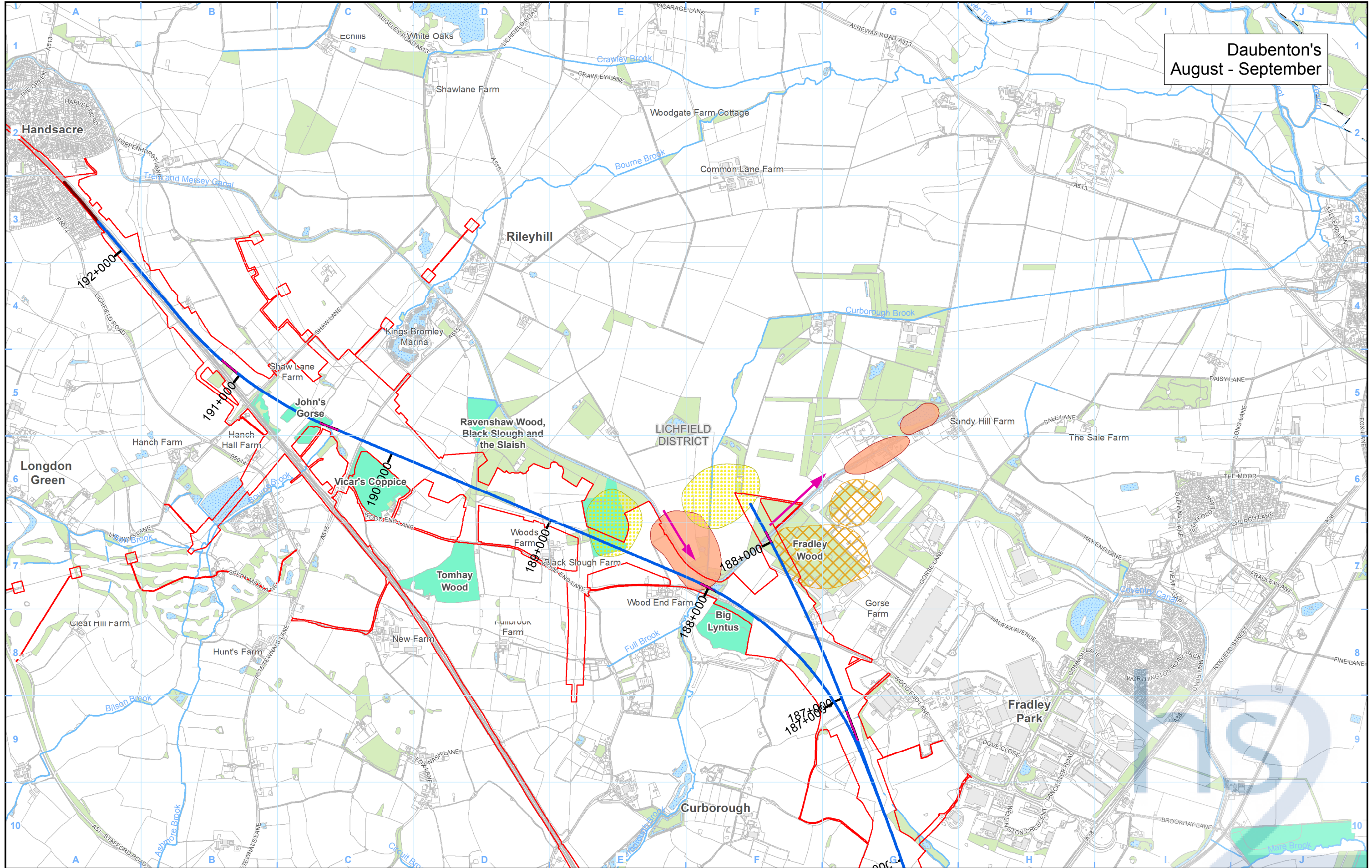
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**Legend**

- Route on embankment
- Route in retaining wall
- Route on viaduct
- Land potentially required during construction
- Community forum boundary
- County boundary
- District/Borough boundary
- Watercourse
- Water body
- Ancient woodland

**Radio tracking activity summary:**

- Core foraging area
- Occasional foraging area
- Infrequent foraging area
- Commuting route

Map Number **EC-22-009**

Map Name  
**Areas of Bat Activity Identified During Radio Tracking**

Community Forum Area CFA22:  
Whittington to Handsacre

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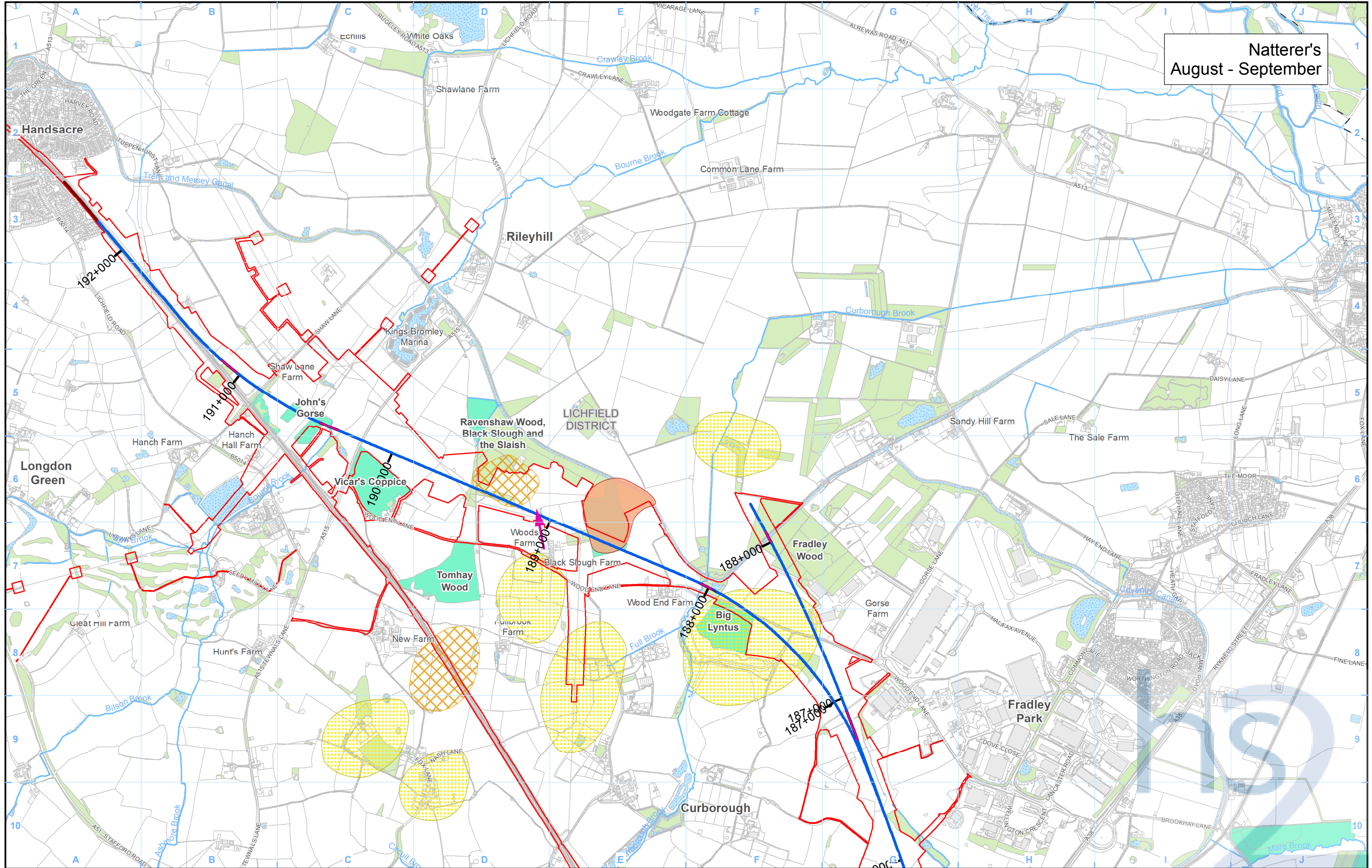
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**Legend**

Route on embankment	District/Borough boundary	<b>Radio tracking activity summary:</b>
Route in retaining wall	Watercourse	Core foraging area
Route on viaduct	Water body	Occasional foraging area
Land potentially required during construction	Ancient woodland	Infrequent foraging area
Community forum boundary		Commuting route
County boundary		

Map Number EC-22-010

Map Name  
**Areas of Bat Activity Identified During Radio Tracking**

Community Forum Area CFA22:  
Whittington to Handsacre

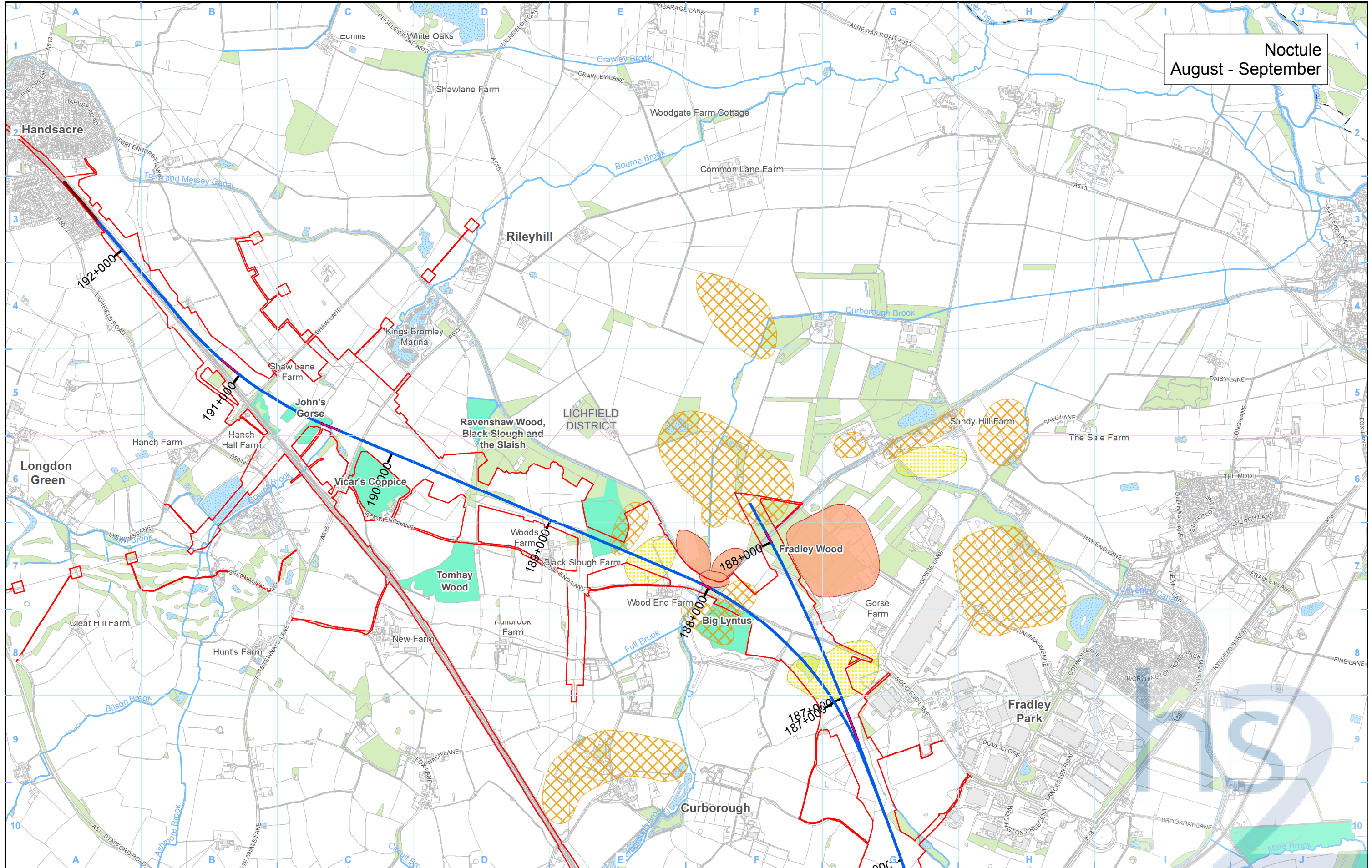
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**Legend**

Route on embankment	District/Borough boundary	<b>Radio tracking activity summary:</b>
Route in retaining wall	Watercourse	Core foraging area
Route on viaduct	Water body	Occasional foraging area
Land potentially required during construction	Ancient woodland	Infrequent foraging area
Community forum boundary		
County boundary		

Map Number **EC-22-011**

Map Name  
**Areas of Bat Activity Identified During Radio Tracking**

Community Forum Area CFA22:  
Whittington to Handsacre

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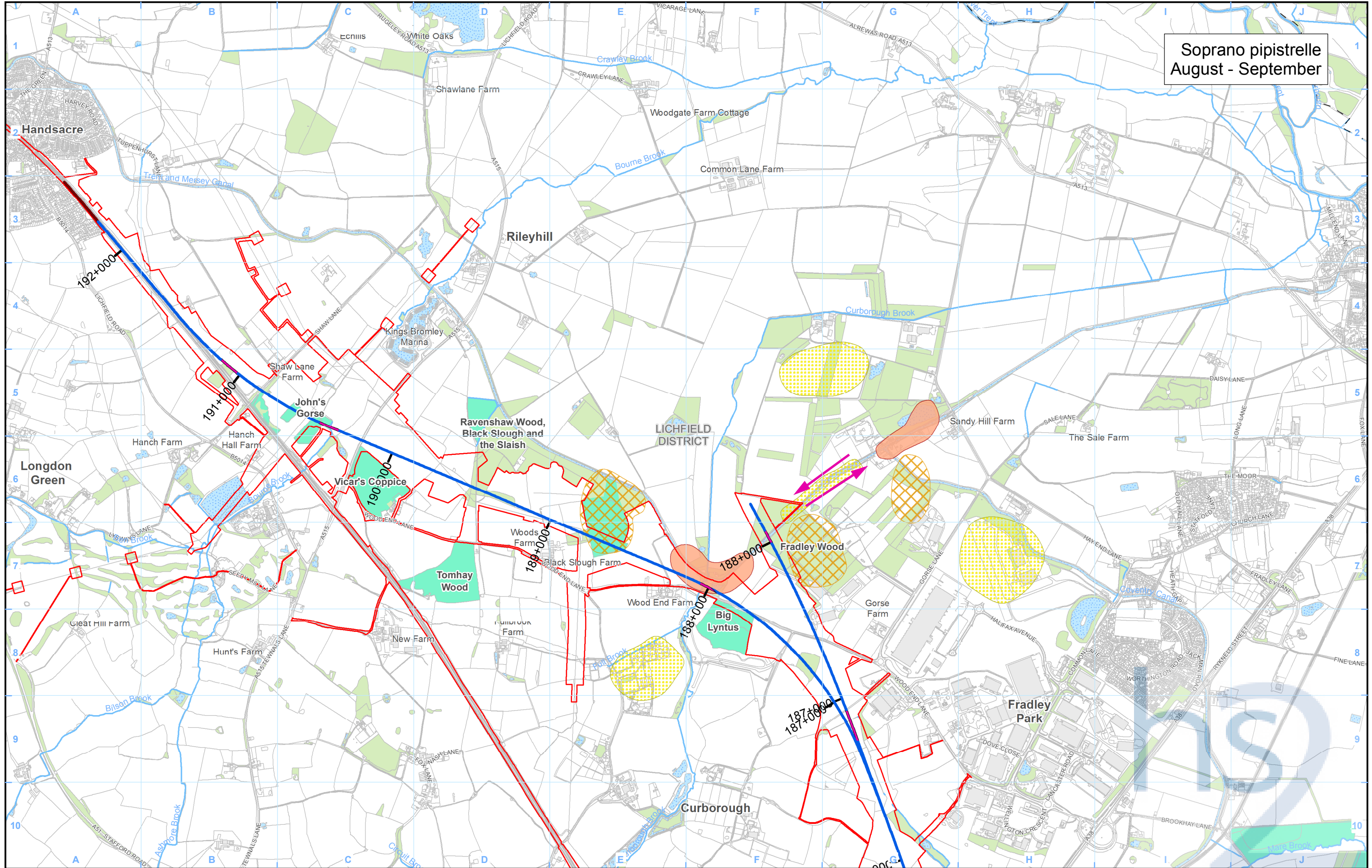
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Date: 01/05/15



Soprano pipistrelle  
August - September



**Legend**

- Route on embankment
- Route in retaining wall
- Route on viaduct
- Land potentially required during construction
- Community forum boundary
- County boundary
- District/Borough boundary
- Watercourse
- Water body
- Ancient woodland

**Radio tracking activity summary:**

- Core foraging area
- Occasional foraging area
- Infrequent foraging area
- Commuting route

Map Number **EC-22-012**

Map Name **Areas of Bat Activity Identified During Radio Tracking**

Community Forum Area CFA22:  
Whittington to Handsacre

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