# A12 Chelmsford to A120 widening scheme

# TR010060

# 9.1 Supplementary Bat Survey Report

Rule 8(1)(k)

Planning Act 2008

Infrastructure Planning (Examination Procedure) Regulations 2010

Volume 9

October 2022

Infrastructure Planning

Planning Act 2008

The Infrastructure Planning
(Examination Procedure) Rules 2010

# A12 Chelmsford to A120 widening scheme

Development Consent Order 202[ ]

## Supplementary Bat Survey Report

| | |
|---|---|
| **Regulation Number** | Rule 8(1)(k) |
| **Planning Inspectorate Scheme Reference** | TR010060 |
| **Application Document Reference** | TR010060/EXAM/9.1 |
| **Author** | A12 Project Team and National Highways |

| Version | Date | Status of Version |
|---|---|---|
| Rev 1 | October 2022 | Section 51 Additional submission |

## CONTENTS

# 0 Executive summary

0.1.1 This is a supplementary report of the A12 Chelmsford to A120 widening scheme Development Consent Order Application. This report presents the results of additional bat surveys and assessment of whether the results affect the evaluation of bat presence along the proposed scheme. It also presents the policy and legislative context within which the environmental impact assessment has been carried out. Likely significant effects of the proposed scheme on bats, and mitigation for bats, are considered in Chapter 9 of the Environmental Statement (ES) [TR010060/APP/6.1]).

0.1.2 Bat ground-based assessment of trees, bat tree climbing surveys and bat dusk emergence / dawn re-entry surveys of trees were undertaken using best practice guidance from Collins (2016) and the Bat Tree Habitat Key (BTHK) (2018).

0.1.3 Bat surveys were previously undertaken by Jacobs between 2019 and 2021. The purpose of this report is to present the results of additional surveys undertaken between 2021 and 2022 for the gas main diversion (Little Braxted to Springfield A1A2, Chapter 2 of the ES [TR010060/APP/6.1]) and Inworth Road.

0.1.4 No additional bat roosts were identified within the trees surveyed during the field surveys detailed in this report. There is no change to the proposed mitigation for bats, nor the valuation of the site.

# 1 Introduction

## 1.1 Background

1.1.1 The A12 Chelmsford to A120 Widening Scheme (the 'proposed scheme') comprises improvements to the A12 between junction 19 (Boreham) at TL 741094, and junction 25 (Marks Tey) at TL 917238, a distance of approximately 24km, or 15 miles. The proposed scheme involves widening the A12 to three lanes in each direction throughout. It also includes safety improvements, including closing of existing at grade accesses, and reducing access to cyclists along the dual carriageway by providing an alternative route for walkers, cyclists and horse riders.

1.1.2 The proposed scheme would require new crossings of watercourses and potential improvements to existing culvert and bridge crossings. There are eight crossings of main rivers, six of which comprise existing crossings and two of which comprise new crossings on proposed offline sections of road. Three of the crossings would require minor realignments at the crossing points.

1.1.3 The proposed scheme is classed as a Nationally Significant Infrastructure Project (NSIP) under the Planning Act (2008), triggering the need to apply for a Development Consent Order (DCO). A DCO application was submitted to the Planning Inspectorate (PINS) by National Highways in August 2022 and was accepted by the Planning Inspectorate on 12 September 2022. The application was supported by an Environmental Statement (ES) which included numerous appendices. Appendix 9.4 (Bat Survey Report) of the ES summarised the baseline data collected with respect to bats.

1.1.4 Due to the iterative nature of the design process in the lead up to DCO submission there were changes in the Order Limits. Some of the changes occurred subsequent to the end of the optimal survey season for protected species and therefore a small number of surveys could not be completed prior to the DCO submission.

## 1.2 Purpose of the report

1.2.1 This report presents the results of these additional bats surveys of the gas main diversion (Little Braxted to Springfield A1A2, Chapter 2 of the ES [TR010060/APP/6.1]) and Inworth Road surveys undertaken from 2021 to 2022. Likely significant effects on, and mitigation for, bats are considered in Chapter 9 of the ES, and this report concludes whether the results of the surveys affect the results of that assessment. It presents the policy and legislative context within which the Environmental Impact Assessment (EIA) has been carried out.

1.2.2 This report presents the results of surveys undertaken along of gas main diversion and Inworth Road surveys undertaken from 2021 to 2022, in areas of land not covered by the original suite of surveys reported in Appendix 9.4 of the ES.

## 1.3 Survey objectives

1.3.1 The key objectives of these survey were to:

a. determine the presence or likely absence of bat roosts within the study area
b. determine species usage and roost type once roosts are discovered (e.g. maternity, hibernation roosts) within study area
c. verify or update the assessment of potential impacts on confirmed bat roosts, foraging areas and commuting routes associated with the proposed scheme (as detailed in the ES), and
d. determine requirements for additional mitigation if necessary.

# 2 Bat ecology

2.1.1 There are currently 18 species of bat known to be present in England, 17 of which have been recorded breeding. Mating occurs in autumn, but the female does not become pregnant until the following spring with one pup born each year. During spring and summer, female bats gather to form maternity colonies to give birth and rear their young (Mitchell-Jones, 2004).

2.1.2 Bats in Britain eat insects including beetles, moths, midges and other invertebrates such as spiders. Bats gather to feed wherever there is an abundance of insects, so the best foraging habitat includes pasture, woodland, marshes, ponds and slow-moving rivers (Mitchell-Jones, 2004). Hibernation occurs during the winter when food sources are scarce.

2.1.3 Bats will use a variety of roosts for different purposes throughout the year which range from feeding perches, transitory night and day roosts, mating roosts, hibernation sites and maternity roosts. The conservation significance of each of these roost types increases with frequency and duration of use, the number of bats involved and on the rarity of the species/assemblage of bats present (Mitchell-Jones, 2004).

2.1.4 Roosting habitat generally comprises three main types (Natural England, undated):

a. Built structures: includes bridges, houses, ancient monuments, churches, farms, and industrial, agricultural, and commercial buildings. These are often important in summer when it is warmer. Cellars, mines and tunnels can provide cool, sheltered areas suitable for hibernating.

b. Natural structures: includes cracks and crevices in cliff faces and caves that are particularly used for hibernating.

c. Hollow or damaged trees: any cracks, splits, cavities, and loose bark can provide roosting habitat for bats throughout the year.

# 3 Legislation and policy

## 3.1 Legislation

3.1.1 All species of bats and their breeding sites or resting sites (roosts) are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species 2017. All bat species are therefore classed as European Protected Species (EPS). It is an offence to intentionally kill, injure or capture a bat, to possess a bat (whether live or dead) or any part of a bat, or sell or offer a bat for sale without a licence. It is also an offence to intentionally damage or destroy any place used by bats for shelter, whether they are present or not and to disturb a bat intentionally or recklessly in its roost or obstruct access to a bat roost.

3.1.2 Natural England (the licensing authority) may grant licences to allow activities which may otherwise be considered illegal to take place if carried out in accordance with the provisions of the licence.

3.1.3 Section 40 of the Natural Environment and Rural Communities (NERC) Act 2006 places a duty on all public bodies to have regard to the conservation of biodiversity in England when carrying out their normal functions (the biodiversity duty).

3.1.4 Section 41 of the NERC Act 2006 also lists seven bat species (barbastelle (*Barbastella barbastellus*), Bechstein's bat (*Myotis bechsteinii*), brown long-eared bat (*Plecotus auritus*), greater horseshoe bat (*Rhinolophus ferrumequinum*), lesser horseshoe bat (*Rhinolophus hipposideros*), noctule (*Nycatalus noctule)* and soprano pipistrelle (*Pipistrellus pygmaeus)*) as species of principal importance for the purpose of conserving biodiversity.

## 3.2 National Networks National Policy Statement

3.2.1 The National Networks National Policy Statement (NNNPS) sets out the government's policies to deliver the development NSIPs on the national road and rail networks in England. The Secretary of State (SoS) uses the NNNPS as the primary basis for making decisions on DCO applications.

3.2.2 Paragraph 5.22 of the NNNPS states that 'the applicant's assessment should describe any likely significant effects on internationally, nationally and locally designated sites of ecological conservation importance; protected species; habitats (including irreplaceable habitats such as ancient woodland and veteran trees); and other species identified as being of principal importance for the conservation of biodiversity.' The surveys described in this report will inform the assessment of significant effects within the ES.

3.2.3 In addition to the national policy set out in the NNNPS, the Proposed Scheme must also have regard to relevant legislation and local plans and policy.

## 3.3 Priority species

3.3.1 The NERC Act 2006 places a responsibility on local authorities and government departments to consider the purposes of conserving biodiversity in a manner

consistent with their normal duties, such as policy and decision-making. This Act ties together wildlife legislation and planning policies.

3.3.2 The common pipistrelle (*Pipistrellus pipistrellus)* is included in the Essex biodiversity action plan (Essex Field Club, 2021).

# 4 Methodology

## 4.1 Desk study

4.1.1 A desk study was undertaken in June 2021 to obtain information pertaining to bats within the proposed scheme and surrounding landscape. The desk study provided sufficient coverage of the gas main diversion and Inworth Road. The methodology and the results of the desk study are presented in detail in Appendix 9.4 Bat Survey Report [TR010060/APP/6.3].

## 4.2 Field study

4.2.1 For the gas main diversion and Inworth Road surveys, each individual field survey was only conducted within the Provisional Order Limits (POL) and its 30m buffer at the time of survey completion. The POL consists of the areas to be impacted preconstruction, during construction and post construction, this includes the area designated for the route of the gas main diversion, construction compounds, haul roads and mitigation areas.

4.2.2 Initially, there were multiple route options for the gas main diversion and a 30m buffer around all options was surveyed. In early 2022 this was refined to one preferred option and surveys were focused to within 30m of the preferred route option.

### Ground-based bat roost assessments of trees

4.2.3 Most trees within the gas main diversion and Inworth Road were subject to ground assessments in 2021 (and therefore the results of these surveys are contained within Appendix 9.4 Bat Survey Report). However following agreements with landowners to access their land, an additional five trees were surveyed in 2022.

4.2.4 The ground-based bat roost assessments are based on guidance found in British Standards Institution (BSI; 2015), BTHK (2018) and Collins (2016). The survey involves comprehensively inspecting each tree from the ground level, using binoculars, high powered torches and an endoscope as required, to identify features suitable for supporting roosting bats. These features are referred to as potential roosting features (PRFs) and may include the following:

a. Disease and decay features which include:

   i. Woodpecker-holes

   ii. Squirrel-holes

   iii. Knot-holes

   iv. Pruning cuts

   v. Tear-outs

   vi. Wounds

vii. Cankers

viii. Compression forks

ix. Butt rots

b. Damage which includes:

i. Lightning strikes

ii. Hazard-beams

iii. Subsidence-cracks

iv. Shearing-cracks

v. Transverse-snaps

vi. Welds

vii. Lifting bark

viii. Desiccation-fissures

ix. Frost-cracks

c. Association, which includes:

x. Fluting (a longitudinal groove or channel in the stem)

xi. Ivy.

4.2.5 All surveyed trees were assigned to a potential suitability category outlined by Collins (2016). The potential suitability categories include high, moderate, low and negligible suitability to support roosting bats (Table 4.1). If a roost was identified during the survey, the individual tree was assigned the category of 'roost'. Any tree that had negligible suitability to support roosting bats was not recorded.

4.2.6 The level of suitability assigned to an individual tree determined the need for further survey efforts. All trees with high or moderate suitability, as well as any confirmed roosts, were subject to either tree climbing, ground endoscope or dusk emergence and dawn re-entry surveys. If further survey effort was required, the individual trees were assessed during the ground-based assessment for their climbing suitability. A note was also made if the tree had features that provided notable hibernation potential for roosting bats in order to inform further surveys if a hibernation survey was necessary.

**Table 4.1 Description of how roost suitability is assigned to individual trees and structures based on potential roost features and surrounding habitats (Collins, 2016)**

| Suitability | Description of roosting habitats | Commuting and foraging habitats |
|---|---|---|
| Roost | Roost confirmed during survey | |
| High | Tree or structure with one or more potential roost sites that are obviously suitable for large numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat. | Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree lined watercourse and grazed parkland. Site is close to and connected to known roosts. |
| Moderate | A tree or structure with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only). | Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of scrub or trees or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water. |
| Low | Tree sufficiently large and of an age to contain PRFs but with either none seen from the ground or features seen with only very limited roosting potential.<br>A structure with one or more potential roost sites that could be used by individual bats opportunistically.<br>The PRFs on either the tree or structure do not provide enough space, shelter, protection, appropriate conditions and/or surrounding habitat to be used on a regular basis or by larger numbers of bats (ie unlikely to be suitable for maternity or hibernation). | Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated stream, but that is isolated ie not very well connected to the surrounding landscape by other habitat.<br>Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub. |
| Negligible | Negligible habitat features on site likely to be used by roosting bats | |

### Limitations

4.2.7 The ground-based assessment surveys were planned for winter 2021/2022, which is the optimal season for this survey type. Due to land access restrictions, some ground-based assessment surveys were carried out within the summer months of 2022. A proportion of the survey work was therefore undertaken

while trees had full foliage and dense ground flora. This is considered a suboptimal time of year to complete ground-based surveys as the view from the ground is obstructed by foliage. The likelihood that surveyors will miss PRFs increases during the summer months. This is therefore considered a limitation of the survey work. This will be mitigated for through repeat preconstruction surveys of any trees due to be directly impacted by construction.

4.2.8 It was not possible to gain access to all residential properties along Inworth Road which were within 30m of the Order Limits. This is not considered a significant limitation as there would be no direct impact from the scheme and minimal disturbance due to the fact they are lived in residential areas. Any bats in these areas are deemed unlikely to be disturbed.

## Tree climbing and ground endoscope surveys

4.2.9 During the ground-based assessments individual trees that required further survey effort were assessed for their suitability for tree climbing and ground endoscope surveys. The trees were assessed based on health and safety considerations such as the condition of the tree, presence of nearby hazards, and height of the PRF.

4.2.10 The BCT guidance (Collins, 2016) outlines that all trees of moderate or high potential, and confirmed roosts, should be surveyed in advance of any removal or disturbance. These surveys are required to identify any active bat roosts, the type of roost and the species of bat using the roost.

4.2.11 Table 4.2 shows the breakdown of the number of surveys required for individual trees within the 30m buffer of Inworth Road and the gas main diversion based on their suitability grade.

**Table 4.2 Survey criteria based on tree roost potential**

| Roost potential | Number of surveys required |
|---|---|
| Confirmed | 3 |
| High | 3 |
| Moderate | 2 |
| Low | 1 |
| Negligible | 0 |

4.2.12 Trees requiring further survey effort that had PRFs above 1.5m in height, were subject to tree climbing surveys if they had been deemed safe to climb during the ground-based assessment. If a tree was considered unsafe to climb but had PRFs above the height of 1.5m, the tree was subject to dusk emergence and dawn re-entry surveys. Trees with PRFs below 1.5m in height were subject to ground-based endoscope surveys.

4.2.13 Both tree climbing and ground endoscope surveys comprised close inspection of all PRFs found on individual trees. Inspections were undertaken using a

small torch and/or endoscope (Ridgid/Seesnake CA100). All surveys were completed by appropriately qualified and licensed ecologists (Natural England Bat Licence Class 2). The ecologists conducting the tree climbing surveys required an additional NPTC CS38 tree climbing and aerial rescue qualification.

4.2.14 The following information was recorded during the tree climbing survey for each PRF that had a potential suitability of high, moderate or was confirmed as a roost (BTHK, 2018):

a. Approximate dimensions of entrance
b. Approximate internal dimensions
c. Dry or wet
d. Clean or dusty/dirty/sludgy
e. Evidence of use by birds, squirrels or other non-bat species
f. Evidence of bat activity (smoothing of internal surfaces, droppings, feeding remains, staining or presence of bat mites)
g. Presence, number, and species of bats observed.

4.2.15 The information gathered was used to determine the suitability of each PRF to support roosting bats. Any evidence of bats having previously been present was recorded. A note was also made if the tree had features that provided notable hibernation potential for roosting bats in order to inform further surveys.

4.2.16 All relevant information gained through the tree climbing and endoscope surveys was used to revise the original feature grades assigned during the ground-based assessment. Where a bat roost was identified, the PRF was upgraded to a confirmed roost. The overall tree grade for individual trees was subsequently updated, improving the accuracy of the assessments. The tree climbing and ground endoscope surveys determined the need for further survey work associated with the individual trees.

**Limitations**

4.2.17 A tree can only be confirmed as a roost if a bat is found within the PRF or if evidence such as bat droppings are found. Bats move between tree roosts frequently and so the likelihood of finding a bat during a tree climbing or ground endoscope survey is low. Bat droppings remain present in PRFs longer than the bats themselves but degrade over time, especially if droppings are near the entrance of a PRF or exposed to the elements. Due to these reasons, it can be challenging to identify a confirmed roost during these surveys. However, completing inspections with an endoscope either from the ground or by climbing techniques increases the likelihood of identifying roosts even when there are no bats present, unlike traditional methods such as emergence / re-entry surveys. Repeating endoscope or climbing surveys during the summer months increases the robustness of these surveys further.

4.2.18 Other signs of roosting bats include smoothing of internal surfaces as well as staining and scratches on trees. These features are not solely indicative of roosting bats and therefore cannot be used as bat roosting evidence.

4.2.19 Trees that were deemed unsuitable for climbing or ground endoscope could not be accessed during the hibernation season, and as such there is a small risk that hibernation roosts have been missed from these trees. Killing and injury of

hibernating bats can be avoided through timing of works to avoid hibernation period.

## Tree emergence / re-entry surveys

4.2.20 The BCT guidance (Collins, 2016) outlines that all trees with moderate or high suitability to support roosting bats should be surveyed in advance of any removal or disturbance. Trees with low suitability do not require further survey effort.

4.2.21 All tree emergence / re-entry surveys were undertaken between 25 May 2022 and 22 September 2022. Depending on the location of the tree, all trees with high or moderate suitability to support roosting bats, but which could not be climbed or that had PRFs higher than 1.5m, were subject to at least one dusk emergence or dawn re-entry as per survey criteria outlined in Table 4.2.

4.2.22 Dusk emergence and dawn re-entry surveys involved monitoring individual trees and their PRFs by suitably qualified ecologists either side of sunset and sunrise. The number of surveyors required for the survey, and their positions, was determined during the ground-based assessment. Surveyors were positioned around the tree to ensure all aspects were monitored during the survey. At least two surveyors were required for the dusk emergence and dawn re-entry surveys due to health and safety requirements.

4.2.23 Each surveyor was equipped with an Echo Meter Touch Pro 2 (EMT2) bat detector, with auto identification, and an iPad mini to record bat activity during the survey. Echo Meter Touch bat detector settings were: Trigger sensitivity – High; Audio division ratio 1/20; Nightly session mode – On; Real time ID – Off. All bats that emerged from or re-entered the individual trees were recorded by the surveyor. Details of the location/time of the emergence/re-entry and the number/species of bats that emerged/re-entered were recorded. Weather conditions were recorded at the start and end of each survey, and if any significant changes in the weather occurred during the survey. All observations of bats were recorded including any foraging, commuting, or swarming behaviour. In certain circumstances, where visibility was reduced, surveyors were equipped with an infrared (IR) camera to assist with the survey.

4.2.24 Dusk emergence surveys started 15 minutes before sunset and continued for 2 hours after sunset to account for late emerging species. Dawn re-entry surveys started two hours before sunrise and continued for 15 minutes after sunrise.

4.2.25 Recordings of bats emerging from / re-entering a confirmed roost were subject to sound analysis. Kaleidoscope was used to identify the individual species of bat according to Russ (2012). Additional time was spent analysing recordings of rare or unusual bat species identified during the surveys.

### Limitations

4.2.26 Restrictions on land access due to land access refusal resulted in three trees (T1644, T1645 and Tuntagged_20211026) having both their emergence surveys in September, rather than one between May-August and one in September as is optimal. However, the first surveys of the trees were conducted between 6 and 7 September 2022 at the earliest opportunity once

access was granted. This is not considered a significant limitation to the survey results and all trees would be subject to preconstruction surveys at which point surveys could be timed more optimally.

## General survey limitations

4.2.27 The findings of this report represent the professional opinion of qualified ecologists and do not constitute professional legal advice. The client may wish to seek professional legal interpretation of the relevant wildlife legislation cited in this document.

4.2.28 This report should be read in full and excerpts may not be representative of the findings.

4.2.29 This report has been prepared exclusively for Jacobs' client and no liability is accepted for any use or reliance on the report by third parties.

# 5 Results

## 5.1 Desk study

5.1.1 The results of the desk study for bats for the proposed scheme are presented in Appendix 9.4 Bat Survey Report.

## 5.2 Field study – ground-based assessments

5.2.1 Table 5.1 summarises the number of each category of bat roost surveyed within the gas main diversion and along Inworth Road (NB results include trees which were subsequently deemed to be outside the 30m buffer of the Order Limits as the design of the scheme was refined over the survey period).

5.2.2 Of the trees surveyed, two were identified as having hibernation potential, tree T1648 which was identified as being suitable for climbing, and tree T1638 whose features were sufficiently low they could be inspected from ground level by endoscope.

5.2.3 The raw data for bat roost suitability of individual trees are provided in Appendix B.

**Table 5.1 Number of trees identified within all gas main diversion options and Inworth Road study area and their assessed roosting suitability**

| Tree bat roosting suitability | Total number of trees (all areas surveyed) |
|---|---|
| Roost | 0 |
| High | 7 |
| Moderate | 33 |
| Low | 11 |
| Negligible | 0 |
| **Total** | **51** |

## 5.3 Field study - climbing and ground endoscope

5.3.1 During climbing surveys, the roost category of five trees was amended as follows:

- tree T1643 was downgraded from moderate to negligible potential
- trees ‘Tuntagged_210722_OBEP_2’ and T1639 were downgraded from moderate to low potential
- trees ‘Tuntagged_200722_OBEP_4’ and T1642 were upgraded from moderate to high potential.

5.3.2 Only one tree (T1638) was identified as having hibernation potential during the ground-based assessments (see Appendix B). A hibernation survey was completed for tree T1638 on 7 December 2021. No evidence of roosting bats was recorded.

5.3.3 No bat roosts of evidence of bat roosting were recorded during the climbing or ground endoscope surveys.

## 5.4 Field study – emergence/re-entry

5.4.1 Appendix D summarises the meta data relating to the emergence and re-entry surveys. Surveys for some trees were not completed due to refinement of the scheme design which meant they would be outside the zone of influence and therefore not subject to impacts.

5.4.2 No bats were recorded emerging from or re-entering any of the trees. The bat species observed commuting and foraging across the habitats within the survey locations were predominantly the more common species such as common and soprano pipistrelle and noctule bats. Multiple Daubenton's bats (*Myotis daubentonii*) were also observed within the survey locations due to the presence of nearby waterbodies. One barbastelle bat was identified during the surveys however this species was also identified previously during bat surveys for the A12 and so is known to be present within the area. Therefore, the presence of this rarer species does not affect the valuation of the study area.

# 6 Discussion

## 6.1 Summary

6.1.1 The majority of trees assessed in this report had been ground assessed in 2021 and were included within the original bat survey report (Appendix 9.4 of the Environmental Statement). A further five trees were identified has having bat roost potential during ground assessments in 2022 due to the survey of new areas as a result of further access being granted.

6.1.2 No additional bat roosts were identified within the trees surveyed in 2022 within the gas main diversion and Inworth Road survey areas covered in this report. There is therefore no change to the impact assessment presented in Chapter 9 Biodiversity of the ES, nor is there a requirement to amend mitigation proposals with respect to roosting bats based on the results of this report.

6.1.3 The Register of Environmental Actions and Commitments (REAC) within the first iteration Environmental Management Plan [TR010060/APP/6.5] includes measures to mitigate for the loss of trees with bat roost potential. These measures would extend to the five additional trees identified within this report, should they be removed to enable construction of the proposed scheme.

## 6.2 Evaluation

6.2.1 There is no change to the valuation of the study area for bats presented in Appendix 9.4 Bat Survey Report as no additional roosts have been identified from the surveys presented in this report.

6.2.2 The overall bat population in the study area is considered to be of **County Importance** for Biodiversity.

# 7 References

7.1.1 Bat Conservation Trust (2021) *Bat roosts*. Available at [redacted] [Accessed October 2021].

7.1.2 Bat Tree Habitat Key (BTHK) (2018) Bat Roosts in Trees – A Guide to Identification and Assessment for Tree-Care and Ecology Professionals. Exeter: Pelagic Publishing.

7.1.3 British Standards Institution (BSI) (2015) *BS 8596: Surveying for Bats in Trees and Woodland.* British Standards Institution, London.

7.1.4 Collins, J. (ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines.* 3rd edn. The Bat Conservation Trust, London.

7.1.5 Essex Field Club (2021) *Essex BAP species.* Available at: [redacted] [Accessed 5th October 2021].

7.1.6 Highways England (2020a) *A12 Chelmsford to A120 Widening Scheme Environmental Scoping Report*. Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR010060/TR010060-000006-A12%20-%20Environmental%20Scoping%20Report.pdf [Accessed January 2021].

7.1.7 Highways England (2020b) A12 Chelmsford to A120 Widening Scheme Extended Phase 1 Habitat Survey Report.

7.1.8 Highways England (2020c) Design Manual for Roads and Bridges, LA 108 – Biodiversity.

7.1.9 Mitchell-Jones, A.J. (2004) *Bat Mitigation Guidelines.* English Nature, Peterborough.

7.1.10 National Highways 2022. A12 Chelmsford to A120 widening scheme. 6.3 Environmental Statement, Appendix 9.4 Bat Survey Report [TR010060/APP/6.]

7.1.11 Natural England (2020) *Multi-Agency Geographical Information for the Countryside (MAGIC).* Available at: www.magic.gov.uk [Accessed 10 March and 4 June 2021].

7.1.12 Russ, J. (2012) British Bat Calls: A guide to Species identification. The Bat Conservation Trust, London.

# Appendix A Figures

Figure A.1: Bat Surveys – Trees Survey Results

# FIGURE A.1

**Legend**

- Order Limits

**Bat Tree Survey Results**

- High potential
- Moderate potential
- Low potential

Tuntagged_18112021_OBTG_2

All Saints' Church

Inworth

TUntagged_07122021_OBBH_1

Tuntagged_18112021_OBTG_1

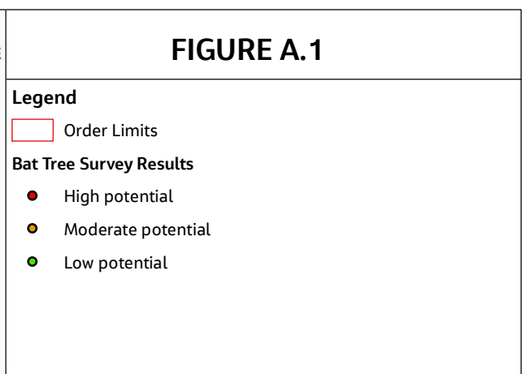
Tuntagged_18112021_OBTG_3

B1023

Hill Farm

0 300 Metres

Contains OS data © Crown Copyright and database right 2022




| Rev. | Rev. Date | Purpose of revision | Drawn | Check'd | Rev'd | Appr'd |
|---|---|---|---|---|---|---|
| P00 | 26/10/22 | Draft | JC | AJ | AJ | KT |

Client

national highways

Project

REGIONAL DELIVERY PARTNERSHIP
A12 CHELMSFORD TO A120 WIDENING SCHEME

Drawing Title

BAT SURVEYS - TREES
SURVEY RESULTS
SHEET 1 OF 4

Drawing Status

S4 - SUITABLE FOR STAGE APPROVAL

| | | |
|---|---|---|
| Scale @ A3 | 1:3750 | DO NOT SCALE |
| Jacobs No. | B36601D4 | |
| Client No. | HE551497 | Rev P00 |

Drawing Number

HE551497-JAC-EBD-5_SCHME-SK-LE-0002

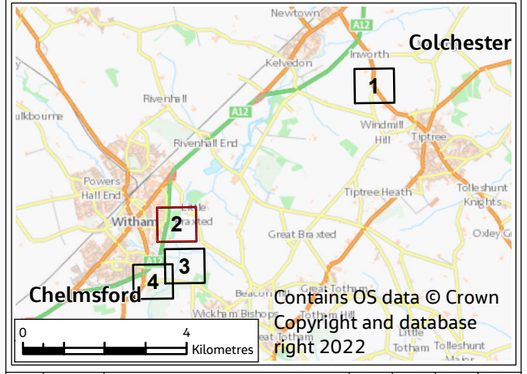

# FIGURE A.1

**Legend**

- Order Limits

**Bat Tree Survey Results**

- High potential
- Moderate potential
- Low potential




| Rev. | Rev. Date | Purpose of revision | Drawn | Check'd | Rev'd | Appr'd |
|---|---|---|---|---|---|---|
| P00 | 26/10/22 | Draft | JC | AJ | AJ | KT |

Client

national highways

Project

REGIONAL DELIVERY PARTNERSHIP
A12 CHELMSFORD TO A120 WIDENING SCHEME

Drawing Title

BAT SURVEYS - TREES
SURVEY RESULTS
SHEET 2 OF 4

Drawing Status

S4 - SUITABLE FOR STAGE APPROVAL

| | | |
|---|---|---|
| Scale @ A3 | 1:3750 | DO NOT SCALE |
| Jacobs No. | B36601D4 | |
| Client No. | HE551497 | Rev P00 |

Drawing Number

HE551497-JAC-EBD-5_SCHME-SK-LE-0002

# FIGURE A.1

**Legend**

Order Limits

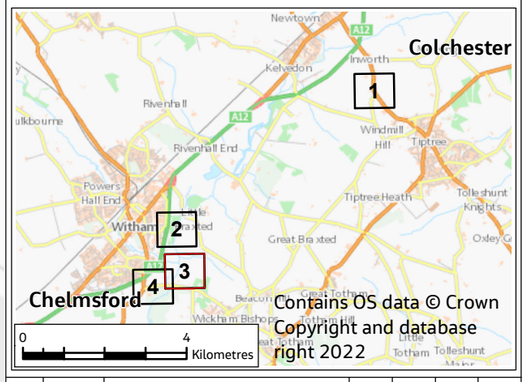
**Bat Tree Survey Results**

- High potential
- Moderate potential
- Low potential

Tuntagged20211028-2
Tuntagged20211028-4
Tuntagged2021102-3
Tuntagged20211028-1
T1647
Tuntagged_200722_OBEP_1
Tuntagged_200722_OBEP_2
Tuntagged_020822_BGOB_1
T1646
T1645
T1644
1643
Tuntagged_200722_OBEP_3
T1642
1641
T1640
Tuntagged_210722_OBEP_4
T1637
T1636
T1649
T1650
T1655
T1651
T1652
Tuntagged-2021/11/10-8
Tuntagged-2021/11/10-6
Tuntagged-2021/11/10-7
Tuntagged-20211027-2
TUntagged-20211027-1
T1648
Tuntagged-2021/11/10-5
Tuntagged-2021/11/10-4
Tuntagged-2021/11/10-3
Tuntagged-2021/11/09-1
Tuntagged-2021/11/09-4
Tuntagged_20211026_2
T1653
1654
Tuntagged-2021/11/09-3
Tuntagged-2021/11/09-2
Tuntagged_20211026_1
Sewells Farm
Barn Grove
Ishams Barn
Benton Hall
Blue Mills Hill
Blue Mills Cottages
Mope La
Witham Rd
Chelmsford

0 300 Metres

Contains OS data © Crown Copyright and database right 2022




Contains OS data © Crown Copyright and database right 2022

| Rev. | Rev. Date | Purpose of revision | Drawn | Check'd | Rev'd | Appr'd |
|---|---|---|---|---|---|---|
| P00 | 26/10/22 | Draft | JC | AJ | AJ | KT |

Client

national highways

Project

REGIONAL DELIVERY PARTNERSHIP
A12 CHELMSFORD TO A120 WIDENING SCHEME

Drawing Title

BAT SURVEYS - TREES
SURVEY RESULTS
SHEET 3 OF 4

Drawing Status

S4 - SUITABLE FOR STAGE APPROVAL

| | | |
|---|---|---|
| Scale @ A3 | 1:3750 | DO NOT SCALE |
| Jacobs No. | B36601D4 | |
| Client No. | HE551497 | Rev P00 |

Drawing Number

HE551497-JAC-EBD-5_SCHME-SK-LE-0002

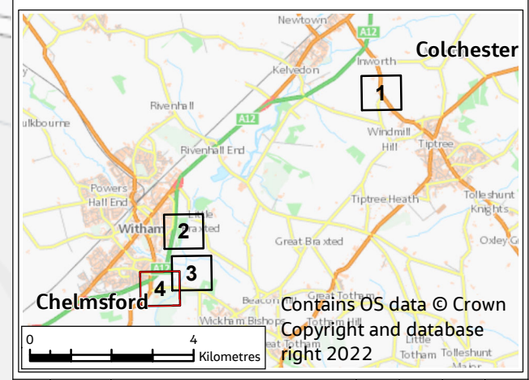
# FIGURE A.1

**Legend**

- Order Limits

**Bat Tree Survey Results**

- High potential
- Moderate potential
- Low potential




| Rev. | Rev. Date | Purpose of revision | Drawn | Check'd | Rev'd | Appr'd |
|---|---|---|---|---|---|---|
| P00 | 26/10/22 | Draft | JC | AJ | AJ | KT |

Client

national highways

Project

REGIONAL DELIVERY PARTNERSHIP
A12 CHELMSFORD TO A120 WIDENING SCHEME

Drawing Title

BAT SURVEYS - TREES
SURVEY RESULTS
SHEET 4 OF 4

Drawing Status

S4 - SUITABLE FOR STAGE APPROVAL

| | | |
|---|---|---|
| Scale @ A3 | 1:3750 | DO NOT SCALE |
| Jacobs No. | B36601D4 | |
| Client No. | HE551497 | Rev P00 |

Drawing Number

HE551497-JAC-EBD-5_SCHME-SK-LE-0002



Benton Hall
Tuntagged-2021/11/09-1
Tuntagged-2021/11/09-4
Tuntagged_20211026_2
T1653
1654
Tuntagged_20211026_1
Tuntagged-2021/11/10-1
TUNTAGGED_061221_OBBH_1
Tuntagged_20211026
Tuntagged-2021/11/10-2
Olivers Farm
Ashby Rd
Scarletts Cl
Sparkey Cl
Halfacres
Benton Cl
Market La
Pipe Mills Hill
B1018
Maldon Rd
0
300
Metres
Contains OS data © Crown Copyright and database right 2022

# Appendix B Summary of ground-based tree assessments

## Table B.1 Summary of surveys completed on trees 2021-2022

| Tree ID | Species | Ground based assessment date | Ground based assessment grade | Further survey | Number of further surveys required if due to be impacted | Noted Hibernation Potential Y/N |
|---|---|---|---|---|---|---|
| Tuntagged-2021/11/10-6 | Dead – species unidentified | 28/10/21 | High | Dusk/dawn | 3 | N |
| Tuntagged-2021/11/10-5 | Crack Willow | 10/11/21 | Moderate | Dusk/dawn | 2 | N |
| Tuntagged-2021/11/10-4 | Crack Willow | 10/11/21 | Moderate | Dusk/dawn | 2 | N |
| Tuntagged_20211028_1 | Dead – species unidentified | 10/11/21 | Moderate | Dusk/dawn | 2 | N |
| Tuntagged_20211028_2 | Oak | 28/10/21 | Moderate | Dusk/dawn | 2 | N |
| Tuntagged_20211028_3 | Ash | 28/10/21 | Moderate | Dusk/dawn | 2 | N |

| Tree ID | Species | Ground based assessment date | Ground based assessment grade | Further survey | Number of further surveys required if due to be impacted | Noted Hibernation Potential Y/N |
|---|---|---|---|---|---|---|
| Tuntagged_20211028_4 | Dead – species unidentified | 28/10/21 | Moderate | Dusk/dawn | 2 | N |
| Tuntagged_18112021_3 | Oak | 18/11/21 | Moderate | Dusk/dawn | 2 | N |
| Tuntagged_020822_BGOB_1 | Field Maple | 02/08/22 | Moderate | Dusk/dawn | 2 | N |
| Tuntagged-2021/11/10-3 | Ash | 27/10/21 | High | Climb | 3 | N |
| Tuntagged-2021/11/10-2 | Oak | 28/10/21 | High | Climb | 3 | N |
| T1648 | Ash | 27/10/21 | High | Climb | 3 | Y |
| T1636 | Oak | 27/10/21 | High | Climb | 3 | N |
| T1645 | Oak | 27/10/21 | High | Climb | 3 | N |
| T1644 | Dead – species unidentified | 10/11/21 | Moderate | Climb | 2 | N |

| Tree ID | Species | Ground based assessment date | Ground based assessment grade | Further survey | Number of further surveys required if due to be impacted | Noted Hibernation Potential Y/N |
|---|---|---|---|---|---|---|
| T1643 | Oak | 10/11/21 | Moderate | Climb | 2 | N |
| T1642 | Ash | 29/10/21 | Moderate | Climb | 2 | N |
| T1641 | Ash | 28/10/21 | Moderate | Climb | 2 | N |
| T1640 | Ash | 28/10/21 | Moderate | Climb | 2 | N |
| T1655 | Ash | 28/10/21 | Moderate | Climb | 2 | N |
| T1654 | Ash | 26/10/21 | Moderate | Climb | 2 | N |
| T1652 | Ash | 28/10/21 | Moderate | Climb | 2 | N |
| T1651 | Ash | 28/10/21 | Moderate | Climb | 2 | N |
| T1649 | Ash | 27/10/21 | Moderate | Climb | 2 | N |
| T1639 | Alder | 28/10/21 | Moderate | Climb | 2 | N |

| Tree ID | Species | Ground based assessment date | Ground based assessment grade | Further survey | Number of further surveys required if due to be impacted | Noted Hibernation Potential Y/N |
|---|---|---|---|---|---|---|
| Tuntagged_061221_OBBH_1 | Willow | 06/12/21 | Moderate | Climb | 2 | N |
| Tuntagged_20211026 | Oak | 26/10/21 | Moderate | Climb | 2 | N |
| Tuntagged_210722_OBEP_4 | Alder | 21/07/22 | Moderate | Climb | 2 | N |
| Tuntagged_200722_OBEP_3 | Oak | 20/07/22 | Moderate | Climb | 2 | N |
| Tuntagged_210722_OBEP_2 | Beech | 20/07/22 | Moderate | Climb | 2 | N |
| Tuntagged_210722_OBEP_1 | Oak | 20/07/22 | Moderate | Climb | 2 | N |
| Tuntagged-2021/11/10-8 | Field Maple | 10/11/21 | High | Ground endoscope | 3 | N |
| Tuntagged-2021/11/10-7 | Field Maple | 10/11/21 | Moderate | Ground endoscope | 2 | N |
| Tuntagged-2021/11/10-1 | Crack Willow | 10/11/21 | Moderate | Ground endoscope | 2 | N |

| Tree ID | Species | Ground based assessment date | Ground based assessment grade | Further survey | Number of further surveys required if due to be impacted | Noted Hibernation Potential Y/N |
|---|---|---|---|---|---|---|
| Tuntagged-2021/11/09-4 | Sycamore | 09/11/21 | Moderate | Ground endoscope | 2 | N |
| Tuntagged-2021/11/09-3 | Hornbeam | 09/11/21 | Moderate | Ground endoscope | 2 | N |
| Tuntagged-2021/11/09-2 | Hornbeam | 09/11/21 | Moderate | Ground endoscope | 2 | N |
| T1637 | Unknown | 29/10/21 | Moderate | Ground endoscope | 2 | N |
| T1646 | Hawthorn | 28/10/21 | Moderate | Ground endoscope | 2 | N |
| T1638 | Field Maple | 28/10/21 | Moderate | Ground endoscope | 2 | Y |
| Tuntagged-2021/11/09-1 | Crack Willow | 09/11/21 | Low | Pre-construction checks | N/A | N |
| Tuntagged_2011027_1 | Ash | 27/10/21 | Low | Pre-construction checks | N/A | N |

| Tree ID | Species | Ground based assessment date | Ground based assessment grade | Further survey | Number of further surveys required if due to be impacted | Noted Hibernation Potential Y/N |
|---|---|---|---|---|---|---|
| Tuntagged_20211027_2 | Unknown | 27/10/21 | Low | Pre-construction checks | N/A | N |
| Tuntagged_20211026_1 | Sycamore | 26/10/21 | Low | Pre-construction checks | N/A | N |
| Tuntagged_20211026_2 | Crack Willow (Dead) | 26/10/21 | Low | Pre-construction checks | N/A | N |
| T1647 | Dead | 28/10/21 | Low | Pre-construction checks | N/A | N |
| T1650 | Oak | 27/10/21 | Low | Pre-construction checks | N/A | N |
| T1653 | Crack Willow | 26/10/21 | Low | Pre-construction checks | N/A | N |
| Tuntagged_071221_OBBH_1 | Unknown | 07/12/21 | Low | Pre-construction checks | N/A | N |
| Tuntagged_18112021_1 | Unknown | 18/11/21 | Low | Pre-construction checks | N/A | N |

| Tree ID | Species | Ground based assessment date | Ground based assessment grade | Further survey | Number of further surveys required if due to be impacted | Noted Hibernation Potential Y/N |
|---|---|---|---|---|---|---|
| Tuntagged_18112021_2 | Oak | 18/11/21 | Low | Pre-construction checks | N/A | N |

# Appendix C Tree climbing and endoscope surveys

### Table C.1 Summary of climbing and endoscope surveys 2022

| Tree ID | Further Survey | Ground Based Assessment Grade | Tree Grade After Further Survey | Survey 1 | Survey 2 | Survey 3 | Survey Limitations |
|---|---|---|---|---|---|---|---|
| T1640 | Climb | Moderate | Moderate | 02/08/22 | 29/09/22 | - | N/A |
| T1641 | Climb | Moderate | Moderate | 02/08/22 | 15/08/22 | 29/09/22 | N/A |
| Tuntagged_210722_OBEP_3 | Climb | Moderate | Moderate | 02/08/22 | 29/09/22 | - | N/A |
| T1643 | Climb | Moderate | Downgraded to negligible | 02/08/22 | - | - | N/A |
| T1646 | Ground endoscope | Moderate | Moderate | 02/08/22 | 29/09/22 | - | N/A |
| Tuntagged_020822_BGOB_1 | Ground endoscope | Moderate | Moderate | 02/08/22 | 29/09/22 | - | N/A |
| Tuntagged_210722_OBEP_2 | Climb | Moderate | Downgraded to low | 02/08/22 | - | - | N/A |

| Tree ID | Further Survey | Ground Based Assessment Grade | Tree Grade After Further Survey | Survey 1 | Survey 2 | Survey 3 | Survey Limitations |
|---|---|---|---|---|---|---|---|
| T1637 | Ground endoscope | Moderate | - | 02/08/22 | Scoped out due to refinement of Order Limits. | - | N/A |
| Tuntagged-2021/11/10-1 | Ground endoscope | Moderate | - | 11/07/22 | Scoped out due to refinement of Order Limits. | - | N/A |
| T1636 | Climb | Moderate | Low | 02/08/22 | (Subsequently scoped out due to refinement of Order Limits.) | - | N/A |
| T1638 | Climb | Moderate | Moderate | 12/07/22 | 29/09/22 | - | N/A |
| T1639 | Climb | Moderate | Downgraded to low | 12/07/22 | N/A | - | N/A |
| Tuntagged_210722_OBEP_4 | Climb | Moderate | High | 02/08/22 | 15/08/22 | 29/09/22 | N/A |
| T1642 | Climb | Moderate | Upgraded to high | 02/08/22 | 15/08/22 | 29/09/22 | N/A |

# Appendix D Tree emergence / re-entry surveys

### Table D.1 Summary of emergence / re-entry surveys 2022

| Tree ID | Visit number | Date | Start time | End time | Sunrise / sunset time | Moon phase | Temp. (C) at start | Rain at start | Cloud cover at start | Wind at start | Temp. (C) at end | Rain at end | Cloud cover at end | Wind at end |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tuntagged20211028-1 | 1 | 26/05/22 | 20:45 | 23:00 | 21:00 | 0.25 | 17 | 1 | 7 | 2 | 15 | 1 | 7 | 3 |
| | 2 | 14/06/22 | 02:38 | 04:53 | 04:38 | Full | 14 | 1 | 2 | 0 | 12 | 1 | 2 | 1 |
| Tuntagged_18112021_3 | 1 | 27/05/22 | 02:49 | 05:04 | 04:49 | 0.25 | 13 | 1 | 0 | 3 | 12 | 1 | 5 | 1 |
| | 2 | 13/06/22 | 21:04 | 23:19 | 21:19 | Full | 16 | 1 | 1 | 3 | 12 | 1 | 1 | 2 |
| T1644 | 1 | 07/09/22 | 19:16 | 19:31 | 21:31 | 0.75 | 17 | 1 | 2 | 0 | 16 | 1 | 8 | 2 |
| | 2 | 20/09/22 | 18:46 | 20:46 | 19:01 | 0.25 | 17 | 1 | 7 | 0 | 14 | 1 | 8 | 1 |
| T1645 | 1 | 07/09/22 | 19:16 | 19:31 | 21:31 | 0.75 | 17 | 1 | 2 | 0 | 16 | 1 | 8 | 2 |
| | 2 | 20/09/22 | 18:46 | 20:46 | 19:01 | 0.25 | 17 | 1 | 7 | 0 | 14 | 1 | 8 | 1 |
| Tuntagged_20211026 | 1 | 08/09/22 | 19:13 | 19:28 | 21:28 | 0.75 | 17 | 1 | 5 | 1 | 16 | 1 | 6 | 2 |
| | 2 | 22/09/22 | 18:41 | 20:41 | 18:56 | 0.25 | 18 | 1 | 7 | 1 | 15 | 1 | 8 | 1 |
| Tuntagged_200722_OBEP_1 | 1 | 02/08/22 | 20:29 | 22:14 | 20:44 | 0.25 | 23 | 1 | 0 | 2 | 22 | 1 | 0 | 2 |
| | 2 | 06/09/22 | 19:18 | 21:02 | 19:32 | 0.75 | 19 | 2 | 8 | 3 | 18 | 1 | 8 | 2 |
| Tuntagged20211028-2* | 1 | 24/05/22 | 02:50 | 05:05 | 04:50 | 0.25 | 11 | 1 | 0 | 1 | 11 | 1 | 0 | 2 |
| | 2 | 13/06/22 | 21:02 | 23:17 | 21:17 | Full | 16 | 1 | 3 | 0 | 12 | 1 | 1 | 0 |
| Tuntagged20211028-3* | 1 | 26/05/22 | 02:50 | 05:05 | 04:50 | 0.25 | 11 | 1 | 0 | 1 | 11 | 1 | 0 | 2 |

| Tree ID | Visit number | Date | Start time | End time | Sunrise / sunset time | Moon phase | Temp. (C) at start | Rain at start | Cloud cover at start | Wind at start | Temp. (C) at end | Rain at end | Cloud cover at end | Wind at end |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2 | 13/06/22 | 21:02 | 23:17 | 21:17 | Full | 16 | 1 | 3 | 0 | 12 | 1 | 1 | 0 |
| Tuntagged-2021/11/10-6 | Scoped out due to refinement of Order Limits. | | | | | | | | | | | | | |
| Tuntagged-2021/11/10-5 | Scoped out due to refinement of Order Limits. | | | | | | | | | | | | | |
| Tuntagged-2021/11/10-4 | Scoped out due to refinement of Order Limits. | | | | | | | | | | | | | |
| Tuntagged_20211028_4 | Scoped out due to refinement of Order Limits. | | | | | | | | | | | | | |