

Greencore Group Plc.

Fitzalan Link, North Littlehampton

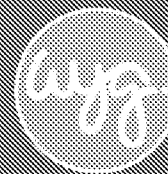
Bat Roost Assessment

September 2011

The Loft, St Clair's Farm, Wickham Road, Droxford, Hants, SO32 3PW

Tel: 01489 872929 Fax: 01489 872939

Email: ecology@wyg.com



Document Control

Project: Fitzalan Link Bat Roost Assessment

Client: Greencore Group Plc

Job Number: A044029-4

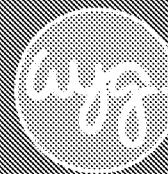
File Origin: N:\PengeData\Environmental Projects\A Projects - Awarded Projects\2010 - 2011 Ecology\A044029-5 Fitzalan Link

Document Checking:

Prepared by:	Emily Hare Assistant Ecologist	Signed:
Reviewed by:	Tim Bradford Project Ecologist	Signed:
Verified by:	Tamsin Clark, Associate Ecologist Claire Wilmer, Regional Director	Signed:

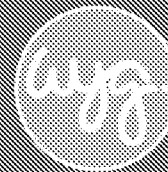


Issue	Date	Status
1	14.09.11	Issue
2		
3		
4		



Contents Page

EXECUTIVE SUMMARY	5
1.0 INTRODUCTION	7
1.1 Background	7
1.2 Site Description.....	7
1.3 Proposed Development.....	7
2.0 CONSULTATION.....	10
2.1 Sussex Biodiversity Records Centre (SxBRC)	10
3.0 METHODOLOGY.....	11
3.1 Bat Roost Assessment	11
3.2 Limitations.....	12
4.0 RESULTS	13
4.1 Trees	13
5.0 CONCLUSIONS AND RECOMMENDATIONS.....	14
5.1 Legislation	14
5.2 Further Survey Work	14
5.3 Mitigation and Enhancement Measures.....	16
6.0 DOCUMENTS CONSULTED	17
• Altringham, J. D. (2003). British bats. Harper Collins, London	17



APPENDICES

Appendix A – Report Conditions

Appendix B – Consultation Response- Bat Records from HBIC and SxBRC

Appendix C – Trees of Bat Roosting Potential

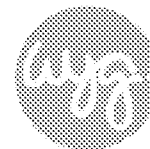
Appendix D – Drawings

Appendix E – Bat Roosting Features

Appendix F – 'Bat-friendly' Planting

Appendix G – Photographs

Appendix H – Bat Conservation Trust Guidelines: Bat survey protocol for trees due to be affected by arboricultural work

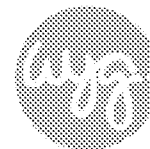


EXECUTIVE SUMMARY

Site Location	The Fitzalan Link site lies in the centre of Littlehampton, West Sussex. The site is centred on OS Grid Reference TQ 031 029. The proposed works are to create a road to link East Street, to the south, with Worthing Road to the north. This development may require the removal of some trees.
Previous WYG survey	An Ecology Scoping/Phase 1 Habitat survey was undertaken by WYG Environment in December 2009
WYG Survey	Bat Roost Assessment
Methods	This assessment involved an inspection of all trees on site to determine the level of risk that roosting bats may be present.
Results	Category 1 (confirmed roost): No trees Category 2a (has 1 or more features likely to support bats): Five trees Category 2b (has features which could support bats, but deemed unlikely by surveyor): nineteen trees Category 3 (no features suitable for roosting bats): Thirty-three trees
Recommendations	Emergence return surveys are recommended for all Category 2a trees which will be impacted by the proposed development; 'Soft-felling' methods are recommended for any Category 2b trees requiring removal; Regardless of the category, it is recommended that all trees to be removed be felled outside the bat active season (i.e. cut down between late October and April inclusive) wherever possible.
Mitigation and Enhancement Measures	Although the appropriate level of mitigation will not be determined until the emergence / return surveys are complete, the options are recommended during preparation of the development plan: The inclusion of artificial roosts such as bat boxes, bricks or tubes on trees



	to enhance and replace roosting opportunities, some of which may be lost as a result of the work (see Appendix E). The creation of a 'bat-friendly' habitat, either on- or off- site to replace habitat which will be lost as a result of the proposals (see Appendix F). Adequate consideration should be given to the type and position of lights to minimise the impact on bats that may be roosting, foraging or commuting in the area. Lights should only be used in those areas where it is necessary for Health and Safety and avoided in areas which are found to support bats where possible. Light spillage should be controlled through the use of hoods and appropriate angling of the light itself and low or high pressure sodium lamps should be used instead of mercury or metal halide lamps.
--	---



1.0 INTRODUCTION

1.1 Background

WYG Environment (WYGE) was commissioned in June 2011 by Greencore Group Plc. to undertake a bat roost assessment of the Fitzalan Link site. This followed a previous WYGE Ecological Scoping/Phase 1 Habitat Survey in December 2009, which identified the potential for bats to roost at the site.

This assessment involved an inspection of all trees on site to determine the likelihood of roosting bats being present. This daytime bat roost assessment was undertaken to determine the bat roost potential of each tree that may be affected by the proposed works.

1.2 Site Description

The Fitzalan Link site lies in the centre of Littlehampton, West Sussex. The site is located between Worthing Road, Highdown Drive and East Street and is centred on Ordnance Survey Grid Reference TQ 031 029 (503125, 102901).

Much of the site is dominated by rough grassland. The boundary of the grassland is dominated by a mosaic of ruderal vegetation and bramble scrub, beyond which are boundary hedgerows, which are typically species poor, and mature trees. The site is surrounded by residential properties, along the north eastern, eastern, and western boundary. The majority of which have their rear gardens backing directly onto the site, with some access gates leading onto the site. To the north of the site lies Worthing Road. The southern boundary is shared with North Littlehampton College. Towards the southern boundary the land becomes increasingly narrow and ends by a small private drive leading out into further residential development. For further information, please see the WYGE Ecological Scoping/Phase 1 Habitat Survey (2009).

1.3 Proposed Development

The proposed development is a road – Fitzalan Link, which will join East Street, to the south, with Worthing Road, to the north. This development will involve the possible removal of some trees, hedgerows and areas of dense scrub and the clearance of a central area of uncut semi-improved neutral grassland and ruderal vegetation, and the southern areas of grazed neutral grassland and amenity grassland. The site boundary was taken from Drawing: WYGLITTLEHAMPTON.1/34 dated 01.2011

Fitzalan Link Bat Roost Assessment

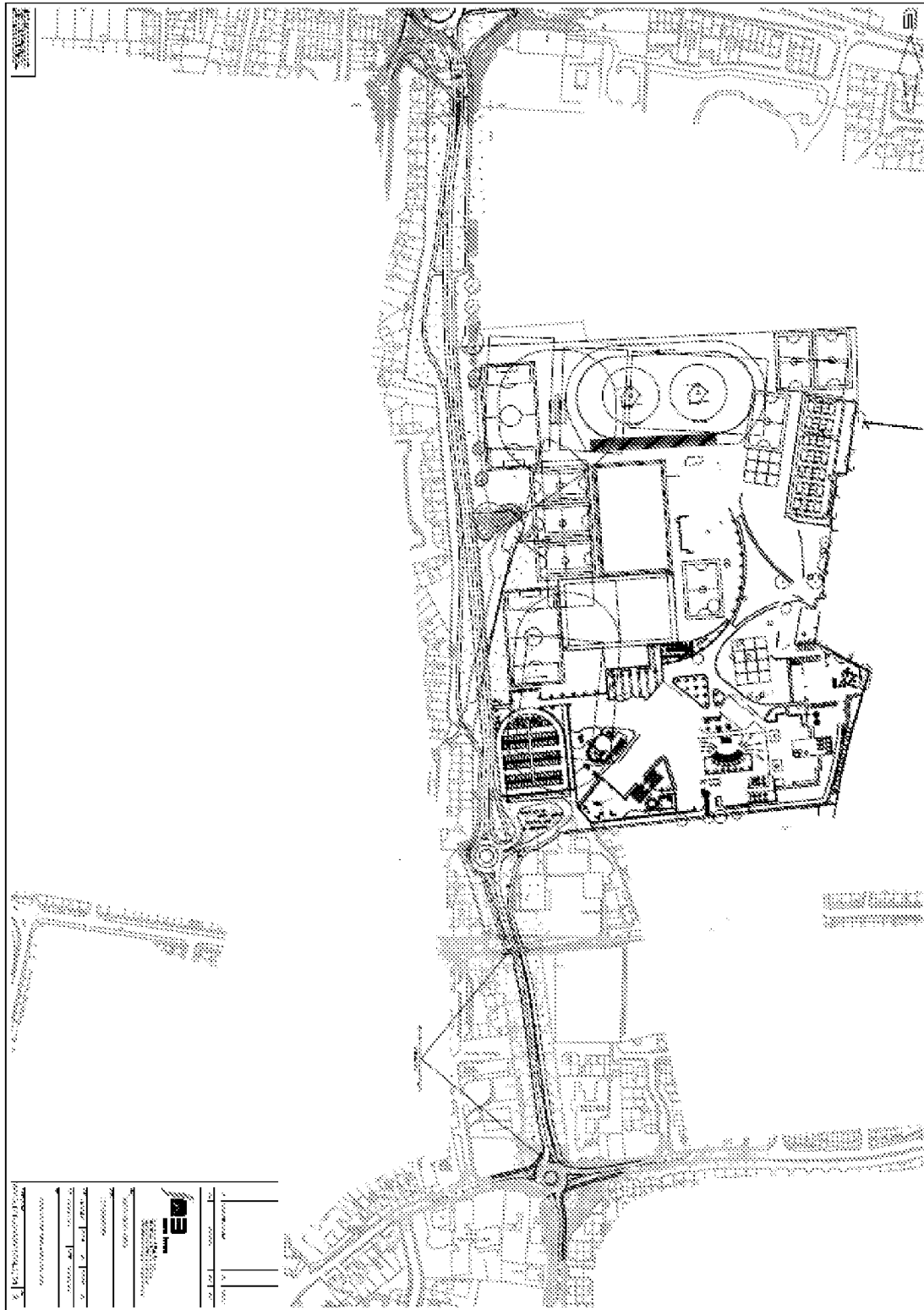


Figure 1 below shows the location of the proposed Fitzalan Link site





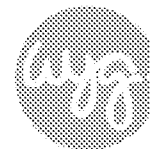
Figure 2 below shows the Fitzalan Link site boundary



Fitzalan Link is located in West Sussex therefore the Sussex Biodiversity Records Centre (SxBRC) were consulted to obtain all records of bats within two kilometres of the site.

SxBRC hold no records of bats at the Fitzalan Link site, however the following records were found within two kilometres:

- Details of the SxBRC records can be viewed in Appendix B



3.0 METHODOLOGY

3.1 Bat Roost Assessment

The bat roost assessment was completed on the 20th June 2011 by WYG Ecologists using methodologies based on the Bat Conservation Trust's *Bat Surveys: Good Practice Guidelines* (2007). Bat roost potential is determined by a variety of factors including physical attributes of the tree, and proximity to good feeding sites and safe commuting routes. A brief summary of the known factors which influence a trees potential to support bats is provided in Table 4.1 below.

Table 4.1. Factors influencing potential for trees to be used by bats (adapted from Bat Conservation Trust, 2007)

Features of trees used by bats	Signs indicating possible use by bats
✧ Natural holes ✧ Woodpecker holes ✧ Cracks/splits in major limbs ✧ Loose bark ✧ Behind dense, thick-stemmed ivy ✧ Hollows/cavities ✧ Within dense epicormic growth ✧ Bird and bat boxes	✧ Tiny scratches around entry point ✧ Staining around entry point ✧ Bat droppings in/around/below entrance ✧ Audible squeaking at dusk or in warm weather ✧ Flies around entry point ✧ Distinctive smell of bats ✧ Smoothing of surfaces around cavity

The trees were visually inspected for their bat roosting potential, including potential access points into the trees and connectivity to the wider environment. These were categorised in accordance with Table 4.2 below (taken from Bat Conservation Trust, 2007), and the categorisation determined by a visual assessment of the trees to record the presence of features such as crevices, holes, fissures, split bark and arboreal ivy.

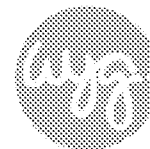


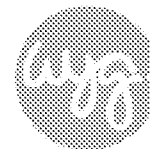
Table 4.2 Categories of trees, based on their potential to support bat roosts (taken from Bat Conservation Trust, 2007)

Tree category	Description
1	Confirmed bat roost tree with field evidence demonstrating bats are present e.g. droppings, scratch marks, grease marks or urine staining.
2a	Trees that have a high potential to support bat roosts.
2b	Trees with a moderate/low potential to support bat roosts.
3	Trees with negligible potential to support bat roosts.

Please note that Tables 4.1 and 4.2 identify what are generally considered to be the most important influences on bat roost preferences. There are 17 species of bats in the UK, each with its own specific requirements. Additionally males generally have different roost preferences to females and, therefore, it is not practical to assess a feature against all the possible permutations of an 'ideal' roost.

3.2 Limitations

A thorough and systematic daytime visual examination of the trees was carried out from ground level for features that could provide opportunities for roosting bats and for signs of bat occupancy; however no climbed inspections were made as this was beyond the scope of works. Consequently features at height (above approx 2 m) could not be positively identified as roosts. However where, in the surveyors professional opinion, a feature had sufficient potential to act as a roost, we have recommended further nocturnal surveys. Therefore we do not consider this to be a limitation to determining if the trees are roosts or not.



4.0 RESULTS

4.1 Trees

A total of fifty seven trees were assessed for their bat roosting potential. The results of the tree assessment are given in the Trees of Bat Roosting Assessment Table (Appendix C) and this information is summarised below. The location of the trees assessed is shown in Appendix D.

Category 1

No evidence of bat roosts was observed in any of the trees at the site and therefore no trees at the site are considered to be Category 1.

Category 2a

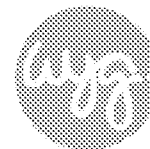
Five trees (T3, T22, T33, T42 and T46) are considered to be Category 2a. These trees support cracks/splits, loose bark, holes or dense thick stemmed ivy (see Photographs, Appendix G).

Category 2b

A further nineteen trees were considered to be Category 2b; which displayed characteristics potentially suited to bats including natural holes, and some ivy cover, but these trees were at least partly exposed to the elements, and considered less likely to support roosting bats.

Category 3

The remaining (thirty-three) trees were considered to be Category 3.



5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Legislation

All British bat species are listed in Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended) and Schedule 2 of the *Conservation of Habitats and Species Regulations 2010*.

This makes it an offence to, or to attempt to do any of the following:

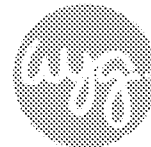
- ✧ Deliberately capture, injure or kill any bat;
- ✧ Deliberately disturb bats, in particular where it is likely to:
 - ✧ Impair their ability to breed or reproduce, or to rear or nurture their young;
 - ✧ Impair their ability to hibernate or migrate; or
 - ✧ Affect significantly the local distribution or abundance of bats.
- ✧ Intentionally or recklessly damage, destroy or obstruct the access to the place of shelter or protection;
- ✧ Damage or destroy a bats breeding site or resting place; and
- ✧ Be in possession of, transport, sell or exchange, or offer to sell or exchange any bat.

Consequently, if any of the trees mentioned as being of category 2a potential to roosting bats are to be removed, further surveys will need to be completed. This will determine if bats are roosting and will be able to help provide mitigation advice.

5.2 Further Survey Work

Category 2a trees

As a result of the assessment of bat roosting potential made above, **further survey work is recommended to determine bat usage of any trees considered to be in Category 2a**, which will be impacted by the proposed development. Nocturnal emergence/return surveys will allow identification of species composition and numbers of bats using the trees, as well as determine the use of the site by bats.



This will allow an accurate assessment of the potential effects and impacts on bats as a result of the development with reference to EU and UK wildlife legislation and planning guidance.

These dusk and dawn survey visits can only take place between May and September in suitable weather conditions, in accordance with the Bat Conservation Trust's Bat Surveys: Good Practice Guidelines (2007).

If the additional survey work indicates that these trees function as a bat roost and/or bats will be significantly impacted as a result of the proposed development, a Natural England development licence is likely to be required which must include a detailed Method Statement outlining impacts, mitigation and provide justification for the development in accordance with the *Wildlife and Countryside Act 1981* (as amended) and the *Conservation of Habitats and Species Regulations 2010*. Please note that if a licence is required Natural England may take up to 30 working days to process it.

Category 2b trees

'Soft felling' is recommended for all category 2b trees. This is a generic term used to describe more cautious felling approaches. Where possible, cross cutting in proximity to cavities or hollows should be avoided, and any sections felled containing cavities should be lowered carefully using lowering and cushioning techniques to reduce the impact of felling limbs which may still have bats within cavities. The felled sections should be left on the ground (preferably for up to 48 hours) with the openings clear, allowing any remaining bats to escape. Split limbs that are under tension may need to be wedged open to prevent their closure when pressure is released, to avoid trapping bats.

All trees

Wherever trees require removal, we would recommend that, where possible, removal or pruning should be undertaken sympathetically using "reasonable avoidance measures" (Appendix H). Furthermore any such works should be undertaken between late October and April inclusive where possible, as these are the months during which bats (if present) are least likely to be occupying the trees. Reasonable avoidance measures are considered to be good practice.

Although the appropriate level of mitigation will not be determined until the emergence / return surveys are complete, the options below are recommended for inclusion when preparing the development plan:

- ❖ The inclusion of artificial roosts such as bat boxes, bricks or tubes on buildings and trees to enhance and replace roosting opportunities, some of which may be lost as a result of the work (see Appendix E).
- ❖ The creation of a 'bat-friendly' habitat, either on- or off- site to replace habitat which will be lost as a result of the proposals (see Appendix F).
- ❖ Adequate consideration should be given to the type and position of lights to minimise the impact on bats that may be roosting, foraging or commuting in the area. Lights should only be used in those areas where it is necessary for Health and Safety and avoided in areas which are found to support bats. Light spillage should be controlled through the use of hoods and appropriate angling of the light itself and low or high pressure sodium lamps should be used instead of mercury or metal halide lamps.



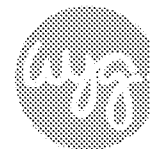
6.0 DOCUMENTS CONSULTED

- » Altringham, J. D. (2003). *British bats*. Harper Collins, London
- » Bat Conservation Trust (2007) *Bat Surveys: Good Practice Guidelines*. Bat Conservation Trust, London. ISBN 978-1-872745-99-2
- » WYGE Ecological Scoping/Phase 1 Habitat Survey report for Fitzalan Link, North Littlehampton. (December 2009)
- » *Wildlife and Countryside Act, 1981* (as amended). HMSO, London.



Appendix A

Report Conditions



WYGE ENVIRONMENT

C1 - REPORT CONDITIONS

Fitzalan Link, North Littlehampton

Bat Roost Assessment

This report is produced solely for the benefit of Greencore Group Plc. and no liability is accepted for any reliance placed on it by any other party unless specifically agreed in writing otherwise.

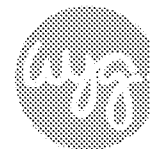
This report is prepared for the proposed uses stated in the report and should not be used in a different context without reference to WYGE. In time improved practices, fresh information or amended legislation may necessitate a re-assessment. Opinions and information provided in this report are on the basis of WYGE using due skill and care in the preparation of the report.

This report refers, within the limitations stated, to the environment of the site in the context of the surrounding area at the time of the inspections. Environmental conditions can vary and no warranty is given as to the possibility of changes in the environment of the site and surrounding area at differing times.

This report is limited to those aspects reported on, within the scope and limits agreed with the client under our appointment. It is necessarily restricted and no liability is accepted for any other aspect. It is based on the information sources indicated in the report. Some of the opinions are based on unconfirmed data and information and are presented as the best obtained within the scope for this report.

Reliance has been placed on the documents and information supplied to WYGE by others but no independent verification of these has been made and no warranty is given on them. No liability is accepted or warranty given in relation to the performance, reliability, standing etc of any products, services, organisations or companies referred to in this report.

Whilst skill and care have been used, no investigative method can eliminate the possibility of obtaining partially imprecise, incomplete or not fully representative information. Any monitoring or survey work undertaken as part of the commission will have been subject to limitations, including for example timescale, seasonal and weather related conditions.



Although care is taken to select monitoring and survey periods that are typical of the environmental conditions being measured, within the overall reporting programme constraints, measured conditions may not be fully representative of the actual conditions. Any predictive or modelling work, undertaken as part of the commission will be subject to limitations including the representativeness of data used by the model and the assumptions inherent within the approach used. Actual environmental conditions are typically more complex and variable than the investigative, predictive and modelling approaches indicate in practice, and the output of such approaches cannot be relied upon as a comprehensive or accurate indicator of future conditions.

The potential influence of our assessment and report on other aspects of any development or future planning requires evaluation by other involved parties.

The performance of environmental protection measures and of buildings and other structures in relation to acoustics, vibration, noise mitigation and other environmental issues is influenced to a large extent by the degree to which the relevant environmental considerations are incorporated into the final design and specifications and the quality of workmanship and compliance with the specifications on site during construction. WYGE accepts no liability for issues with performance arising from such factors.

WYGE Environment Planning Transport Ltd.



Appendix B: Consultation Response

Bat Records from SxBRC



Bat Records from SxBRC

***Myotis mystacinus*****Whiskered Bat**

Very similar to Brandt's bat, *Myotis brandtii*, and only separated from that species in 1970. On average not quite as large and with small anatomical differences. Summer roosts are mainly in buildings and trees, while winter roosts, so far as has been established, are in tunnels and caves. Though somewhat scarcer than Brandt's bat, the whiskered bat is found throughout the British Isles apart from central and northern Scotland. The majority of records from our area are from West Sussex, with a few from East Sussex.

Like all bats, a legally protected species and listed on the Sussex Rare Species Inventory.

BAT

Grid Reference	Recorder	Date	Locality
TQ042662	Frank Greenaway	24/07/2006	Poling Copse, Poling Copse, Arundel

Myotis nattereri**Natterer's Bat**

A medium-sized, long-eared bat of open woodland, wood pasture and mixed farmland, often flying near water. In summer it roosts in old buildings, barns and hollow trees and it hibernates in caves, mines and other underground places.

Found throughout much of the British Isles, but generally scarce. The UK population of Natterer's bats is probably of international importance (Roberts & Hutson, c. 1994) and it is widespread in Sussex. Like all bats, a legally protected species

BAT

Grid Reference	Recorder	Date	Locality
TQ042662	Frank Greenaway	24/07/2006	Poling Copse, Poling Copse, Arundel

Pipistrellus pipistrellus 45kHz**45 Khz Pipistrelle**

Pipistrelles are often recorded as either 45 kHz or 55 kHz depending on the pitch of the echolocation calls picked up by bat detectors. Bats in this 45 kHz category are now simply *Pipistrellus pipistrellus* with the 55 kHz becoming *P. pygmaeus*. Pipistrelles are the commonest bats in the British Isles and are found in all types of countryside, except very exposed areas, as well as in towns and suburbs. Summer roosts are usually in buildings, though tree holes and bat boxes are also used. Winter roosts are in buildings, tree holes and caves.

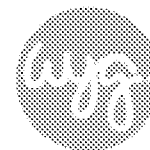
BAT

Grid Reference	Recorder	Date	Locality
TQ054821	Recorder @ Sussex Bat Group	24/05/1998	12 Wallace Road, Rustington, West Sussex

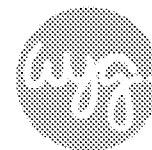


Appendix C: Trees of Bat Roosting Potential

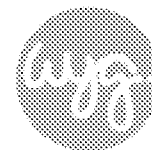
14/09/2011



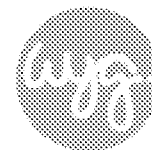
Tree species	No. of tree on plan	DBH (millimetres)	Approx height (metres)	Tree displays veteran characteristics generally	Presence of features used as bat roosts								Signs indicating possible use of bats								BCT category of tree potential for bats	Assessment results/Comments
					Natural holes	Woodpecker holes	Cracks/splits in major limbs	Loose bark	Behind dense thick, stemmed ivy	Hollow/cavities	Within dense epicormic growth	Bird and bat boxes	Tiny scratches around entry points	Staining around entry point	Bat droppings in/around/below entrance	Audible squeaking at dusk or in warm weather	Flies around entry point	Distinctive smell of bats	Smoothing of surfaces around cavity			
Ash	T5	204	8	x	x	x	x	x	✓	x	x	x	x	x	x	x	x	x	2b	Low to Moderate Potential. Thin ivy.		
Poplar black hybrid	T6	825	28	x	x	x	x	x	✓	x	x	x	x	x	x	x	x	x	2b	Low to Moderate Potential. Some thick ivy.		
Poplar black hybrid	T7	855	28	x	x	x	x	x	✓	x	x	x	x	x	x	x	x	x	2b	Low to Moderate Potential. Thin ivy.		
Poplar black	T8	865	28	x	x	x	x	x	✓	x	x	x	x	x	x	x	x	x	2b	Low to Moderate Potential. Thin ivy.		



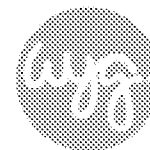
Tree species	No. of tree on plan	DBH (millimetres)	Approx height (metres)	Tree displays veteran characteristics generally	Presence of features used as bat roosts								Signs indicating possible use of bats								BCT category of tree potential for bats	Assessment results/Comments
					Natural holes	Woodpecker holes	Cracks/splits in major limbs	Loose bark	Behind dense thick, stemmed ivy	Hollow/cavities	Within dense epicormic growth	Bird and bat boxes	Tiny scratches around entry points	Staining around entry point	Bat droppings in/around/below entrance	Audible squeaking at dusk or in warm weather	Flies around entry point	Distinctive smell of bats	Smoothing of surfaces around cavity			
hybrid																						
Poplar black hybrid	T10	370	10	x	x	x	x	x	✓	x	x	x	x	x	x	x	x	x	x	2b	Low to Moderate Potential. Thick ivy.	
Poplar sp.	T11	116	5	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	3	Negligible Potential.	
Scots pine	T12	175	2	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	3	Negligible Potential.	



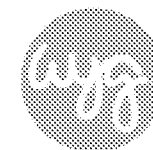
Tree species	No. of tree on plan	DBH (millimetres)	Approx height (metres)	Tree displays veteran characteristics generally	Presence of features used as bat roosts								Signs indicating possible use of bats								BCT category of tree potential for bats	Assessment results/Comments
					Natural holes	Woodpecker holes	Cracks/splits in major limbs	Loose bark	Behind dense thick, stemmed ivy	Hollow/cavities	Within dense epicormic growth	Bird and bat boxes	Tiny scratches around entry points	Staining around entry point	Bat droppings in/around/below entrance	Audible squeaking at dusk or in warm weather	Files around entry point	Distinctive smell of bats	Smoothing of surfaces around cavity			
Black Italian Poplar	T13	1125	27	x	x	x	x	x	✓	x	x	x	x	x	x	x	x	x	2b	Low Potential. Thin ivy.		
Leyland cypress	T14	142	3	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	3	Negligible Potential.		
Ash	T15	180	7	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	3	Negligible Potential.		



Tree species	No. of tree on plan	DBH (millimetres)	Approx height (metres)	Tree displays veteran characteristics generally	Presence of features used as bat roosts								Signs indicating possible use of bats								BCT category of tree potential for bats	Assessment results/Comments
					Natural holes	Woodpecker holes	Cracks/splits in major limbs	Loose bark	Behind dense thick, stemmed ivy	Hollow/cavities	Within dense epicormic growth	Bird and bat boxes	Tiny scratches around entry points	Staining around entry point	Bat droppings in/around/below entrance	Audible squeaking at dusk or in warm weather	Flies around entry point	Distinctive smell of bats	Smoothing of surfaces around cavity			
Hybrid black poplar probable Golden poplar	T16	840	22	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	3	Negligible Potential.		
Hybrid black poplar probable Golden poplar	T17	625	22	x	x	x	x	x	✓	x	x	x	x	x	x	x	x	x	2b	Low to Moderate Potential. Some ivy.		
Hybrid black	T18	120	7	x	x	x	x	x	✓	x	x	x	x	x	x	x	x	x	2b	Low to Moderate Potential. Some ivy.		

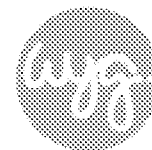


Tree species	No. of tree on plan	DBH (millimetres)	Approx height (metres)	Tree displays veteran characteristics generally	Presence of features used as bat roosts								Signs indicating possible use of bats								BCT category of tree potential for bats	Assessment results/Comments
					Natural holes	Woodpecker holes	Cracks/splits in major limbs	Loose bark	Behind dense thick, stemmed ivy	Hollow/cavities	Within dense epicormic growth	Bird and bat boxes	Tiny scratches around entry points	Staining around entry point	Bat droppings in/around/below entrance	Audible squeaking at dusk or in warm weather	Flies around entry point	Distinctive smell of bats	Smoothing of surfaces around cavity			
poplar probable Golden poplar																						
Hybrid black poplar probable Golden poplar	T19	200	10	x	x	x	x	x	✓	x	x	x	x	x	x	x	x	x	2b	Low to Moderate Potential. Some ivy present.		
Hybrid black poplar probable	T20	150	8	x	x	x	x	x	✓	x	x	x	x	x	x	x	x	x	2b	Low to Moderate Potential. Some ivy present.		

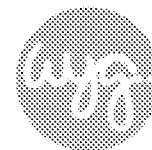


Tree species	No. of tree on plan	DBH (millimetres)	Approx height (metres)	Tree displays veteran characteristics generally	Presence of features used as bat roosts								Signs indicating possible use of bats								BCT category of tree potential for bats	Assessment results/Comments
					Natural holes	Woodpecker holes	Cracks/splits in major limbs	Loose bark	Behind dense thick, stemmed ivy	Hollow/cavities	Within dense epicormic growth	Bird and bat boxes	Tiny scratches around entry points	Staining around entry point	Bat droppings in/around/below entrance	Audible squeaking at dusk or in warm weather	Flies around entry point	Distinctive smell of bats	Smoothing of surfaces around cavity			
Golden poplar																						
Hybrid black poplar probable Golden poplar	T22	1060	24	x	x	x	x	x	✓	x	x	x	x	x	x	x	x	x	x	2a	Moderate to High Potential. Dense ivy present.	
Hybrid black poplar probable Golden poplar	T23	198	10	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	3	Negligible Potential.	

Fitzalan Link Bat Roost Assessment

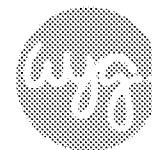


Tree species	No. of tree on plan	DBH (millimetres)	Approx height (metres)	Tree displays veteran characteristics generally	Presence of features used as bat roosts								Signs indicating possible use of bats								BCT category of tree potential for bats	Assessment results/Comments
					Natural holes	Woodpecker holes	Cracks/splits in major limbs	Loose bark	Behind dense thick, stemmed ivy	Hollow/cavities	Within dense epicormic growth	Bird and bat boxes	Tiny scratches around entry points	Staining around entry point	Bat droppings in/around/below entrance	Audible squeaking at dusk or in warm weather	Flies around entry point	Distinctive smell of bats	Smoothing of surfaces around cavity			
Lombardy poplar	T24	414	17	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	3	Negligible Potential.		
Lombardy poplar	T25	642	17	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	3	Negligible Potential.		
Lombardy poplar	T26	637	17	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	3	Negligible Potential.		
Elder	T27	152	5	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	3	Negligible Potential.		
Leyland Cypress	T28	364	7	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	2b	Negligible Potential.		



Tree species	No. of tree on plan	DBH (millimetres)	Approx height (metres)	Tree displays veteran characteristics generally	Presence of features used as bat roosts								Signs indicating possible use of bats								BCT category of tree potential for bats	Assessment results/Comments
					Natural holes	Woodpecker holes	Cracks/splits in major limbs	Loose bark	Behind dense thick, stemmed ivy	Hollow/cavities	Within dense epicormic growth	Bird and bat boxes	Tiny scratches around entry points	Staining around entry point	Bat droppings in/around/below entrance	Audible squeaking at dusk or in warm weather	Flies around entry point	Distinctive smell of bats	Smoothing of surfaces around cavity			
Leyland cypress	T29	580	9	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	3	Low Potential.		
Leyland cypress	T30	760	5	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	3	Low Potential.		
Hybrid black poplar probable Golden poplar	T31	460	17	x	x	x	x	x	✓	x	x	x	x	x	x	x	x	x	2b	Low to Moderate Potential. Some ivy present.		
Hybrid black poplar probable	T32	195	12	x	x	x	x	x	✓	x	x	x	x	x	x	x	x	x	2b	Low to Moderate Potential. Some ivy present.		

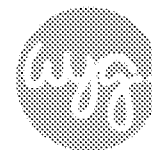
Fitzalan Link Bat Roost Assessment



Tree species	No. of tree on plan	DBH (millimetres)	Approx height (metres)	Tree displays veteran characteristics generally	Presence of features used as bat roosts								Signs indicating possible use of bats							BCT category of tree potential for bats	Assessment results/Comments
					Natural holes	Woodpecker holes	Cracks/splits in major limbs	Loose bark	Behind dense thick, stemmed ivy	Hollow/cavities	Within dense epicormic growth	Bird and bat boxes	Tiny scratches around entry points	Staining around entry point	Bat droppings in/around/below entrance	Audible squeaking at dusk or in warm weather	Flies around entry point	Distinctive smell of bats	Smoothing of surfaces around cavity		
Golden poplar																					
Hybrid black poplar probably Golden poplar	G33	240 880 240		x	x	x	x	x	✓	x	x	x	x	x	x	x	x	x	2a	Moderate to High Potential. Ivy present.	
Hybrid black poplar probably	T34	895	18	x	x	x	x	x	✓	x	x	x	x	x	x	x	x	x	2b	Low to Moderate Potential.	

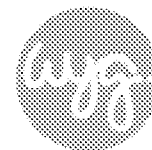
14/09/2011

Fitzalan Link Bat Roost Assessment



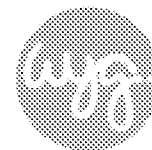
Tree species	No. of tree on plan	DBH (millimetres)	Approx height (metres)	Tree displays veteran characteristics generally	Presence of features used as bat roosts								Signs indicating possible use of bats								BCT category of tree potential for bats	Assessment results/Comments
					Natural holes	Woodpecker holes	Cracks/splits in major limbs	Loose bark	Behind dense thick, stemmed ivy	Hollow/cavities	Within dense epicormic growth	Bird and bat boxes	Tiny scratches around entry points	Staining around entry point	Bat droppings in/around/below entrance	Audible squeaking at dusk or in warm weather	Flies around entry point	Distinctive smell of bats	Smoothing of surfaces around cavity			
Cypress sp.	T39	600	5	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	3	Negligible Potential.		
Cypress sp.	T40	468	5	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	3	Negligible Potential.		
Cypress sp.	T41	244	3	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	3	Negligible Potential.		
Black Italian Poplar	T42	783	21	x	x	x	x	x	x	✓	x	x	x	x	x	x	x	x	2a	Moderate to High Potential. Holes in wood.		

Fitzalan Link Bat Roost Assessment



Tree species	No. of tree on plan	DBH (millimetres)	Approx height (metres)	Tree displays veteran characteristics generally	Presence of features used as bat roosts								Signs indicating possible use of bats								BCT category of tree potential for bats	Assessment results/Comments
					Natural holes	Woodpecker holes	Cracks/splits in major limbs	Loose bark	Behind dense thick, stemmed ivy	Hollow/cavities	Within dense epicormic growth	Bird and bat boxes	Tiny scratches around entry points	Staining around entry point	Bat droppings in/around/below entrance	Audible squeaking at dusk or in warm weather	Flies around entry point	Distinctive smell of bats	Smoothing of surfaces around cavity			
Cypress sp.	T43	494	3	x	x	x	x	x	x	x	x	x	x	x	x	x	x	3	Negligible Potential.			
Cypress sp.	T44	167	3	x	x	x	x	x	x	x	x	x	x	x	x	x	x	3	Negligible Potential.			
Hybrid black poplar probably Golden poplar	T45	712	3	x	x	x	x	x	x	x	x	x	x	x	x	x	x	3	Negligible Potential.			
Black Italian	T46	630	17	x	✓	x	x	x	x	x	x	x	x	x	x	x	x	2a	Moderate to High Potential. Hole by limb.			

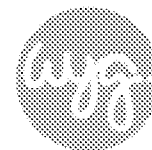
Fitzalan Link Bat Roost Assessment



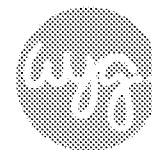
Tree species	No. of tree on plan	DBH (millimetres)	Approx height (metres)	Tree displays veteran characteristics generally	Presence of features used as bat roosts								Signs indicating possible use of bats								BCT category of tree potential for bats	Assessment results/Comments
					Natural holes	Woodpecker holes	Cracks/splits in major limbs	Loose bark	Behind dense thick, stemmed ivy	Hollow/cavities	Within dense epicormic growth	Bird and bat boxes	Tiny scratches around entry points	Staining around entry point	Bat droppings in/around/below entrance	Audible squeaking at dusk or in warm weather	Flies around entry point	Distinctive smell of bats	Smoothing of surfaces around cavity			
Poplar																						
Cypress sp.	T47	388	3	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	3	Negligible Potential.	
Lombardy poplar	T48	509	16	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	3	Negligible Potential.	
Lombardy poplar	T49	634	17	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	3	Negligible Potential.	
Ash	T50	267	11	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	3	Negligible Potential.	

14/09/2011

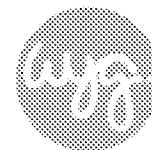
Fitzalan Link Bat Roost Assessment



Tree species	No. of tree on plan	DBH (millimetres)	Approx height (metres)	Tree displays veteran characteristics generally	Presence of features used as bat roosts								Signs indicating possible use of bats								BCT category of tree potential for bats	Assessment results/Comments
					Natural holes	Woodpecker holes	Cracks/splits in major limbs	Loose bark	Behind dense thick, stemmed ivy	Hollow/cavities	Within dense epicormic growth	Bird and bat boxes	Tiny scratches around entry points	Staining around entry point	Bat droppings in/around/below entrance	Audible squeaking at dusk or in warm weather	Flies around entry point	Distinctive smell of bats	Smoothing of surfaces around cavity			
Ash	T55	386	11	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	3	Negligible Potential.		
Elder	T56	330	3	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	3	Negligible Potential.		
Ash	T57	285	7	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	3	Negligible Potential.		
Lombardy poplar	T58	1000	17	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	3	Negligible Potential.		
Lombardy poplar	T59	968	17	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	3	Negligible Potential.		



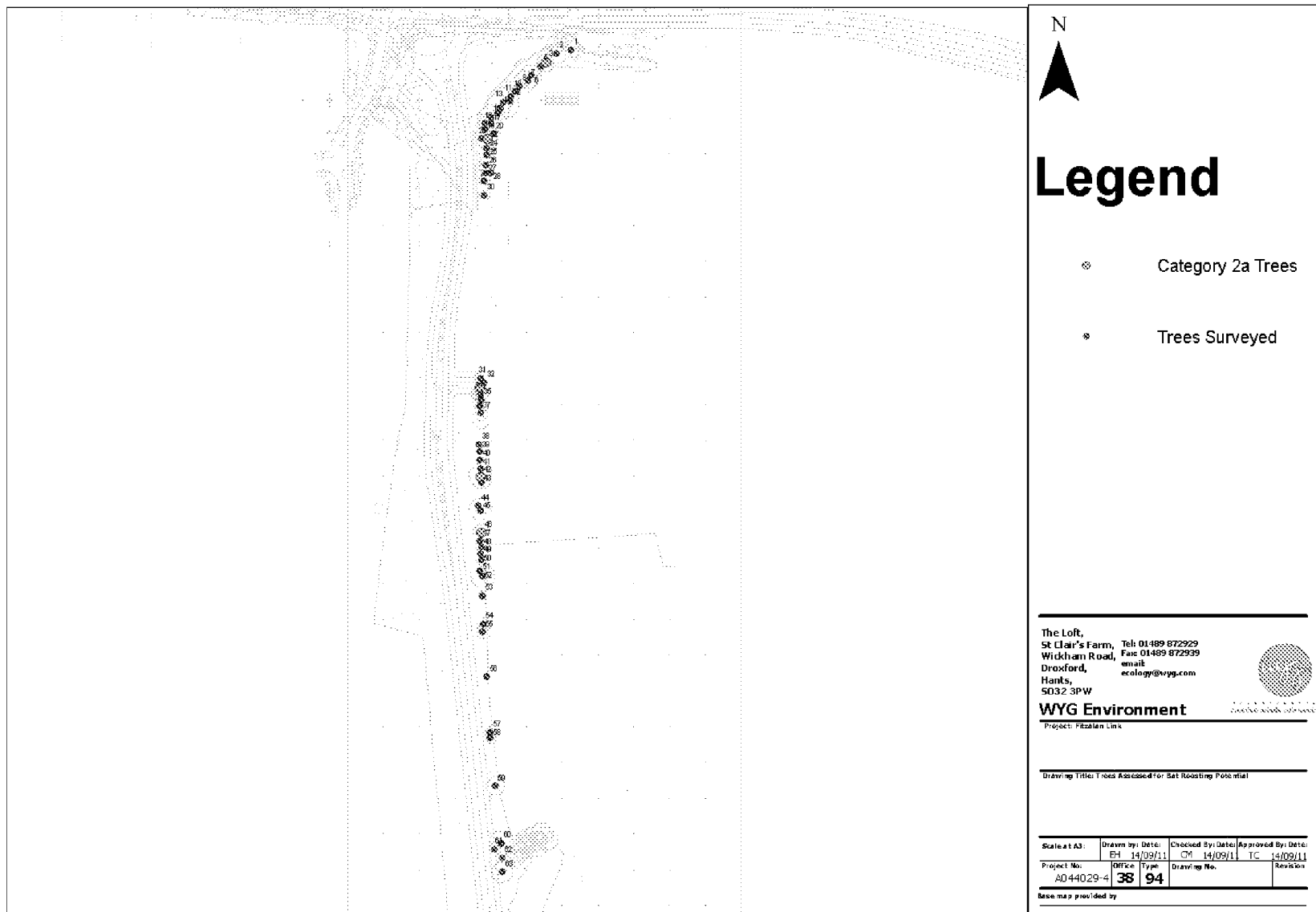
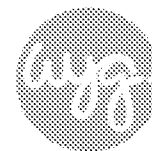
Tree species	No. of tree on plan	DBH (millimetres)	Approx height (metres)	Tree displays veteran characteristics generally	Presence of features used as bat roosts								Signs indicating possible use of bats							BCT category of tree potential for bats	Assessment results/Comments
					Natural holes	Woodpecker holes	Cracks/splits in major limbs	Loose bark	Behind dense thick, stemmed ivy	Hollow/cavities	Within dense epicormic growth	Bird and bat boxes	Tiny scratches around entry points	Staining around entry point	Bat droppings in/around/below entrance	Audible squeaking at dusk or in warm weather	Flies around entry point	Distinctive smell of bats	Smoothing of surfaces around cavity		
Black Italian Poplar	T60	713	23	x	x	x	x	x	✓	x	x	x	x	x	x	x	x	x	2b	Low to Moderate Potential. Some ivy.	
Black Italian Poplar	T61	317	16	x	x	x	x	x	✓	x	x	x	x	x	x	x	x	x	3	Negligible Potential. Thin ivy.	
Black Italian Poplar	T62	685	18	x	x	x	x	x	✓	x	x	x	x	x	x	x	x	x	2b	Low to Moderate Potential. Some ivy.	



Tree species	No. of tree on plan	DBH (millimetres)	Approx height (metres)	Tree displays veteran characteristics generally	Presence of features used as bat roosts							Signs indicating possible use of bats						BCT category of tree potential for bats	Assessment results/Comments
					Natural holes	Woodpecker holes	Cracks/splits in major limbs	Loose bark	Behind dense thick, stemmed ivy	Hollow/cavities	Within dense epicormic growth	Bird and bat boxes	Tiny scratches around entry points	Staining around entry point	Bat droppings in/around/below entrance	Audible squeaking at dusk or in warm weather	Flies around entry point		
Ash	T63	483	14	x	x	x	x	x	x	x	x	x	x	x	x	x	x	3	Negligible Potential.

Locations of Trees Assessed

Fitzalan Link Bat Roost Assessment



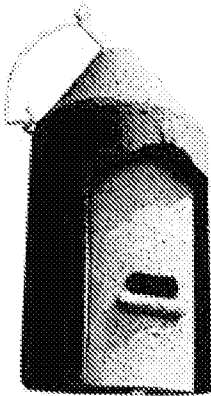


Appendix E

Bat Roosting Features



For trees



Woodcrete boxes have the highest rates of occupation of all box types. The 75% wood sawdust, concrete and clay mixture allows natural respiration, stable temperature, and durability. They are long lasting (approx. 25 years) and are rot- and predator-proof. Hang from a tree branch near the trunk, or fix to a trunk with the supplied 'tree-friendly' aluminium nail. Attractive to smaller British bats.

Material: Woodcrete (75% wood sawdust, concrete and clay mixture)

Diameter: 16cm

Height: 33cm

Weight: 4kg



Appendix F

'Bat-friendly' Planting

(from the BCT leaflet 'Gardening for Bats')



Gardening for bats

Aim at having flowers in bloom through the year, including both annuals and herbaceous perennials.

Below are some suggestions, but this is by no means an exhaustive list. See what grows well in YOUR garden, and what seems most attractive to insects.

Flowering times are approximate, varying in different areas. Regular dead-heading extends flowering period in many flowers. A=annual; HA=half-hardy annual.

HA=half-hardy annual; P=perennial; W=wild flower.

Flowers for borders

	Hyacinth	P	March -
St John's Wort	Hyacinth	P	March - Oct.
Marigolds	Calendula	HA	March - June
aubretia	a. nivalis	P	March - June
honesty	Lunaria rediviva	HA	March
forget-me-not	Myosotis sp.	A/P	March - May
elephant ears	Begonia	P	April
Wallflowers	Erysimum	B	April - June
Cranesbills	Geranium sp.	P	May - Sept.
Yarrow	Achillea	P	May -
Poppies	Papaver sp.	A	May - July
Dames violet	Hesperis matronalis	P	May - August
Red Valerian	Centaurea ruber	P	May - Sept.
Poached egg plant	Limnaria	HA	June - Aug.
Knapweed	Centaurea nigra	P	June - Sept.
Phacelia		HA	June - Sept.
Ox-eye daisy	Leucanthemum vulgare	P	June - Aug.
Evening primrose	Centaurea hians	B	June - Sept.
Candytuft	Ikera umbellata	HA	June - Sept.
Sweet William	Diarrhiza carotus	B	June - July
Blanket flowers	Scilla	P	June -
Verbena	V. bonariensis	HHA	June - Oct.
Scabious	Linaria arvensis	P	July - Aug.
Night-scented stock	Matthiola incana	HA	July - Aug.
Pincushion flower	Scabious sp.	A/P	July - Sept.
Cherry pie	Heliotropium	HHA	July - Oct.
Mexican aster	Cosmos sp.	A/P	July - Oct.
Cone flower	Rudbeckia sp.	A/P	August - Nov.
Mallow	Malva sp.	P	August - Oct.
Michaelmas daisy	Aster sp.	P	August - Sept.
ice plant 'Pink lady'	Sedum spectabile	P	Sept.
Herbs – both leaves and flowers are fragrant			
Fennel	Foeniculum vulgare		July - Sept.
Bergamot	Monarda didyma		June - Sept.
Sweet Cicely	Myrrhis odorata		April - June
Hyssop	Hyssopus officinalis		July - Sept.
Feverfew	Tanacetum officinale		June - Sept.
Borage	Borago officinalis		May - Sept.

Rosemary	Rosemary officinalis		March - May
Lemon balm	Monarda officinalis		June - August
Coriander	Coriandrum sativum		
Lavender	Lavandula sp.		
Marjoram	Origanum sp.		
Trees, shrubs and climbers important to insects			
Oak	Quercus sp.		large gardens only
Silver Birch	Betula pendula		
Common alder	Alnus glutinosa		Suitable for coppicing
Hazel	Corylus avellana		Suitable for coppicing
Elder	Sambucus nigra		Small
Pussy willow	Salix caprea		Suitable for coppicing
Hawthorn	Crataegus monogyna		Suitable for coppicing
Honeysuckle	Lonicera sp.		grow a variety for succession.
Dog rose	Rosa canina		Climber
Bramble	Rubus fruticosus		Climber
Ivy	Hedera helix		Climber
Buddleia	Buddleia davidii		shrub
Goulden rose	Viburnum opulus		shrub
Gorse	Ulex sp.		shrub
Plants for pond edges and marshy areas			
Purple loosestrife	Lythrum salicaria	W	June - Aug.
Meadow sweet	Filipendula ulmaria	W	June - Sept.
Lady's smock	Cardamine pratensis	W	April - June
Water mint	Monarda aquatica	W	July - Sept.
Angelica	Angelica sylvestris	W	July - Sept.
Hemp agrimony	Eupatorium camphorosmum	W	July - Sept.
Marsh marigold	Calceolaria vulgaris	W	March - May
Creeping Jenny	Lysimachia nummularia	W	May - August
Fringed water lily	Nymphaeas peltata	W	June - Sept.
Water forget-me-not	Myosotis scorpioides	W	June - Sept.

Allow part of your lawn to grow long in summer and cut in autumn, removing the clippings. Avoid using fertilizers.

Compost heaps are good producers of insects too.

Add a seat to watch your garden come to life!

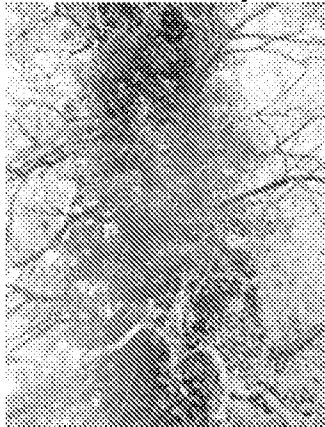


Appendix G – Photographs



Trees

Tree with ivy



Tree with ivy



Tree with ivy



Possible cracks in tree



Possible cracked bark



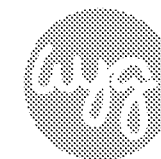
Possible hole in bark





Appendix H:

Bat Conservation Trust Guidelines - Bat survey protocol for trees due to be affected by arboricultural work



Fitzalan Link Bat Roost Assessment

Bat survey protocol for trees due to be affected by arboricultural work

TREE CATEGORY AND DESCRIPTION	STAGE 1 SURVEY REQUIREMENTS PRIOR TO DETERMINATION	STAGE 2 FURTHER MEASURES TO INFORM MITIGATION	STAGE 3 LIKELY MITIGATION
Category 1 Confirmed bat roost tree with field evidence of the presence of bats, e.g. droppings, scratch marks, grease marks or urine staining.	Tree identified on a map and on the ground. Further assessment to provide a best expert judgement on the likely use of the roost, numbers and species of bat, by analysis of droppings or other field evidence. Ecologist involvement will be required.	Avoid disturbance to trees where possible ¹ . Further dusk and dawn surveys to establish more accurately the presence, species, numbers and type of roost present, and to inform the requirements for mitigation if felling is required.	Felled under Habitats Regulations licence ² following the installation of equivalent habitats as a replacement. Felling would be undertaken taking reasonable avoidance measures ³ such as 'soft felling' to minimise the risk of harm to individual bats.

¹ A general principle for those involved in advising on and undertaking tree works should be, wherever possible, to avoid disturbance and retain all features which offer some value to bats. For safety-related tree work, a balance should be sought between tree safety standards and the impact on wildlife.

² When a Habitats Regulations licence to undertake work on a tree roost is required, the licence will need to demonstrate that alternative approaches have been previously considered to try to avoid works to the tree. These may be options such as diverting paths away from hazardous trees and removing unsafe limbs, instead of felling an entire tree.

³ Reasonable avoidance measures are considered to be good practice. 'Soft felling' is a generic term used to describe more cautious felling approaches, using lowering and cushioning techniques to reduce the impact of felling limbs which may still have bats within cavities. Where proportionate to the impact, best practice approaches to felling may include methods such as additional dusk emergence or dawn re-entry surveys immediately prior to felling (during the active bat season) or the use of non-return valves to ensure that bats can leave but not return to a roost cavity before works begin.

Fitzalan Link Bat Roost Assessment

TREE CATEGORY AND DESCRIPTION	STAGE 1 SURVEY REQUIREMENTS PRIOR TO DETERMINATION	STAGE 2 FURTHER MEASURES TO INFORM MITIGATION	STAGE 3 LIKELY MITIGATION
Category 2a Trees that have a High potential to support bat roosts	Tree identified on a map and on the ground. Further assessed to provide a best expert judgement on the potential use of suitable cavities, based on the habitat preferences of bats. Ecologist involvement may be required.	Avoid disturbance to trees where possible ¹ . More detailed, off-the-ground visual assessment Further dusk and dawn surveys to establish the presence of bats and, if present, the species, numbers and type of roost to inform the requirements for mitigation if felling is required.	Trees with confirmed roosts following further survey would be upgraded to Category 1 and felled under licence as above. Trees with no confirmed roosts would be downgraded to Category 2b and felled taking reasonable avoidance measures ³ .
Category 2b Trees with a Moderate/ Low potential to support bat roosts	None. Ecologist involvement is unlikely to be required.	Avoid disturbance to trees where possible ¹ . No further surveys.	Trees would be felled taking reasonable avoidance measures ³ .
Category 3 Trees with Negligible potential to support bat roosts	None. Ecologist involvement will not be required unless new evidence is found.	None.	No mitigation for bats required.

Reference: Bat Conservation Trust (2007). Bat Surveys – Good Practice Guidelines. Bat Conservation Trust, London. ISBN 978-1-872745-99-2