



Highways England

BAT STRUCTURES INTERIM BASELINE SURVEY REPORT

A27 ARUNDEL BYPASS





Highways England

BAT STRUCTURES INTERIM BASELINE SURVEY REPORT

A27 ARUNDEL BYPASS

PUBLIC

PROJECT NO. 70038257

OUR REF. NO. A27_ECO_04.2_BATSTRUCTURES_INTERIM-BASELINE_ISSUE01

DATE: JANUARY 2019

Highways England

BAT STRUCTURES INTERIM BASELINE SURVEY REPORT

A27 ARUNDEL BYPASS

WSP

4th Floor
6 Devonshire Square
London
EC2M 4YE

Phone: +44 20 7337 1700

Fax: +44 20 7337 1701

WSP.com



QUALITY CONTROL

Issue/revision	First issue
Remarks	N/A
Date	31/01/2019
Prepared by	[REDACTED]
Signature	[REDACTED]
Checked by	[REDACTED]
Signature	
Authorised by	[REDACTED]
Signature	
Project number	70019688
Report number	1.0
File reference	A27_ECO_04.2_batstructures_interim-baseline_ISSUE01

CONTENTS

1.	INTRODUCTION	11
1.1.	PROJECT BACKGROUND	11
1.2.	ECOLOGICAL BACKGROUND	12
1.3.	AIMS AND OBJECTIVES	13
2.	METHODS	14
2.1.	STUDY AREA	14
2.2.	DESK STUDY	14
2.3.	PRELIMINARY ROOST ASSESSMENT	15
2.4.	BAT DUSK EMERGENCE / PRE-DAWN RETURN SURVEY	16
2.5.	DATES OF SURVEY AND PERSONNEL	17
2.6.	NOTES AND LIMITATIONS	19
3.	RESULTS	20
3.1.	DESK STUDY	20
3.2.	FIELD SURVEY	21
3.3.	BAT DUSK EMERGENCE / PRE-DAWN RE-ENTRY SURVEY	26
	RESULTS SUMMARY	28
4.	DISCUSSION AND RECOMMENDATIONS	30
4.2.	FURTHER SURVEY RECOMMENDATIONS	31
5.	FIGURES	33

TABLES

Table 2-1 – Roost suitability categorisation	16
--	----

Table 2-2 - Recommended number of survey visits for presence / absence surveys to give confidence in a negative result for structures	17
Table 2-3 - Dates for survey visits	18
Table 3-1 - Status of bat species recorded or assumed to be present within the study area	20
Table 3-2 - Structures identified during the desk study as requiring further survey	21
Table 3-3 - Structures with roosting features present	23
Table 3-4 – Emergence / Re-entry survey summary	26
Table 3-5 – Results summary	28
Table 4-1 – Recommended survey requirements	32

FIGURES

Figure 1. Desk study	33
Figure 2. Preliminary Roost Assessment results	33
Figure 3. Radio-tracked roost locations (structures only)	33

APPENDICES

APPENDIX A PRA SURVEY RESULTS

APPENDIX B BAT EMERGENCE LOCATIONS AND FLIGHT PATHS

APPENDIX C IMAGES OF STRUCTURES SURVEYED

APPENDIX D WEATHER CONDITIONS



This report has been prepared by WSP on behalf of Highways England in relation to the A27 Arundel Bypass project ('the Scheme').

The contents of this report represent interim baseline survey findings collected at Project Control Framework Stage 2 (option selection) between spring 2017 and spring 2018 inclusive prior to the Preferred Route Announcement. The Scheme Options under consideration in 2017/early-2018 were Options 1, 3 and Option 5A.

It is intended that the baseline data presented in this report will be updated following further consultation at Stage 2 (2018/2019) and again for Project Control Framework Stage 3 (in 2020).



EXECUTIVE SUMMARY

WSP was commissioned by Highways England to undertake preliminary bat roost assessments on structures within a Field Survey Area extending to 25m from the Scheme Options for the A27 Arundel Bypass Scheme to establish whether bat roosts are present. This report presents the findings of this work to date, as data collection in the field is on-going.

In total, 19 structures within the Field Survey Area were assessed, and eight were identified as having features suitable for roosting bats; three were classed as having moderate suitability and five of low suitability. One structure (a railway bridge) was not accessible. The remaining 10 structures were not suitable for roosting bats.

Seven of the structures that were suitable for roosting were selected for further emergence / re-entry surveys.

A bat roost was confirmed within a residential dwelling (reference: 10550, Structure 1) associated with Option 5A. Four egress points were identified on this structure with individual common pipistrelle (*Pipistrellus pipistrellus*) and soprano pipistrelle (*Pipistrellus pygmaeus*) species emerging. Due to the species recorded and number of bats, the roost is considered to be of low conservation significance. No bats were seen to emerge or re-enter at any of the other six structures surveyed. Further surveys should be undertaken on the other five structures where, either a full set of surveys could not be completed or roost characterisation is required, as per the Bat Conservation Trust guidelines.

The Field Survey Area will be extended once detailed design information becomes available. Further surveys are scheduled for the 2018/2019 bat activity season to capture information on known roost sites and additional structures that could support roosting bats.

1. INTRODUCTION

1.1. PROJECT BACKGROUND

- 1.1.1. The scope of the A27 Arundel Bypass scheme as described in the Road Investment Strategy¹ is:
“The replacement of the existing single carriageway road with a dual carriageway bypass, linking together the two existing dual carriageway sections of the road”.
- 1.1.2. This corresponds to the six-kilometre section of the A27 from the A284 Crossbush junction (east of Arundel) to the west of Yapton Lane (west of Arundel). The A27 currently passes through the South Downs National Park and the town of Arundel passing over the River Arun and crossing the railway line.
- 1.1.3. The Scheme Options taken forward to the Public Consultation were Options 1, Option 3 and Option 5A. These are briefly described individually below.
- **Option 1:** consists of new dual carriageway from Crossbush junction south of the current A27 to the south-west of Arundel railway station, joining the A27 east of Ford Road, with a new bridge over the River Arun alongside the existing bridge. From Ford Road roundabout, which will be signalised, the existing A27 would be widened to dual carriageway;
 - **Option 3:** is an off-line route from the existing A27 alignment. Option 3 would consist of a new dual carriageway corridor along its entire length. The proposed alignment will then be joined to the existing A27 via an extension of the existing infrastructure at Crossbush Junction. The alignment that runs westwards across the floodplain south of Tortington Priory and requires two new overbridges, firstly over the Arun Valley Railway Line, and secondly over the River Arun. Its alignment diverges north through the Binsted Woods, Tortington Common and South Downs National Park, re-joining the existing A27 at Havenwood Park. It requires four new underbridges at Old Scotland Lane, Binsted Lane, Tortington Lane and at Ford Road; and
 - **Option 5A:** is a new dual carriageway from Crossbush junction south of the current A27. The alignment crosses the Arun Valley Railway, continuing west across the floodplain, over Ford Road, running south of Tortington Priory Scheduled Monument before going north through the Binsted Wood Complex and the South Downs National Park, re-joining the existing A27 at a new junction near Yapton Lane.
- 1.1.4. When referring to the combined footprint of the Scheme (all options), the term ‘Scheme Options’ is used in this report. When discussing the footprint of any single option, it is referred to by its number i.e. Option 1, Option 3 or Option 5A.

¹ Road Investment Strategy: for the 2015/2016 – 2019/2020 Road Period, Department for Transport, March 2015

1.2. ECOLOGICAL BACKGROUND

- 1.2.1. The Field Survey Area (defined in Section 2.1) contains habitat considered to be of high suitability for bats², comprising continuous high-quality habitat that is well connected to the wider landscape by features such as river floodplains, tree-lined watercourses, extensive hedgerows and large areas of ancient woodland. These habitats have the potential to support a wide assemblage of bat species, including rare woodland bats, non-typical of less habitat-diverse sites.
- 1.2.2. Structures such as dwellings, bridges, sheds and barns are present across the Field Survey Area³, and these may provide bat roosting opportunities for all or part of the year. Structures may be used as transitional roosts, hibernation or maternity roosts. Structural features used for roosting include roof spaces, boiler rooms and other dark spaces not in frequent use by people. Features also include the top of chimney breasts, roof beams, between tiles and roof lining, under flat felt roofs, in the top of gable ends and in mortise and tenon joints.
- 1.2.3. Surveys were undertaken where a structure, and bats that roost within, could be affected as a result of direct or indirect impacts of the Scheme Options. They may be demolished or modified, or affected by indirect impacts such as removal of surrounding vegetation used for foraging or as flight lines, lighting disturbance, or the construction of a new road where collision risk is increased and where habitats may be fragmented close to a roost.
- 1.2.4. WSP undertook the following bat surveys in addition to those included in this report:
- Bat activity transect surveys⁴⁵;
 - Bat static automated surveys⁵;
 - Department for Environment, Food and Rural Affairs (Defra) Local Effects (or Crossing Point) surveys⁵;
 - Defra Landscape Scale Effects surveys⁵; and
 - Radio-tracking surveys⁶.
- 1.2.5. These surveys provided a species list and confirmed roosting of the Annex II bat species Bechstein's bat *Myotis bechsteinii* and barbastelle *Barbastella barbastellus* and the 'very rare'⁷ Alcathe bat *Myotis alcathe* within the Field Survey Area. All these roosts were located in trees.
- 1.2.6. Highways England is undertaking an Environmental Impact Assessment of the Scheme Options to inform scheme development. Comprehensive survey data for bat structures is required to inform

² Collins, J. (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn.). The Bat Conservation Trust, London.

³ See section 2.2 for definition

⁴ Collins, J. (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust

⁵ WSP (2019) A27_ECO_04.1_BAT ACTIVITY_INTERIM-BASELINE_ISSUE01

⁶ WSP (2019) A27_ECO_04.4_BAT RADIO TRACKING_INTERIM-BASELINE_ISSUE01

⁷ Taken from the Sussex bat group local distribution information on this species.

Scheme Option selection and ultimately inform an Environmental Impact Assessment of the preferred Scheme Option selected.

1.3. AIMS AND OBJECTIVES

1.3.1. WSP was commissioned by Highways England to:

- Undertake a detailed desk study⁸;
- Undertake a preliminary roost assessment of the structures within the Field Survey Area to determine which may be suitable for roosting bats;
- Identify evidence of bats roosting in any of the surveyed structures;
- Identify the location (access/ egress points) of any roosts present in the structures;
- Determine the roost status, including species present and approximate numbers of bats utilising any roosts identified and the conservation significance of roosts in line with best practice guidelines^{9,10}; and
- Make recommendations for further survey work to inform detailed mitigation design and for a future European Protected Species Mitigation Licence application(s) if required.

1.3.2. The contents of this report represent interim baseline survey findings collected at Project Control Framework Stage 2 (option selection).

⁸ The desk study includes roost records only. Bat activity records and designated site data can be found within the WSP (2019) A27_ECO_04.1_BAT ACTIVITY_INTERIM-BASELINE_ISSUE01 and WSP (2019) A27_ECO_04.4_BAT RADIO TRACKING_INTERIM-BASELINE_ISSUE01

⁹Collins, J. (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd ed.). The Bat Conservation Trust, London. Section 3.7.

¹⁰ English Nature (2004) Bat Mitigation Guidelines. English Nature, Peterborough

2. METHODS

2.1. STUDY AREA

2.1.1. The following study areas were used:

- Desk Study Area – a distance of 6km from the outer boundary of the Scheme Options was selected, within which bat records were obtained from the Sussex Biological Records Centre (hereafter the ‘Desk Study Area’). This distance was selected based on the furthest bat core sustenance zone¹¹.
- Field Survey Area – a zone extending to 25m from the outer boundary of the Scheme Options was selected for fieldwork (hereafter the ‘Field Survey Area’). This distance was selected to obtain baseline information on the potential direct impact on roosts of higher conservation significance¹² to aid in the route selection process. Further surveys in 2018/2019 will assess impacts extending to 100m from the Scheme Options to be determined by the suitability of the potential roost, potential impact pathways and detailed design information.

2.1.2. The Field Survey Area of 25m from the Scheme Options was selected with the intent that any structures that might be subject to direct impacts of any of the Scheme Options would be included within this area. Subsequent surveys are proposed to be undertaken to a distance of 100m from the Scheme Options. 100m is considered the furthest distance over which noise and vibration, lighting or other indirect impacts is likely to affect bats. Radio tracking studies are proposed to be undertaken⁵ to supplement preliminary roost inspections and emergence survey work.

2.2. DESK STUDY

2.2.1. A desk study was undertaken to collate records of bat roosts within 6km of the Scheme Options from the past 10 years. Verified records were obtained from the Sussex Biological Records Centre¹³. The data supplied included records from acoustic surveys, radio tracking data and inspection survey data and information on roost type (e.g. hibernation, maternity or unspecified roosts) and species recorded.

2.2.2. This information was supplemented by a review of radio tracking work undertaken for the Mid-Arun Valley Environmental Survey (MAVES), including the May 2016¹⁴ and June 2017¹⁵ (interim) reports.

2.2.3. A review of the conservation status of bats present within the Desk Study Area, both within the UK, and Sussex, was also undertaken to provide context to the discussion section of the report.

¹¹ Collins, J. (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn.). The Bat Conservation Trust, London. Section 3.7.

¹² English Nature (2004) Bat Mitigation Guidelines. English Nature, Peterborough

¹³ This includes records submitted by the Sussex Bat Group.

¹⁴ Whitby, D. (2016) Bat Survey and Trapping Survey, Binsted Woods AEW Ltd. Private publication.

¹⁵ Whitby, D. (2017) Bat Survey, Trapping Survey Interim report of results Binsted Woods. AEW Ltd. Private publication

2.2.4. A review of granted European Protected Species (EPS) licences for bats was also undertaken using Natural England's MAGIC map application^{16, 17}.

2.3. PRELIMINARY ROOST ASSESSMENT

2.3.1. A preliminary roost assessment (PRA) is a detailed inspection of the exterior and interior of a structure to identify features that bats could use for roosting and to search for signs of bats. For the purpose of these surveys, only external structure inspections were conducted which were undertaken with reference to best practice guidance³. The method of this survey is described below.

EXTERNAL STRUCTURE INSPECTION

- 2.3.2. All structures identified within the Field Survey Area were inspected to enable an assessment of their suitability to support roosting bats and to search for evidence indicating the current or historic use of the structure by roosting bats.
- 2.3.3. The method for surveying for structures for bat roosts was undertaken with reference to current best practice guidance¹⁸ and relevant sections of the Design Manual for Roads and Bridges.^{19,20}
- 2.3.4. A systematic visual inspection of the exterior of the structure using binoculars and a high-powered torch was carried out to search for features which may provide potential roost features (PRF) for bats. Where PRFs were noted, their location and a brief description was recorded. Where safe access was possible at ground-level, features were visually inspected using high-powered torches for evidence indicating use by roosting bats such as droppings, urine staining, and scratch marks / characteristic staining (from fur oils).²¹
- 2.3.5. Structures were categorised in line with the descriptions in Table 1. Based on the features present and the location of the structure, the potential for different types of bat roost was also considered. The conservation significance of these roosts, in line with the bat mitigation guidelines was stated where applicable²². For the purpose of this preliminary roost assessment potential roost types were grouped as follows²³:

- Maternity (breeding roost);

¹⁶ Natural England (2018) MAGIC map application, [Online] Available at: <https://magic.defra.gov.uk/magicmap.aspx> [Accessed 16/11/2018]

¹⁷ DMRB volume 11 section 4 (2009) Assessment of Implications (of highways and/or roads projects).

¹⁸ Collins, J. (ed) (2016) Bat Surveys for professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London.

¹⁹ Interim Advice Note 116/08 Nature conservation in relation to bats

²⁰ Anon (1999) *Design Manual for Roads and Bridges, Volume 10: Environmental Design and Management, Section 4: Nature Conservation, Part 3 HA 80/99 Nature Conservation Advice in Relation to Bats*. Highways Agency.

²¹ However, it is important to note that bats often leave no visible signs of their presence of the outside of structures or when they do these can be washed away by weather.

²² English Nature (2004) Bat Mitigation Guidelines. English Nature, Peterborough

²³ Hundt, L. (2012) Bat Surveys: Good Practice Guidelines, 2nd edition, Bat Conservation Trust, London.

- Summer / transitional (to include transitional, satellite, night and day roosts); and,
- Hibernation.

Table 2-1 – Roost suitability categorisation²⁴

Category	Description
Confirmed	Structure with features confirmed to be used by roosting bats either by historic records or evidence recorded during survey.
High	Structure with highly suitable features capable of supporting larger roosts, and/or multiple roost locations. Generally, these structures are located in proximity to highly suitable foraging / commuting habitat such that the presence of a roost is considered highly probable.
Moderate	Structure exhibiting features with definite bat roost potential, but with only one or two features suitable for larger roosts, or multiple features with the potential to be used by individual / small numbers of bats. Surrounding area includes good quality foraging habitat for bats e.g. broadleaved woodland, tree-lined watercourses and grazed parkland, such that the presence of a roost is considered probable.
Low	Structure with single, or few features capable of supporting individual/small numbers of bats e.g. external roosting features such as fascia or soffit boards, in which bats are considered less likely to be present. Or, a greater number or variety of features located in sub-optimal habitat such that bats would be less likely to use it e.g. isolated from foraging or commuting habitats.
Negligible	Structure with no potential opportunities for roosting bats, or very few or minor features in an isolated / unsuitable location such that the presence of a roost is considered highly improbable. e.g. isolated from suitable foraging or commuting habitats.

2.3.6. The bridge over the River Arun was also surveyed for PRFs. Bridges often cross linear features and their verges provide commuting and foraging habitat for bats, whilst the bridges themselves can provide roosting opportunities²⁵. Features used by roosting bats include; expansion joints, gaps at the corner of buttresses, cracks and crevices between stonework, brickwork where mortar has fallen out, drainage pipes and internal voids. The survey was conducted using the same method as the other structures.

2.4. BAT DUSK EMERGENCE / PRE-DAWN RETURN SURVEY

2.4.1. Structures identified as having PRFs were subject to further surveys to record bats emerging from or returning to roost. The level of survey effort employed was proportional to the level of suitability for roosts to be present, as seen in recommended guidance. The number of survey visits conducted is

²⁴ Collins, J. (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London. ISBN-13 978-1-872745-96-1

²⁵ Mitchell-Jones, A.J., & McLeish, A.P. Ed., (2004), 3rd Edition Bat Workers' Manual. English Nature, Peterborough. ISBN 1 86107 558 8

shown in Table 2-2 below. Surveyor locations were utilised to fully cover the PRFs on all suitable structures.

- 2.4.2. The dusk emergence surveys began 15 minutes before sunset and lasted a minimum of 1.5 hours. The dawn return to roost surveys began a minimum of 1.5 hours before sunrise and lasted until 15 minutes after sunrise.
- 2.4.3. The surveyors used a variety of bat detectors including: Batlogger M, Echometer touch and Petterson bat detectors to listen to and record echolocation calls of bats observed. During the survey, surveyors mapped the flight-lines used by any bats observed and noted any features used by the bats to exit / enter the structures. Incidental records of bat activity in the vicinity of the surveyor locations were also collected.

Table 2-2 - Recommended number of survey visits for presence / absence surveys to give confidence in a negative result for structures²⁶

Roost suitability	Recommended minimum number of survey visits
Low	One survey visit. One dusk emergence or dawn re-entry.
Moderate	Two separate survey visits. One dusk emergence and a separate dawn re-entry survey.
High	Three separate survey visits. At least one dusk emergence and a separate dawn re-entry surveys. Third visit can be either dusk or dawn.

2.5. DATES OF SURVEY AND PERSONNEL

- 2.5.1. The preliminary roost assessment survey was completed by licensed surveyors (Class 2 and Class 4) whilst the emergence / re-entry surveys were conducted by experienced bat surveyors and a licensed surveyor (2015-14109-CLS-CLS). All surveyors had bat survey experience. The dates of survey are summarised in Table 2.3 below.
- 2.5.2. The preliminary roost assessment of the bridge over the River Arun was conducted in conjunction with the hibernation surveys carried out in January and February 2018 by experienced bat ecologists and a licensed surveyor (2017-28263-CLS-CLS).

²⁶ Collins, J. (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London. ISBN-13 978-1-872745-96-1

Table 2-3 - Dates for survey visits

Structure number	Date of PRA	Date of bat dusk/dawn survey	Start time	End time	Number of surveyors
1	19/07/2017	23/08/2017	19:50	21:55	3
3	28/06/2017	24/08/2017	04:14	06:03	3
5	19/07/2017	29/08/2017	19:40	21:25	4
8	19/07/2017	29/08/2017	19:44	21:23	2
11	20/06/2017	30/08/2017	04:20	06:14	2
12	20/06/2017	30/08/2017	04:13	06:10	2
13	20/06/2017	30/08/2017	04:15	06:15	2
2	19/07/2017	Not applicable ²⁷	Not applicable ²⁸	Not applicable ²⁸	Not applicable ²⁸
4	28/06/2017	Not applicable ²⁸	Not applicable ²⁸	Not applicable ²⁸	Not applicable ²⁸
6	19/07/2017	Not applicable ²⁸	Not applicable ²⁸	Not applicable ²⁸	Not applicable ²⁸
7	19/07/2017	Not applicable ²⁸	Not applicable ²⁸	Not applicable ²⁸	Not applicable ²⁸
9	19/07/2017	Not applicable ²⁸	Not applicable ²⁸	Not applicable ²⁸	Not applicable ²⁸
10	19/07/2017	Not applicable ²⁸	Not applicable ²⁸	Not applicable ²⁸	Not applicable ²⁸
14	20/06/2017	Not applicable ²⁸	Not applicable ²⁸	Not applicable ²⁸	Not applicable ²⁸
15	22/06/2017	Not applicable ²⁸	Not applicable ²⁸	Not applicable ²⁸	Not applicable ²⁸
16	22/06/2017	Not applicable ²⁸	Not applicable ²⁸	Not applicable ²⁸	Not applicable ²⁸
17	29/06/2017	Not applicable ²⁸	Not applicable ²⁸	Not applicable ²⁸	Not applicable ²⁸
18	22/01/2018	Not applicable ²¹	Not applicable ²¹	Not applicable ²¹	Not applicable ²¹
19	Not surveyed – access not permitted	Not applicable ²⁸	Not applicable	Not applicable ²	Not applicable

²⁷ Structure identified as having negligible suitability for roosting bats during PRA and therefore does not require further survey

²⁸ Structure not accessible for PRA therefore the requirement for further survey is yet unknown

2.6. NOTES AND LIMITATIONS

- 2.6.1. Weather during the dawn re-entry surveys of the three timber structures (structures 11, 12 and 13 respectively) was sub-optimal for bat surveys. Surveyors described conditions as being very windy for the duration of the survey with intermittent rain throughout. There was little to no activity between the three structures. These conditions are likely to reduce bat activity and may prevent bats from emerging or cause them to return to roost prematurely prior to the re-entry surveys. These three surveys are therefore not considered valid survey effort, and should be repeated in 2018.
- 2.6.2. Due to access restrictions a stable 10m to the west of Structure 1 could not be assessed. However, this is not considered a constraint to this assessment, as it has been recommended that surveys are undertaken at the stable during 2018 should access be permitted. Therefore, the assessment of that stable would be included within an updated report. An image of this structure is shown in Appendix C, recorded as 'additional'.
- 2.6.3. Photographs and descriptions were not taken for all of the structures. However, it is considered that this does not limit the assessment within this report and these structures should be revisited during 2019 surveys and any missing data will be recorded during these surveys.
- 2.6.4. The bridge over the River Arun (structure 18) was surveyed as part of the hibernation survey in January and February 2018. As a result, it was not subject to dusk emergence or dawn re-entry surveys in 2017. Additionally, the bridge over the railway (structure 19) was not surveyed as part of these works, due to health and safety and access restrictions with surveying along the railway. However, these are not considered constraints to this preliminary baseline report, as it has been recommended that these surveys are undertaken during 2018 where access is permitted and where these structures fall within the Field Survey Area of the selected Scheme Option.
- 2.6.5. Structures in urban areas (defined as the area adjacent to the current A27 in Arundel) were not included in these surveys due to the large number of properties. However, it is considered that this does not limit the assessment within this report as following the Option selection, a review of structures likely to be impacted is planned and structures not included in these surveys are planned to be assessed in 2018/2019. These further assessments will be included within an updated bat structures report following the preferred route announcement.

3. RESULTS

3.1. DESK STUDY

SPECIES RECORDS

- 3.1.1. The desk study generated 200 bat records within the Desk Study Area. All records are provided in Figure 1. Fifty-five records of roosting bats were from structures and a further six records are from radio-tracked bats (Figure 3) located during the WSP radio-tracking study 2017²⁹. None of the fifty-five structures are anticipated to be directly impacted by the Scheme.
- 3.1.2. Sussex Biodiversity Records Centre data informed bat roosts to be widely distributed within the Desk Study Area. The majority of bat roost records were from [REDACTED] approximately 1 km north west of the Field Survey Area, and 1 km to the north east [REDACTED] Common pipistrelle roosts were also present [REDACTED] approximately 0.4 km north of the Survey Area. Barbastelle roosts were recorded [REDACTED], approximately 1 km east and west of the Survey Area respectively.
- 3.1.3. The MAVES commissioned bat surveys in 2016 and 2017 from Animal Ecology and Wildlife Consultants^{30,31}. A total of 12 roosting locations were identified (all in trees outside of the Field Survey Area) for: barbastelle (1), Bechstein’s bat (3), Alcahloe bat (4) and serotine (*Eptesicus serotinus*) (4). These records are predominately from the Binsted Wood Complex Local Wildlife Site and can be viewed in Figure 1. These surveys confirmed the presence of the following species detailed in Table 3-1, along with their conservation status^{32,33}. Those with an asterisk (*) are identified by the MAVES to be breeding within the Desk Study Area.

Table 3-1 - Status of bat species recorded or assumed to be present within the study area

Flight strategy	Species	Relative UK Distribution and Status ³⁴	Local Distribution and Status
Cluttered Habitat Adapted Species	Brown long-eared bat <i>Plecotus auritus</i> (*)	Widespread, relatively common	Relatively abundant, widespread
	Whiskered bat	Widespread, uncommon	Widespread, scarce

²⁹ WSP (2019) A27_ECO_04.4_BAT RADIO TRACKING_INTERIM-BASELINE_ISSUE01

³⁰ Whitby, D. (2016) Bat Survey and Trapping Survey, Binsted Woods AEWL Ltd. Private publication

³¹ Whitby, D. (2017) Bat Survey, Trapping Survey Interim report of results Binsted Woods. AEWL Ltd. Private publication

³² <http://www.sussexbatgroup.org.uk/batsinsussex> Accessed 13 September 2017

³³ It should be noted that the distribution and status data was obtained from a national source and a local source, as such terminology may vary

³⁴ Bat Conservation trust (2010) Species Factsheets http://www.bats.org.uk/pages/uk_bats.html Accessed 13 September 2017

Flight strategy	Species	Relative UK Distribution and Status ³⁴	Local Distribution and Status
	<i>Myotis mystacinus</i> (*)		
	Natterer's bat (*) <i>Myotis nattereri</i>	Locally common	Widespread, scarce
	Daubenton's bat <i>Myotis daubentonii</i>	Relatively common, widespread	Fairly abundant, widespread
	Bechstein's bat (*)	Very rare, (restricted to southern Wales and parts of southern England)	Very rare
	Alcathoe bat (*)	Data deficient	Very rare- hardly known
Edge Habitat Adapted Species	Serotine (*)	Uncommon, (largely restricted to the south)	Widespread, uncommon
	Common pipistrelle	Widespread, common	Widespread, abundant
	Nathusius' pipistrelle	Rare, but widespread, may be under recorded	Widespread, scarce
	Soprano pipistrelle	Widespread, common (England)	Widespread, fairly common
	Barbastelle	Very rare, widespread	Widespread, very rare
Open Habitat Adapted Species	Noctule (*)	Widespread, relatively common	Widespread, uncommon

3.1.4. In addition, 13 EPS licences have been issued within the Desk Study Area. These licences have predominately been issued for brown long eared and common and soprano pipistrelle species but small numbers also included whiskered, Brandt's, barbastelle, serotine and Natterer's. None of these EPS licence records fall within the Field Survey Area.

3.2. FIELD SURVEY

3.2.1. Nineteen structures were identified within the Field Survey Area. The structures are listed in Table 3-2 and can be viewed in Figure 2. Full descriptions of each structure are provided in Appendix A.

Table 3-2 - Structures identified during the desk study as requiring further survey

Structure number	Structure reference / description	Grid reference	Associated Scheme Option
1	10550 - Dwelling house	██████████	5A

considered to be of low roost suitability due to the structures offering only limited roosting opportunities for individual bats and the remaining ten structures were considered to have negligible roost suitability.

Table 3-3 - Structures with roosting features present

Structure Number	Structure Reference	Description	Features present	Suitability of roost features	Roost type that structure has the potential to support	Number of surveys required
1	10550 - Dwelling house	Detached residential home. Two storey brick build. Buildings is located within high quality habitat.	<ul style="list-style-type: none"> Multiple features are present.³⁵ 	Moderate	Summer / occasional	2
3	10900 - Dwelling house	Detached residential home. Two storey brick built with assumed loft conversion. Tiled roof with chimney stack. Buildings is located within high quality habitat.	<ul style="list-style-type: none"> Multiple features are present.³⁶ 	Moderate	Summer / occasional	2
5	10375 - Dwelling house	Single storey brick built bungalow with 2m high walls and pitched roof to a height of 4m at ridge. Buildings is located within high quality habitat.	<ul style="list-style-type: none"> Some raised slate tiles; Slipped wooden plank under soffit; and Some gaps between the brickwork and soffit. 	Moderate	Summer / occasional	2

³⁵ These structures are scheduled to be revisited during 2018 surveys.

³⁶ These structures are scheduled to be revisited during 2018 surveys.

Structure number	Structure reference / description	Grid reference	Associated Scheme Option
2	10550 – Dog kennel	██████████	5A
3	10900 - Dwelling house	SU 99758 07347	1
4	10900 – Shed / workshop	SU 99759 07324	1
5	10375 - Dwelling house	SU 97096 06771	5A
6	10375 - Shed in garden	SU 97103 06737	5A
7	10375 - Shed in garden next to boundary wall	SU 97071 06740	5A
8	10375 - Shed on western side of small copse	SU 97224 06752	5A
9	11250 - Garden shed 1	TQ 00586 05861	5A
10	11250 - Garden shed 2	TQ 00622 05831	5A
11	11235 - Timber-framed structure 1	TQ 00885 05765	5A
12	11235 - Timber-framed structure 2	TQ 00887 05717	5A
13	11235 - Timber-framed cabin	TQ 00893 05646	5A
14	11235 - Timber-framed outbuilding	TQ 00999 05715	5A
15	11765 – Derelict farm building 1	TQ 01678 06051	5A
16	11765 – Open farm building	TQ 02163 06050	5A
17	12275 – Derelict farm building	TQ 01787 06663	1
18	Bridge over the River Arun	TQ 01459 06795	1
19	Bridge over the railway line	TQ 02286 06069	5A

PRELIMINARY ROOST ASSESSMENT

- 3.2.2. Access permitting, the 19 structures identified during the desk study were taken forward to the preliminary roost assessment survey (Figure 2). Eighteen structures were accessible and were surveyed, eight of which had PRFs. These are provided in Table 3-3 and a full list of the structures surveyed and their details are provided in Appendix A. Photographs of the structures can be seen in Appendix C. Access was not permitted to structure 19 and this structure was therefore not surveyed.
- 3.2.3. Given that multiple features were present on the residential properties, and that the buildings are located within high quality habitat structure 1, 3 and 5 were considered to be of moderate roost suitability for bats. Features identified included raised slate tiles, gaps between the brickwork and soffits, slipped wooden plank under soffit, and voids in the bridge abutments. Five structures were

Structure Number	Structure Reference	Description	Features present	Suitability of roost features	Roost type that structure has the potential to support	Number of surveys required
8	10375 - Shed on western side of small copse	Flat-roofed timber shed with timber weatherboarding to 2m in height.	<ul style="list-style-type: none"> Gap between the timber face and roof on west side of the shed. 	Low	Summer / occasional / night roost	1
11	11235 - Timber-framed structure 1	A campsite toilet / wash area. A wooden structure. Timber-framed structure, timber weatherboarding with bitumastic felt covered roof.	Multiple features are present ³⁷ .	Low	Summer / occasional	1
12	11235 - Timber-framed structure 2	Timber framed campsite building with timber weatherboarding and roof.	Multiple features are present. ³⁸	Low	Summer / occasional	1
13	11235 - Timber-framed structure 3	Timber-framed structure, timber weatherboarding with corrugated metal roofing.	Multiple features are present. ³⁹	Low	Summer / occasional	1
18	Bridge over the River Arun	The Arun Bridge is a concrete span bridge, crossing both a road and the River Arun. The bridge has concrete abutments, a concrete deck and multi girder centre arch. The bridge is well lit from above	No suitable roosting features were seen on the main bridge. However, both abutments have access to internal dark voids where, whilst there are	Low	Summer / occasional and hibernation	1

³⁷ These structures are scheduled to be revisited during 2018 surveys.

³⁸ These structures are scheduled to be revisited during 2018 surveys.

³⁹ These structures are scheduled to be revisited during 2018 surveys.

Structure Number	Structure Reference	Description	Features present	Suitability of roost features	Roost type that structure has the potential to support	Number of surveys required
		with street lights across the top along the road.	no crevices, there is a space which may be suitable for roosting and hibernating bats. The open nature of the voids means that they are exposed to wind and rain meaning little thermal stability. No other suitable features were present due to crevices being too wide, open and damp.			
19	Railway bridge	No access was available at the time of the assessment to this bridge. From aerial imagery this looks to be a single lane structure built for farm access.	It is unknown at the present time whether the railway bridge could support roosting bats.	Unknown	Unknown	Unknown

3.3. BAT DUSK EMERGENCE / PRE-DAWN RE-ENTRY SURVEY

- 3.3.1. Eight structures were identified as requiring further surveys (low, moderate or high suitability from PRA) and seven were taken forward for dusk emergence and dawn re-entry surveys in 2017⁴⁰. These structures are shown in Figure 2.
- 3.3.2. Bats were recorded roosting within one of the structures; Structure 1 located at [REDACTED]. Six bats were seen emerging from four different features around the building. Five of the bats recorded emerging were common pipistrelles and one was a soprano pipistrelle. Figure 4 shows the emergence locations on Structure 1. Both common and soprano pipistrelles were active, foraging and commuting, throughout the survey.
- 3.3.3. No bats were recorded emerging from or returning to the other six structures surveyed.
- 3.3.4. Weather conditions at the start and end of the surveys can be seen in Appendix D. Summaries of the surveys of each of the structures is provided below.

Table 3-4 – Emergence / Re-entry survey summary

Structure number	Land parcel reference number	Dusk/Dawn survey	Survey results
1	10550	Dusk	<ul style="list-style-type: none"> ▪ A single soprano pipistrelle emerged from below the roof overhang between the door and window. ▪ A single common pipistrelle emerged from a lifted ridge tile. ▪ Four additional bats emerged from the roof tiles, three of which were in the same area, close to the chimney stack. These bats were not echolocating but are believed to be pipistrelle species based on surveyor experience. ▪ Soprano pipistrelle and common pipistrelle were recorded regularly throughout the survey. ▪ Soprano and common pipistrelles were recorded throughout survey around the house, garden and along the tree line. ▪ Multiple emergences have been observed by the homeowner (Anecdotal evidence of personal communications between homeowner and surveyors)

⁴⁰ Structure 18 received a PRA in January 2018 (included in this report), outside of the bat activity season, and therefore no presence/absence surveys are reported as part of this study for 2017 for this structure.

3	10900	Dawn	<ul style="list-style-type: none"> ▪ No re-entry observed. ▪ Four bat passes were recorded during the survey formed of one soprano pipistrelle and three bats with very brief or quiet calls which could not be identified.
5	10375	Dusk	<ul style="list-style-type: none"> ▪ No bats seen emerging. ▪ Total of 33 passes were recorded. Species were predominately common and soprano pipistrelle with one serotine pass, four noctule passes and one brown long eared pass. ▪ 22 of the 33 passes were located close to the road and adjacent hedgerow suggesting use of this linear feature for commuting. ▪ Foraging was recorded in the rear garden of the structure.
8	10375	Dusk	<ul style="list-style-type: none"> ▪ No bats seen emerging. ▪ Soprano pipistrelle, common pipistrelle and noctule recorded ▪ Soprano pipistrelles foraging in the clearing behind the structure continuously between 20:04 and 20:23. Flying at canopy height. Very little activity recorded later in the survey from 20:23 onwards
11	11235	Dawn	<ul style="list-style-type: none"> ▪ No re-entry seen. ▪ Four bat passes consisting of two common pipistrelle passes and two soprano pipistrelle passes. One soprano pipistrelle was commuting with the other three passes heard but not seen.
12	11235	Dawn	<ul style="list-style-type: none"> ▪ No re-entry seen ▪ No bat activity

13	11235	Dawn	<ul style="list-style-type: none"> ▪ No re-entry seen ▪ No bat activity
----	-------	------	---

RESULTS SUMMARY

- 3.3.5. The 19 structures identified within the Field Survey Area comprise a combination of homes (Structures 1, 3 and 5), garden sheds (Structures 2, 4, 6, 7, 8, 9 and 10), timber campsite outbuildings (Structures 11, 12, 13, and 15), bridges (18 and 19) and derelict farm buildings (Structures 15, 16 and 17). Full structure descriptions are available in Appendix A. Of the 18 structures which had a preliminary roost assessment, three were categorised as ‘Moderate Roost Suitability’, five were categorised as ‘Low Roost Suitability’, whilst the other 10 were of ‘Negligible Roost Suitability’.
- 3.3.6. Dusk emergence and dawn re-entry surveys confirmed the likely absence of a roost from one structure and confirmed the presence of roosting soprano and common pipistrelles in Structure 1. Further survey is required on the other five structures due to invalid survey conditions for three structures and two structures require a second survey due to being of moderate suitability as it was not possible to complete the full set of surveys for structures of moderate suitability due to access restrictions.
- 3.3.7. A summary of the results and further survey recommendations are detailed in Table 3-5. Further survey is recommended only where potential roosts may be subject to direct or indirect impact and further survey recommendations are therefore subject to change after selection of a preferred Scheme Option.

Table 3-5 – Results summary

Structure number	Suitability	Bat roost confirmed (yes/no)?	Further survey required (yes/no) and type of survey? ⁴¹
1	Moderate	Yes	Yes – roost characterisation surveys

⁴¹ Full details of further survey recommendations are shown in Section 5 of this report.

Structure number	Suitability	Bat roost confirmed (yes/no)?	Further survey required (yes/no) and type of survey? ⁴¹
3	Moderate	No	Yes – a second emergence survey to complete the two-survey requirement
5	Moderate	No	Yes – a second emergence survey to complete the two-survey requirement
8	Low	No	No
11	Low	No	Yes – one emergence survey to be repeated due to poor weather conditions
12	Low	No	Yes – one emergence survey to be repeated due to poor weather conditions
13	Low	No	Yes – one emergence survey to be repeated due to poor weather conditions

4. DISCUSSION AND RECOMMENDATIONS

- 4.1.1. Structure 1 was confirmed as having a bat roost, with four egress points recorded. The resident of this property reported frequently observing multiple emergences of bats from their property and commented that there are often many more bats emerging compared to the numbers recorded during the emergence survey. It is possible that this dwelling provides a maternity roost for common pipistrelle and that bats had already begun to disperse at the time of survey in late August.
- 4.1.2. A roost characterisation survey should be carried out if this roost is likely to be affected by the Scheme in order to determine its roost type and to develop appropriate mitigation. The impacts may be both direct through potential loss or disturbance of the roost, and indirect through the removal or degradation of habitat surrounding the roost used by foraging and commuting bats and by increased lighting and noise. Should it be considered that the Scheme will have a negative impact upon a confirmed bat roost, it may be necessary to apply to Natural England for a European Protected Species Mitigation licence.
- 4.1.3. No bats were recorded emerging from or returning to roost at the other six structures surveyed. Weather conditions of the structures 11, 12 and 13 invalidated these surveys, and therefore the likely absence of bat roosts cannot be concluded for those structures. The likely absence of bat roosts can be concluded for structure 8. A second survey is required on structures 3 and 5, as these buildings are considered to be of moderate roost suitability and only had one survey in 2017.
- 4.1.4. The urban areas adjacent to the Scheme Options, including Arundel, were not surveyed. Due to the close location of dwellings in the west of Arundel to the wooded habitat (Stewards Copse, Tortington Common, Binstead Woods) it is likely that bat roosts will be present in these areas. During the radio tracking study in 2017⁴² six roosts were identified in properties within the Field Survey Area, including in this area with two brown long-eared roosts (R12 and R15, Figure 3) and four whiskered roosts (R24, R25, R26, R27 Figure 3). It is recommended that the dwellings are subject to further surveys when more detailed Scheme design information becomes available.
- 4.1.5. The roosts located as a result of the radio-tracking study⁴² (Figure 3) indicate that breeding roosts of scarce woodland bat species are present within structures in the wider study area. This information will be consolidated along with data from other bat surveys undertaken to date.

⁴² WSP (2019) A27_ECO_04.4_BAT RADIO TRACKING_INTERIM-BASELINE_ISSUE01

4.2. FURTHER SURVEY RECOMMENDATIONS

4.2.1. The following further survey work is recommended to inform the baseline assessment:

- The River Arun Bridge should be subject to an emergence survey following the categorisation of 'low' suitability in its preliminary roost assessment in January 2018;
- A preliminary roost assessment should be undertaken at the bridge over the railway to determine its suitability for bats;
- A roost characterisation survey should be carried out at the confirmed roost in Structure 1 in order to inform future mitigation strategies;
- A second emergence survey should be carried out at structures 3 and 5;
- A repeated emergence survey should be carried out at structures 11, 12 and 13 due to poor weather conditions during previous surveys; and
- A preliminary roost assessment of the stable structure (Additional) opposite Structure 1 should be carried out as this property could not be accessed in 2017.
- Preliminary roost assessment should also be carried out at unsurveyed buildings within an extended Field Survey Area of 100m from the Scheme Options.
- Preliminary roost assessment and further surveys should be carried out at residential properties in Arundel within the 100m of the Scheme Options.

4.2.2. Further survey work in 2018/2019 is likely to include the following, subject to detailed design information, and a greater understanding of information required to inform any necessary licences from Natural England:

4.2.3. The aim of these surveys is to confirm whether bats are present (by direct field evidence) and/or to categorise structures in terms of their bat roost suitability. Structures would be placed into the following categories: High, Moderate, Low or Negligible suitability following BCT criteria⁴³.

4.2.4. Buildings identified as having low, moderate and high suitability should be subject to further, night time emergence / re-entry surveys to determine if bats are present and, if present, to characterise the roost (e.g. maternity colony, occasional roosts etc.). These surveys should be carried out between May and September with reference to guidance contained within chapter 7 of the BCT survey guidance⁴⁴.

These surveys should be carried out within the Field Survey Area based on the PRA suitability rating of each structure (summarised in

4.2.5. Table 4-1), adopting BCT guidance⁴⁴:

- Structures with high suitability should be subject to three separate survey visits (emergence and re-entry).

⁴³ Collins, J. (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London. ISBN- 13 978-1-872745-96-1

Table 4-1 – Recommended survey requirements

Structure suitability	Field Survey Area required	Further survey effort required
High	All structures within the 100 m Field Survey Area.	Up to 3 No. emergence or re-entry surveys. Known roosts should also be subject to roost characterisation surveys involving at least one emergence / re-entry survey undertaken between May and August. Up to three separate survey visits (emergence and re-entry) may be required in order to characterise the roost (i.e. roost type, species present etc.), with effort proportional to impact (distance to the Scheme Option) and conservation significance ⁴⁴ .
Moderate	All structures within the 100 m Field Survey Area.	Up to 2 No. emergence or re-entry surveys.
Low	All structures within the 100 m Field Survey Area.	1 No. emergence or re-entry survey.
Negligible	N/A	No further survey proposed.

⁴⁴ Mitchell-Jones, A. J. (2004). Bat Mitigation Guidelines. English Nature, Peterborough

5. FIGURES

Figure 1. Desk study

Figure 2. Preliminary Roost Assessment results

Figure 3. Radio-tracked roost locations (structures only)

\\uk.wspgroup.com\central_data\Projects\70046xx\7004640 - A27 Arundel Stage 3\02 WIP\EN Environment\EC Ecology\03 Doc\05 Baseline Surveys\Bats\2018\Emergence\1. Building\GIS\PRAs Results Fig 2.qgz



LEGEND:

- Option 1
- Option 3
- Option 5A
- Confirmed
- Moderate
- Low
- Negligible

Structure Code

B = Bridge
 DFB = Derelict Farm Building
 DH = Dwelling House
 Dog = Dog Kennel
 Sh = Garden Shed
 TFS = Timber Framed Structure

STATUS:
FOR INFORMATION ONLY



WSP, 6 Devonshire Square
 London, EC2M 4YE
 Tel: +44 (0) 20 7337 1700
 www.wsp.com

CLIENT: **Highways England**

PROJECT: **A27 Arundel Bypass**

TITLE:
Figure 2 - Preliminary Bat Roost Assessment Results

SCALE @A3: 1:2,000	DRAWN: AP	APPROVED: HB
VERSION: 1	DATE: 18/01/19	DATE: 18/01/19
PROJECT No: 70019688	DRAWING No: Figure 2	

\\uk.wspgroup.com\central_data\Projects\70046xx\7004640 - A27 Arundel Stage 3\02 WIP\EN Environment\EC Ecology\03 Doc\05 Baseline Surveys\Bats\2018\Emergence\1. Building\GIS\PR Results Fig 2.qgz



LEGEND:

- Option 1
- Option 3
- Option 5A
- Confirmed
- Moderate
- Low
- Negligible

Structure Code

- B = Bridge
- DFB = Derelict Farm Building
- DH = Dwelling House
- Dog = Dog Kennel
- Sh = Garden Shed
- TFS = Timber Framed Structure

STATUS:

FOR INFORMATION ONLY



WSP, 6 Devonshire Square
London, EC2M 4YE
Tel: +44 (0) 20 7337 1700
www.wsp.com

CLIENT:

Highways England

PROJECT:

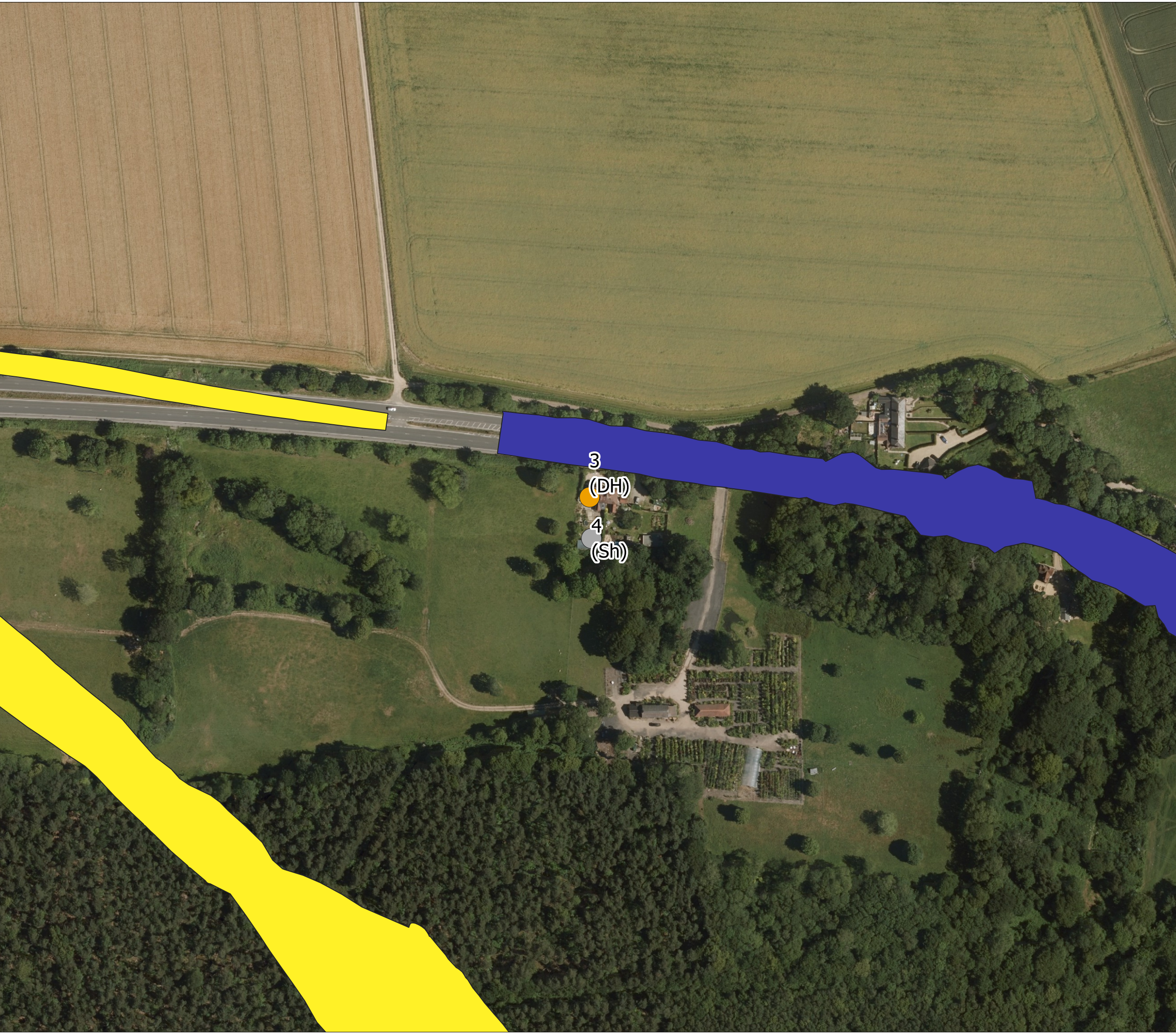
A27 Arundel Bypass

TITLE:

Figure 2 - Preliminary Bat Roost Assessment Results

SCALE @A3: 1:2,000	DRAWN: AP	APPROVED: HB
VERSION: 1	DATE: 18/01/19	DATE: 18/01/19
PROJECT No: 70019688	DRAWING No: Figure 2	

\\uk.wspgroup.com\central_data\Projects\70046xx\7004640 - A27 Arundel Stage 3\02 WIP\EN Environment\EC Ecology\03 Doc\05 Baseline Surveys\Bats\2018\Emergence\1. Building\GIS\PRAs Results Fig 2.qgz



LEGEND:

- Option 1
- Option 3
- Option 5A
- Confirmed
- Moderate
- Low
- Negligible

Structure Code

- B = Bridge
- DFB = Derelict Farm Building
- DH = Dwelling House
- Dog = Dog Kennel
- Sh = Garden Shed
- TFS = Timber Framed Structure

STATUS:

FOR INFORMATION ONLY



WSP, 6 Devonshire Square
London, EC2M 4YE
Tel: +44 (0) 20 7337 1700
www.wsp.com

CLIENT:

Highways England

PROJECT:

A27 Arundel Bypass

TITLE:

Figure 2 - Preliminary Bat Roost Assessment Results

SCALE @A3: 1:2,000	DRAWN: AP	APPROVED: HB
VERSION: 1	DATE: 18/01/19	DATE: 18/01/19
PROJECT No: 70019688	DRAWING No: Figure 2	

\\uk.wspgroup.com\central_data\Projects\70046xx\7004640 - A27 Arundel Stage 3\02 WIP\EN Environment\EC Ecology\03 Doc\05 Baseline Surveys\Bats\2018\Emergence\1. Building\GIS\PRAs Results Fig 2.qgz



LEGEND:

- Option 1
- Option 3
- Option 5A
- Confirmed
- Moderate
- Low
- Negligible

Structure Code

- B = Bridge
- DFB = Derelict Farm Building
- DH = Dwelling House
- Dog = Dog Kennel
- Sh = Garden Shed
- TFS = Timber Framed Structure

STATUS:

FOR INFORMATION ONLY



WSP, 6 Devonshire Square
London, EC2M 4YE
Tel: +44 (0) 20 7337 1700
www.wsp.com

CLIENT:

Highways England

PROJECT:

A27 Arundel Bypass

TITLE:

Figure 2 - Preliminary Bat Roost Assessment Results

SCALE @A3: 1:2,000	DRAWN: AP	APPROVED: HB
VERSION: 1	DATE: 18/01/19	DATE: 18/01/19
PROJECT No: 70019688	DRAWING No: Figure 2	