



Linden Homes

Bartons Road, Havant

Bat Survey Report

August 2014

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

Tel: 01489 872929

Email: ecology@wyg.com





Document Control

Project: Bartons Road, Havant

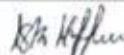
Client: Linden Homes

Job Number: A081595

File Origin: J:\Environmental Projects\A Projects - Awarded Projects\2012-2013 Ecology\A081595 Bartons Road\700 Reports\Bats

Document Checking:

Prepared by: Isla Hoffmann ACIEEM
Assistant Ecologist

Signed: 

Checked by: Emily Hare
Assistant Ecologist

Signed: 

Verified by: Nicola Tyrrell MCIEEM
Principal Ecologist
On behalf of: Claire Wilmer CEnv MCIEEM
Director of Ecology

Signed: 


Issue	Date	Status
1	May 2014	Issue
2	August 2014	Final
3		
4		



Contents Page

Executive Summary	1
1.0 Introduction	3
1.1 Background	3
1.2 Site location and general description	4
1.3 Development proposals	4
1.4 Previous survey	4
1.5 Planning guidance: Natural England's standing advice	6
1.6 Legislative considerations	7
2.0 Methodology.....	9
2.1 Data search.....	9
2.2 Dusk emergence / dawn return surveys of buildings.....	9
2.3 Dusk emergence / dawn return surveys of trees	10
2.4 Bat activity survey.....	10
2.5 Value of the on-site protected species population in a wider ecological context.....	11
3.0 Survey results.....	16
3.1 Data search.....	16
3.2 Dusk emergence / dawn return survey of buildings	16
3.3 Dusk emergence / dawn return survey of trees.....	22
3.4 Activity surveys.....	24
4.0 Interpretation	28
4.1 Limitations to survey	29
5.0 Potential impacts of the development on bats	30
5.1 Effects on roosts.....	30
5.2 Effects on foraging / commuting habitat.....	30
6.0 Recommendations and mitigation	31
6.1 Survey recommendations	31
6.2 Avoidance.....	31
6.3 Mitigation	31
6.4 Enhancement.....	34
7.0 References.....	36



Appendix Contents

Appendix A - Figures

Appendix B – Data search results

Appendix C – Native/wildlife friendly plant species

Appendix D – Bat boxes



Executive Summary

Contents	Summary
Site location	The site is located in Havant, Hampshire, directly to the north of Bartons Road. The site is centred on Ordnance Survey National Grid Reference SU 731 080 and is approximately 1.5 ha. The site consists of buildings, hard standing, amenity grassland and introduced shrub with a large area of neutral semi-improved grassland in the western portion of the site and scattered scrub and broadleaved trees along the site boundaries. A large expanse of broadleaved woodland lies directly to the north of the site and a railway line with woodland and grassland beyond lies directly to the west. Directly to the south of the site lies Bartons Road and Maidenhead Aquatics Garden Centre beyond. To the east of the site lies arable farmland. The proposed development is for approximately 60 residential properties with associated access, car parking and landscaping.
Previous surveys / reports	An extended Phase 1 habitat survey of the site was completed by WYG in April 2013. A Bat Roost Assessment of buildings within the site boundary, including internal inspection, was completed by WYG in May 2013. The surveys identified buildings and trees within the site boundary with the potential to support roosting bats and identified habitats suitable to support foraging and commuting bats. The subsequent report made recommendations for further survey of the site in relation to bats.
Current survey	The following further surveys were undertaken of the site in accordance with the recommendations of the extended Phase 1 habitat survey and Bat Roost Assessment reports: • Bat dusk emergence / dawn return survey of buildings (August – September 2013) • Bat dusk emergence / dawn return survey of trees (August – September 2013) • Bat activity surveys (May – September 2013) All surveys were undertaken in accordance with the Bat Conservation Trust's <i>Bat Surveys – Good Practice Guidelines 2nd Edition</i> (Hundt, L., 2012).



Survey results	Dusk emergence / dawn return surveys The bat dusk emergence and dawn return surveys of Buildings 11, 12 and 14 and Trees 1, 11, 12, 13 and 14 did not record any bat roosts suggesting bat roosts are likely to be absent from the site. Bat activity surveys At least seven species of bat were recorded using the habitats across the site; common pipistrelle (<i>Pipistrellus pipistrellus</i>), soprano pipistrelle (<i>Pipistrellus pygmaeus</i>), brown long-eared bat (<i>Plecotus auritus</i>), <i>Myotis</i> spp. (<i>Myotis</i> sp.), noctule (<i>Nyctalus noctula</i>), Leisler's bat (<i>Nyctalus leisleri</i>) and serotine (<i>Eptesicus serotinus</i>). Commuting activity appeared to be spread across the site. Foraging activity appeared to be more restricted to the hedgerow at the western boundary of the site and the semi-improved grassland towards the north-western extent of the site. The site was assessed as being of up to 'local parish or district' level importance for foraging and commuting bats.
Further recommendations & mitigation	Results of the activity survey will remain valid for two years and results of the emergence / return survey will remain valid for one year. If works have not commenced within this time, it is recommended that the requirement for an update survey is undertaken to determine whether there have been any changes in bat activity across the site. To help maintain the favourable conservation status of bats on site the following measures for avoidance and mitigation are recommended to be incorporated within the master plan: • Mature trees are retained within the final development wherever possible; • Light spillage into the boundary trees is avoided wherever possible, to retain darkened corridors suitable for bats around the site; • Where hedge lines are to be severed, to reduce the risk from traffic collisions, 'hop-over' planting be incorporated; • Planting species of value to foraging and commuting bats; • Construction activity ceasing at sunset to avoid impacts to bats during the construction phase.
Enhancement	Additional enhancement measures recommended to be included within the development include the provision of artificial bat roosts (i.e. bat boxes) where possible across the site, in new buildings and on retained trees, as well as incorporating 'bat friendly' planting into the landscaping scheme.



1.0 Introduction

1.1 Background

WYG was commissioned by Linden Homes to complete the following survey work in relation to bats in order to inform proposed development at Bartons Road, Havant (hereafter referred to as 'the site');

- Bat roost assessment – internal;
- Bat dusk emergence / dawn re-entry survey of buildings;
- Bat dusk emergence / dawn re-entry survey of trees; and
- Bat activity surveys.

This further survey work follows an extended Phase 1 habitat survey completed by WYG in April 2013 (WYG 2013) which identified the potential for buildings and trees on site to support roosting bats and for habitats on site to support foraging and commuting bats.

Bat activity surveys were recommended based on:

- The occurrence of bat records in the local area;
- The presence of suitable foraging and commuting habitat on site and in the surrounding landscape (hedgerows, grassland, ditches etc); and
- Potential direct / indirect impacts to some of these habitats as a result of the development proposals.

This report details the findings of the bat roost assessment, bat dusk emergence / dawn return surveys of buildings and trees and bat activity surveys. The report recommends, where necessary, measures to avoid, minimise and offset the potential impacts of the proposed development to roosting, commuting and foraging bats. This report will provide information to inform a planning application.



1.2 Site location and general description

The site is located in Havant, Hampshire, directly to the north of Bartons Road. The site is centred on Ordnance Survey National Grid Reference SU 731 080 and is approximately 1.5 ha.

The site consists of buildings, hard standing, amenity grassland and introduced shrub with a large area of neutral semi-improved grassland in the western portion of the site and scattered scrub and broadleaved trees along the site boundaries.

A large expanse of broadleaved woodland, Barton's Copse, lies directly to the north of the site and a railway line with woodland and grassland beyond lies directly to the west. Directly to the south of the site lies Bartons Road and Maidenhead Aquatics Garden Centre beyond. To the east of the site lies arable farmland.

1.3 Development proposals

The proposed development is for approximately 60 residential properties, with associated access, car parking and landscaping.

1.4 Previous survey

Extended Phase 1 habitat survey

An extended Phase 1 habitat survey was undertaken in April 2013 (WYG, 2013). This identified eight buildings (buildings 1, 5, 6, 11, 12, 14, 19 and 20) on site offering **low to moderate potential** to support roosting bats. During this survey the buildings were assessed externally and from the ground only. Therefore, in order to complete the bat roost assessment, a further bat roost assessment was recommended.

A number of the mature trees within the development site boundary were identified as having **suitable features** to support roosting bats and as such it was recommended that dusk emergence / dawn return surveys be undertaken of any of these trees (Trees 1, 5, 6, 7, 9, 11, 12, 13 and 14) if they were proposed for removal as part of the development works.

The site was assessed as being of **low habitat quality** for foraging and commuting bats and therefore, as a medium sized site, it was recommended that bat activity surveys of the site be undertaken once per season (Spring, Summer, Autumn) and that one automated survey of the site be undertaken on three



Bartons Road, Havant: Bat Survey Report

consecutive nights per season (Spring, Summer, Autumn) in line with the Bat Conservation Trust's *Bat Surveys: Good Practice Guidelines 2nd Edition* (Hundt, L., 2012).

Bat Roost Assessment survey

A Bat Roost Assessment was undertaken in May 2013 (WYG 2013), including an internal roof void and endoscope inspection, following guidance set out in the Bat Conservation Trust's *Bat Surveys: Good Practice Guidelines 2nd Edition* (Hundt, L., 2012) and English Nature's *Bat Mitigation Guidelines* (Mitchell-Jones, A. J., 2004).

In accordance with the *Bat Surveys: Good Practice Guidelines* buildings were either confirmed as bat roosts, or assessed as having 'negligible', 'low', 'moderate' or 'high' potential to support roosting bats and recommendations for further survey made accordingly.

The external building assessment was undertaken from the ground using binoculars, with ladders and an endoscope being used to survey features which were not accessible or fully visible such as air vents, holes and cracks/crevices.

The internal building assessment was undertaken using ladders to access the internal roof voids. High powered (1,000,000 candle power) Clulite torches were used to provide full visual coverage of any darkened areas within the roof void and endoscopes were used to assess recesses behind the roofing felt.

Building 11 was assessed as offering **moderate potential** to support roosting bats. It was recommended that two nocturnal surveys be undertaken of the building, including one dusk and pre-dawn survey.

Building 12 (southern elevation of eastern extension only) and **Building 14** were assessed as offering **low potential** to support roosting bats. It was recommended that one nocturnal bat survey of these buildings be undertaken, comprising a dusk and pre-dawn survey.

Full details can be found in the Internal Roof Void and Endoscopic Inspection of Buildings letter (WYG, 2013).



1.5 Planning guidance: Natural England's standing advice

The National Planning Policy Framework (NPPF) sets out the principles to which Local Planning Authorities (LPA's) should adhere to when considering planning applications. These include:

- *Planning decisions should be based upon up-to-date information about the environmental characteristics of their areas. These characteristics should include the relevant biodiversity and geological resources of the area. In reviewing environmental characteristics local authorities should assess the potential to sustain and enhance those resources.*
- *Planning decisions should aim to maintain, and enhance, restore or add to biodiversity and geological conservation interests. In taking decisions, local planning authorities should ensure that appropriate weight is attached to...protected species; and to biodiversity and geological interests within the wider environment.*
- *The aim of planning decisions should be to prevent harm to biodiversity and geological conservation interests. Where granting planning permission would result in significant harm to those interests, local planning authorities will need to be satisfied that the development cannot reasonably be located on any alternative sites that would result in less or no harm. In the absence of any such alternatives, local planning authorities should ensure that, before planning permission is granted, adequate mitigation measures are put in place. Where a planning decision would result in significant harm to biodiversity and geological interests which cannot be prevented or adequately mitigated against, appropriate compensation measures should be sought. If that significant harm cannot be prevented, adequately mitigated against, or compensated for, then planning permission should be refused.*

The NPPF also provides the following advice:

It is essential that the presence or otherwise of protected species, and the extent that they may be affected by the proposed development, is established before the planning permission is granted, otherwise all relevant material considerations may not have been addressed in making the decision. The need to ensure ecological surveys are carried out should therefore only be left to coverage under planning conditions in exceptional circumstances, with the result that the surveys are carried out after planning permission has been granted. However, bearing in mind the delay and cost that may be involved, developers should not be required to undertake surveys for protected species unless there is a reasonable likelihood of the species



Bartons Road, Havant: Bat Survey Report

being present and affected by the development. Where this is the case, the survey should be completed and any necessary measures to protect the species should be in place, through conditions and/or planning obligations, before the permission is granted.

Natural England's standing advice to LPAs follows the principles and advice set out in the NPPF. Where there is a reasonable likelihood of a protected species being present, sufficient information (in the form of species surveys) should be undertaken before the planning application is considered.

Furthermore, in terms of national conservation policy, seven of the British species of bat are Priority Species covered by Biodiversity Action Plans (BAPs) of which, noctule (*Nyctalus noctula*), soprano pipistrelle (*Pipistrellus pygmaeus*), barbastelle (*Barbastella barbastellus*), Bechstein's (*Myotis bechsteinii*) and brown long-eared bats (*Plecotus auritus*) might be expected to be found on/in proximity to the site. These BAPs highlight the importance of certain habitats to species, detail the threats they face and propose measures to aid in the reversal of declines.

The effects of development proposals should be considered when assessing the impact of the maintenance of favorable conservation status of local bat populations, especially those mentioned on the BAP. The presence of BAP species is a material consideration in determining a planning application and it is therefore appropriate for the LPA to ensure that these species are not adversely affected by development.

Barbastelle, serotine (*Eptesicus serotinus*), Bechstein's, soprano pipistrelle and greater horseshoe (*Rhinolophus ferrumequinum*) bats are listed on the Hampshire BAP. The Hampshire BAP species are of material consideration in the determination of the planning application.

1.6 Legislative considerations

All British bat species are listed in Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended) and under Schedule 2 of the *Conservation of Habitats and Species (Amended) Regulations 2012* as European protected species. Furthermore, the *Countryside and Rights of Way Act 2000* (Schedule 12, Paragraph 5) has amended Section 9 of the 1981 Act. They are, therefore, fully protected under Section 9 of the 1981 Act and under Regulation 41 of the *Conservation of Habitats and Species (Amended) Regulations 2012* which transposes the Habitats Directive into UK law.



Bartons Road, Havant: Bat Survey Report

This makes it an offence to:

- 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; and
- Damage or destroy a bats breeding site or resting place.

Unmitigated removal of linear corridors such as sections of hedgerows and increases in habitat disturbance (e.g. through lighting, noise and vibration impacts) during construction and operational phases of a proposed development could indirectly impact bats that use the site to forage and commute.

Furthermore direct impacts to bats may occur through road traffic mortalities in the operational phase of a proposed development. Such indirect and direct impacts could result in an offence being committed.



2.0 Methodology

2.1 Data search

As part of the extended Phase 1 habitat survey completed by WYG in April 2013 (WYG, 2013), site and species specific information was sourced through direct consultation with the Hampshire Biodiversity Information Centre (HBIC). HBIC provided information in relation to the presence of protected species, designated sites and areas of particular regional, national or international importance within 2km of the site.

2.2 Dusk emergence / dawn return surveys of buildings

The purpose of the nocturnal surveys was to determine if any bats were roosting within Buildings 11, 12 and 14, and if so to identify which species and how many were present.

One nocturnal bat survey of Buildings 12 and 14 (assessed as having low potential) was completed, comprising a dusk and dawn survey on 12th -13th August 2013 undertaken by three surveyors (see Figures 2 and 3, Appendix A).

Two nocturnal bat surveys of Building 11 (assessed as having moderate potential) were completed, including a dusk and dawn survey on 19th - 20th August 2013 and a dusk survey completed on 16th September 2013, both undertaken by four surveyors (see Figures 4, 6 and 6, Appendix A).

The surveys were carried out during a period of suitable weather conditions (i.e. not during heavy rain, low temperatures or strong winds) as recommended within the Bat Conservation Trusts (BAT CONSERVATION TRUST's) *Bat Surveys: Good Practice Guidelines* (Hundt, L., 2012).

In order to detect any bat activity, each surveyor was equipped with a 'Bat Box Duet' or Pettersson bat detector and recorder attached. This allowed all ultrasonic frequencies to be monitored and recorded simultaneously.

The dusk emergence surveys commenced approximately 30 minutes before sunset and lasted for approximately one and a half hours after sunset. The dawn return surveys commenced approximately one and half hours before sunrise and lasted until sunrise.



2.3 Dusk emergence / dawn return surveys of trees

The purpose of the nocturnal survey was to determine if any bats were roosting within trees 1, 11, 12, 13 and 14, and if so to identify species and numbers present.

One nocturnal bat survey of trees 1, 11, 12, 13 and 14, was completed, comprising a dusk and dawn survey on 28th -29th August 2013 undertaken by three surveyors (see Figures 7 and 8, Appendix A).

The survey was carried out during a period of suitable weather conditions (i.e. not during heavy rain, low temperatures or strong winds) as recommended within the Bat Conservation Trusts (BAT CONSERVATION TRUST's) *Bat Surveys: Good Practice Guidelines* (Hundt, L., 2012).

In order to detect any bat activity, each surveyor was equipped with a 'Bat Box Duet' bat detector and recorder attached. This allowed all ultrasonic frequencies to be monitored and recorded simultaneously.

The dusk emergence survey commenced approximately 30 minutes before sunset and lasted for approximately one and a half hours after sunset. The dawn return survey commenced approximately one and half hours before sunrise and lasted until after sunrise.

2.4 Bat activity survey

According to the guidance set out in the Bat Conservation Trust's *Bat Surveys: Good Practice Guidelines, 2nd Edition* (Hundt, L., 2012), the site is classified as a medium-sized site (approximately 1.5 ha within 1 to 15 ha range) and the habitat on site was considered to be of 'low habitat quality'. Based on this assessment, activity surveys of the site consisted of one transect survey per season (Spring, Summer, Autumn) (including one dusk and dawn survey) undertaken along one transect route (Figure 1, Appendix A) and one automated survey per season (Spring, Summer, Autumn) undertaken at one location over three consecutive nights.

Transect surveys

Transect surveys were carried out at all compartments of the site on 4th June (Spring dusk transect), 1st August (Summer dusk transect), 2nd August (Summer dawn transect) and 16th September (Autumn dusk transect) 2013. Two surveyors were used for each survey, walking one transect route, which incorporated all areas of the site. The transect route is illustrated in Figure 1, Appendix A.



Bartons Road, Havant: Bat Survey Report

Dusk surveys commenced 15 minutes prior to sunset and concluded approximately two and quarter hours after sunset. The dawn survey commenced two hours before sunrise and concluded at sunrise. Weather conditions (temperature, precipitation and wind speed) were recorded on each survey.

The surveyors made a note of bat activity, using both visual observation and audio bat detectors to identify foraging and / or commuting behaviour. Surveyors recorded the time of occurrence and a description of any bat activity observed. Additionally, where bats could be seen, the patterns / directions of the bats' flight were also recorded. All the surveyors undertaking the surveys were qualified ecologists experienced at undertaking bat surveys. All surveyors used a Batbox Duet (frequency division and heterodyne) bat detector or Pettersson bat detector and walked along the transect route at a steady pace. The direction of the transect walked varied between survey visits to record activity in different locations at different times. Surveyors also stopped in a number of places along the transect route. Each stop lasted five minutes. Any calls were recorded on Zoom H2 digital audio recorders and later analysed using specialist software (BatSound) on a PC. The recordings and the field notes were used to help build a picture of bat use across the site and to identify areas of relatively higher use.

Automated surveys

In accordance with Bat Conservation Trust (Hundt, L. 2012) guidelines, an automatic bat detector (Song Metre 2) was deployed for three consecutive nights per season (Spring, Summer, Autumn) to record bat passes at one location on site. The data were analysed to gain further information on the species present and levels of bat activity on site. A map showing the location of the automated detector recording point is included in Figure 1, Appendix A of this report.

2.5 Value of the on-site protected species population in a wider ecological context

The assessment of the value of the bat population on the site is based on the article in the Institute of Ecology and Environmental Management (IEEM) In Practice magazine – *Valuing Bats in Ecological Impact Assessment*, No. 70, December 2010. Where bats (species and number) are found using certain habitats (to roost, commute or forage) their population is assigned a relative ecological value. The value of a site to the species is partly based upon how well used a site is and also upon how rare the bat species using it are. In the case of commuting routes or foraging areas the number of roosts nearby is also a factor. Once the value of the bat population has been calculated, robust mitigation for any impact on the bats can be determined.



Bartons Road, Havant: Bat Survey Report

British bat species have been subdivided into groups, dependant on how common they are; common, rarer and rarest. These were further subdivided based upon the location surveyed, as shown in Table 1. Tables have been adapted from *Valuing Bats in Ecological Impact Assessment* (IEEM, 2010).

Table 1. Categorising Bats by Distribution and Rarity in England

Rarity	Country
	England
Rarest	Greater horseshoe Bechstein's Alcathoe Greater mouse-eared Barbastelle Grey long-eared
Rarer	Lesser horseshoe Whiskered Brandt's Daubenton's Natterer's Leisler's Noctule Nathusius' pipistrelle Serotine
Common	Common pipistrelle Soprano pipistrelle Brown long-eared

The type of roost found at a site is combined with the rarity of the species using the roost in order to determine at what level the site is important for bats, as shown in Table 2 below. For example, a site which supports a roost of a small number of non-breeding bats of common pipistrelle (*Pipistrellus pipistrellus*) is of District, Local or Parish level importance for bats whilst a site which supports a maternity roost of Bechstein's bat is of National level importance for bats.

**Table 2.** Valuing Bat Roosts

Geographic Frame of Reference	Roost Types
District, Local or Parish	Feeding perches (common species) Individual bats (common species) Small numbers of non-breeding bats (common species) Mating sites (common species)
County	Maternity sites (common species) Small number of hibernating bats (common and rarer species) Feeding perches (rarer/rarest species) Individual bats (rarer/rarest species) Small numbers of non-breeding bats (rarer/rarest species)
Regional	Mating sites (rarer/rarest species) including well-used swarming sites Maternity sites (rarer species) Hibernation sites (rarest species) Significant hibernation sites for rarer/rarest species or all species assemblages
National/UK	Maternity sites (rarest species) Sites meeting Sites of Special Scientific Interest (SSSI) guidelines
International	Special Areas of Conservation (SAC) sites

To calculate the score for either commuting routes or foraging areas the numerical values from each column in either Table 3 or 4 below are added together. For example, a site used by a small number of 'rarer' bats where there is a large number of known roosts nearby and an absence of other linear features has a value score of 21 for commuting bats.

**Table 3.** Valuing Commuting Routes

Species	Number of Bats	Roosts/Potential Roosts Nearby	Type and Complexity of Linear Features
Common (2)	Individual bats (5)	None (1)	Absence of (other) linear features (1)
-	-	Small number (3)	Unvegetated fences and large field sizes (2)
Rarer (5)	Small number of bats (10)	Moderate number/Not known (4)	Walls, gappy or flailed hedgerows, isolated well grown hedgerows, and moderate field sizes (3)
-	-	Large number of roosts or close to a SSSI (5)	Well grown and well connected hedgerows, small field sizes (4)
Rarest (20)	Large number of bats (20)	Close to or within a SAC for the species (20)	Complex network of mature well-established hedgerows, small fields and rivers/streams (5)

Table 4. Valuing Foraging Areas

Species	Number of Bats	Roosts /Potential Roosts Nearby	Foraging Habitat Characteristics
Common (2)	Individual bats (5)	None (1)	Industrial or other site without established vegetation (1)
-	-	Small number (3)	Suburban areas or intensive arable land (2)
Rarer (5)	Small number of bats (10)	Moderate number/Not known (4)	Isolated woodland patches less intensive arable and/or small towns and villages (3)
-	-	Large number of roosts or close to a SSSI (5)	Larger or connected woodland blocks, mixed agriculture and small villages/hamlets (4)
Rarest (20)	Large number of bats (20)	Close to or within a SAC for the species (20)	Mosaic of pasture, woodlands and wetland areas (5)

The score is then used to assess the site's level of importance for commuting or foraging bats as shown in Table 5 below.



Table 5. Scoring System for Valuing Commuting and Foraging Bats

Geographic Frame of Reference	Score
International	>50
National	41-50
Regional	31-40
County	21-30
District, local or parish	11-20
Not important	1-10



3.0 Survey results

3.1 Data search

HBIC returned records of at least six species of bat which been recorded within 2km of the site, including serotine *Eptesicus serotinus*, whiskered bat *Myotis mystacinus*, noctule bat *Nyctalus noctula*, common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, long-eared bat *Plecotus* spp., brown long-eared bat *Plecotus auritus* and other unidentified species bat records. A total of 26 bat records were returned with the closest record of a long-eared bat located approximately 860m south east of the site. It is not known whether any of these records represent bat roosts.

The brown long eared bat (*Plecotus auritus*) is a UK BAP Priority Species and pipistrelle bats are Hampshire BAP species.

See Appendix B for the full data search.

A later data search for another site in the area, highlighted the presence of Bechstein's bat *Myotis bechsteinii*. All of the results were in 2009 and from two 2 x 2 km grid squares approximately 0.9 km east of the site. Due to the sensitive nature of the records the data is not given to a greater degree of accuracy than this. The highest number of bats recorded was 51 indicating that a maternity roost may be present.

3.2 Dusk emergence / dawn return survey of buildings

Weather conditions and timings

Table 6 shows the survey dates, times and weather conditions during each of the surveys. All weather conditions and temperatures (taken using a thermometer) were recorded at the start of each survey.

Table 6. Weather Conditions during Dusk Emergence / Dawn Return Survey of Buildings

Survey	Date	Dusk / Dawn times	Survey Time(s)	Weather
Dusk emergence and dawn return survey of Buildings 12 and 14	12/08/2013	20.31	20:01 – 22:01	18.5°C; 75% cloud cover; light breeze; no precipitation
	13/08/2013	05:47	04:17 – 05:47	9.1°C; 0% cloud cover; still; no precipitation



Survey	Date	Dusk / Dawn times	Survey Time(s)	Weather
Dusk emergence and dawn return survey of Building 11	19/08/2013	20:17	19:47 – 21:47	20.0°C; 0% cloud cover; light breeze; no precipitation
	20/08/2013	05:58	04: 27- 05:58	10.0°C; 5% cloud cover; still; no precipitation
Dusk emergence survey of Building 11	16/09/13	19:16	18:46 – 20:46	15.0°C; 20% cloud cover; light breeze; no precipitation

12th August dusk emergence survey

No bats were seen emerging from buildings 12 or 14 during the dusk emergence survey. See Figure 2

Surveyor 1

Surveyor 1 was positioned viewing the southern and eastern elevations of Building 14 and recorded two species of bat during the dusk emergence survey; common pipistrelle and Leisler's bat (*Myctalus leisler*). The majority of the bats recorded were common pipistrelles. The first bat recorded was a Leisler's bat which was heard but not seen at 21.45, approximately 1 hour and 14 minutes after sunset and the last bat recorded was a common pipistrelle bat heard but not seen at 21.58, approximately 1 hour and 27 minutes after sunset.

Surveyor 2

Surveyor 2 was positioned viewing the northern and western elevations of Building 14 and recorded two brief bat calls which could not be identified to species level at 21.47 and 21.53, 1 hour and 16 minutes and 1 hour and 22 minutes after sunset respectively. All bats recorded were only heard and not seen.

Surveyor 3

Surveyor 3 was positioned viewing the southern elevation of the eastern extension of Building 12 and recorded four bat passes of at least two species of bats during the dusk emergence survey; including common pipistrelle and soprano pipistrelle. The first bat recorded could not be identified to species level and was recorded at 21.10, approximately 39 minutes after sunset and the last bat recorded was a



Bartons Road, Havant: Bat Survey Report

common pipistrelle at 22.01, approximately 1 hour 30 minutes after sunset. All bats recorded were only heard and not seen.

13th August dawn re-entry survey

No bats were seen returning to buildings 12 or 14 during the dawn return survey. See Figure 3, Appendix A.



Bartons Road, Havant: Bat Survey Report

Surveyor 1

Surveyor 1 was positioned viewing the southern and eastern elevations of Building 14 and recorded four calls of four different species of bat; common pipistrelle, soprano pipistrelle, brown long-eared bat and a *Myotis* spp. bat, during the dawn re-entry survey. The first bat recorded was at 04.23 and the last bat recorded was at 04.53, approximately 1 hour and 24 minutes and 55 minutes before sunrise respectively. All bats recorded were only heard and not seen.

Surveyor 2

Surveyor 2 was positioned viewing the northern and western elevations of Building 14 and recorded two brief bat calls which could not be identified to species level at 04.52 and 04.55, 55 minutes and 52 minutes before sunrise respectively. All bats recorded were only heard and not seen.

Surveyor 3

Surveyor 3 was positioned viewing the southern elevation of the eastern extension of Building 12 and recorded two soprano pipistrelle bat calls during the dawn re-entry survey. The first call was recorded at 05.11, 36 minutes before sunrise and was only heard, not seen. The other call was recorded at 05.26, 21 minutes before sunrise and the bat was seen to fly over the buildings and then off site.

19th August dusk emergence survey

No bats were seen emerging from building 11, during the dusk emergence survey. See Figure 4, Appendix A.

Surveyor 1

Surveyor 1 was positioned viewing the northern and eastern elevations of Building 11 and recorded six bat calls of three species; common pipistrelle, soprano pipistrelle, *Myotis* spp. bat, during the dusk emergence survey. The first bat call was recorded at 20.34, 17 minutes after sunset, and was a soprano pipistrelle seen flying across the garden. The last bat recorded was a common pipistrelle recorded at 21.37, 1 hour and twenty minutes after sunset.



Bartons Road, Havant: Bat Survey Report

Surveyor 2

Surveyor 2 was positioned viewing the eastern elevation of Building 11 and recorded one bat call during the dusk emergence survey. The recorded call was of a common pipistrelle bat at 21.24, 1 hour and 7 minutes after sunset and was heard but not seen.

Surveyor 3

Surveyor 3 was positioned viewing the southern elevation of Building 11 and recorded three bat calls during the dusk emergence survey which were all heard but not seen. The calls were brief and the recordings could not be used to identify the bats to species level. The first bat was recorded at 20.07 and the last call was recorded at 21.27, 10 minutes before sunset and 1 hour and 10 minutes after sunset respectively.

Surveyor 4

Surveyor 4 was positioned viewing the western elevation of Building 11 and recorded three bat calls during the dusk emergence survey, one of which was of a *Myotis* spp. bat at 21.08, 51 minutes after sunset. The other two calls were brief and the recordings could not be used to identify the calls to species level. These calls were recorded at 21.12 and 21.29, 55 minutes and 1 hour and 12 minutes after sunset respectively.

20th August dawn re-entry survey

No bats were seen returning to building 11 during the dawn re-entry survey. See Figure 5, Appendix A.

Surveyor 1

Surveyor 1 was positioned viewing the northern and eastern elevations of Building 11 and recorded one bat call of a soprano pipistrelle at 05.04, 54 minutes before sunrise during the dawn return survey.

Surveyor 2

Surveyor 2 was positioned viewing the eastern elevation of Building 11 and recorded no bat calls during the dawn return survey.

Surveyor 3

Surveyor 3 was positioned viewing the southern elevation of Building 11 and recorded two brief bat calls during the dawn return survey. The recordings of the call did not allow for identification of the calls to



Bartons Road, Havant: Bat Survey Report

species level and the bats were only heard and not seen. The calls were recorded at 04.49 and 05.03, 1 hour and 9 minutes and 55 minutes before sunrise.

Surveyor 4

Surveyor 4 was positioned viewing the western elevation of Building 11 and recorded one brief bat call during the dawn return survey at 05.45, 13 minutes before sunrise. The recording of the call did not allow the call to be identified to species level and the bat was only heard, not seen.

16th September 2013 dusk emergence survey of Building 11

No bats were seen emerging from the building 11 during the follow up dusk emergence survey. See Figure 6, Appendix A.

Surveyor 1

Surveyor 1 was positioned viewing the northern and eastern elevations of Building 11 and recorded no bat calls during the dusk emergence survey.

Surveyor 2

Surveyor 2 was positioned viewing the southern and eastern elevations of Building 11 and recorded four bat calls during the dusk emergence survey. The first bat recorded was a Leisler's bat call recorded at 19.41, 22 minutes after sunset. An unidentified species of bat was recorded at 19.55, a serotine bat was recorded at 19.58 and another unidentified species of bat was recorded at 20.38, 39 minutes, 42 minutes and 1 hour 22 minutes after sunset respectively. All the calls recorded were made by bats which were heard but not seen.

Surveyor 3

Surveyor 3 was positioned viewing the southern and western elevations of Building 11 and recorded three bat calls during the dusk emergence survey. The first call was of a soprano pipistrelle recorded at 19.39, 23 minutes after sunset with two further calls whose recordings could not be used to identify the bats to species level being recorded at 20.09 and 20.37, 53 minutes and 1 hour 21 minutes after sunset respectively. All the calls recorded were made by bats which were heard but not seen.



Bartons Road, Havant: Bat Survey Report

Surveyor 4

Surveyor 4 was positioned viewing the western elevation of Building 11 and recorded no bat calls during the dusk emergence survey.

3.3 Dusk emergence / dawn return survey of trees

Weather conditions and timings

Table 7 shows the survey dates, times and weather conditions during each of the surveys. All weather conditions and temperatures (taken using a thermometer) were recorded at the start of each survey.

Table 7. Weather Conditions during Dusk Emergence / Dawn Return Survey of Trees

Survey	Date	Dusk / Dawn times	Survey Time(s)	Weather
Dusk emergence and dawn return survey of Trees 1, 11, 12, 13 and 14.	28/08/2013	19:58	19:28 – 21:28	21.0°C; 20% cloud cover; still; no precipitation
	29/08/2013	06:10	04:40 – 06:10	8.0°C; 100% cloud cover; still; no precipitation

28th August dusk emergence survey of trees

No bats were seen emerging from the trees during the dusk emergence survey. See Figure 7, Appendix A.

Surveyor 1

Surveyor 1 was positioned viewing Tree 1 and recorded six bat calls during the dusk emergence survey including calls of soprano pipistrelle, Leisler's and *Myotis* spp. bats. The first bat call recorded was at 20.13, 15 minutes after sunset and the last bat call was recorded at 21.22, 1 hour and 24 minutes after sunset. Two bats were seen as well as heard and were observed approaching the trees from behind the surveyor.

Surveyor 2

Surveyor 2 was positioned viewing Tree 11 and recorded eighteen bat calls of at least four species; common pipistrelle, soprano pipistrelle, Leislers and *Myotis* spp. The first call recorded was at 20.22, 20



Bartons Road, Havant: Bat Survey Report

minutes after sunset and the last call recorded was at 21.21, 1 hour and 23 minutes after sunset. All the calls recorded were made by bats which were heard but not seen.

Surveyor 3

Surveyor 3 was positioned viewing Trees 12, 13 and 14. No bats were recorded emerging from these trees. Three species of bat were recorded. These were common pipistrelle, noctule and Leisler's. All calls were heard but not seen. A technical issue has prevented the storage/communication of the exact details of the exact timings of these bat calls.

29th August dawn return survey of trees

No bats were seen returning to the trees during the dawn return survey. See Figure 8, Appendix A.

Surveyor 1

Surveyor 1 was positioned viewing Tree 1 and recorded three bat calls during the dawn return survey. Two of the calls were from bats which were not seen and one call was made by a bat flying over the site from the north-east to the south-west. The recordings of these calls did not allow for the calls to be identified to species level. The first bat recorded was at 05.11 and the last bat recorded was at 05.46, 59 minutes and 24 minutes before sunrise respectively.

Surveyor 2

Surveyor 3 was positioned viewing Tree 11 and recorded six bat calls during the dawn return survey, including calls of common pipistrelle, *Myotis* spp. and noctule. The first bat recorded was at 04.44 and the last bat recorded was at 06.00, 1 hour and 26 minutes and 10 minutes before sunrise respectively. All bats were heard but not seen.

Surveyor 3

Surveyor 3 was positioned viewing Trees 12, 13 and 14. No bats were recorded.



3.4 Activity surveys

3.4.1 Transect Surveys

Weather conditions and timings

Table 8 shows the survey dates, times and weather conditions during each of the surveys. All weather conditions and temperatures (taken using a thermometer) were recorded at the start of each survey.

Table 8. Weather Conditions during Bat Activity Surveys

Survey	Date	Dusk / Dawn times	Survey Time(s)	Weather
Spring transect	04/06/2013	21:11	20:56 – 23:26	16.5°C; 0% cloud cover; still; no precipitation
Summer transect (dusk)	01/08/2013	20:50	20:35 – 23:05	19.0°C; 0% cloud cover; still; no precipitation
Summer transect (dawn)	02/08/2013	05:30	03:30 – 05:30	11.0°C; 80% cloud cover; still; no precipitation
Autumn transect	16/09/2013	19:16	19:00 – 22:00	15.0°C; 0% cloud cover; breezy; no precipitation

Spring - 4th June 2013 dusk transect survey

During the Spring dusk activity survey, thirteen bat calls of at least four species, common pipistrelle, soprano pipistrelle, noctule and *Myotis* spp., were recorded. Common pipistrelle was the most frequently recorded bat species during the survey, followed by soprano pipistrelle. The first bat recorded was at 21.32 and the last bat recorded was at 23.13, 21 minutes and 2 hours and 2 minutes after sunset respectively. A single noctule bat call and a single *Myotis* spp. call were recorded during the survey at 21.36 and 21.50, 25 minutes and 39 minutes after sunset respectively.

The majority of bats were assessed to be commuting through the site, at both the southern and north-eastern extents of the site whilst two common pipistrelles were assessed to be foraging over the field at the north-western extent of the site. See Figure 9, Appendix A.



Bartons Road, Havant: Bat Survey Report

Summer - 1st - 2nd August 2013 dusk and dawn transect surveys

During the Summer dusk activity survey, nineteen bat calls were recorded; although, the recordings of the calls did not allow any calls to be identified to species level. The first bat recorded was at 21.22 and the last bat recorded was at 22.45, 32 minutes and 1 hour and 55 minutes after sunset respectively. The majority of bats were assessed to be commuting through the site, whilst small numbers of bats were assessed to be foraging over the field at the north-western extent of the site. See Figure 10, Appendix A.

During the Summer dawn activity survey, three bat calls were recorded, although the recordings of the calls did not allow any calls to be identified to species level. The first bat recorded was at 03.58 which was heard but not seen briefly at the south western corner of the site, another was recorded at 04:02 along the western boundary of the site and the last bat recorded was at 04.27, approximately 1 hour and 3 minutes before sunrise. See Figure 11, Appendix A.

Autumn - 16th September 2013 dusk transect survey

During the Autumn dusk activity survey, four bat calls of three species, common pipistrelle, soprano pipistrelle and serotine, were recorded. The first bat recorded, a common pipistrelle, was at 19.56, 40 minutes after sunset. Three out of four of the bat calls were made by bats which were only briefly heard but not seen and therefore assumed to be commuting through the site. The last bat recorded, a serotine, was at 20.40, 1 hour and 24 minutes after sunset and was seen foraging up and down the hedgerow on the western boundary of the site. See Figure 12, Appendix A.

Automated surveys

Weather conditions and timings

The automated bat detector (SM2) was placed within a crevice of an oak tree along the northern boundary of the site. At least seven species of bat were recorded using the site, including common pipistrelle, soprano pipistrelle, *Myotis* sp., Leisler's, noctule, brown long-eared and serotine. The most frequently recorded bat calls were common pipistrelle, followed by soprano pipistrelle. Table 9 details the species recorded.

See Figure 1 Appendix A for location of automated bat recorder.



Table 9. SM2 Records

Month	Date	Weather	Species	No. of Passes
Spring	29/05/2013	10°C; 100% cloud cover; 7km/h wind; precipitation	Common pipistrelle	261
			Soprano pipistrelle	190
			<i>Myotis</i> sp.	6
			Noctule	2
			Leisler's	3
	30/05/2013	13°C; 100% cloud cover; 13km/h wind; precipitation	Common pipistrelle	128
			Soprano pipistrelle	103
			<i>Myotis</i> sp.	3
			Leisler's	2
			Brown long-eared	2
	31/05/2013	16°C; 50% cloud cover; 13km/h wind; no precipitation	Common pipistrelle	267
			Soprano pipistrelle	161
			<i>Myotis</i> sp.	22
			Leisler's	7
			Serotine	1
Summer	01/06/2013	14°C; 50% cloud cover; 18km/h wind; no precipitation	Common pipistrelle	294
			Soprano pipistrelle	73
			<i>Myotis</i> sp.	6
			Leisler's	3
	02/06/2013	13°C; 50% cloud cover; 12km/h wind; no precipitation	Common pipistrelle	120
			Soprano pipistrelle	59
			Pipistrelle sp.	6
	03/06/2013	11°C; 50% cloud cover; 7km/h wind; no precipitation	Common pipistrelle	117
			Soprano pipistrelle	44
			Pipistrelle sp.	1
	04/06/2013	13°C; 50% cloud cover; 12km/h wind; no precipitation	Common pipistrelle	6
			Soprano pipistrelle	4
			Noctule	1
	05/06/2013	14°C; 50% cloud cover; 11km/h wind; no precipitation	No bats recorded	
	06/06/2013	15°C; 50% cloud cover; 14km/h wind; no precipitation	No bats recorded	
	29/07/2013	18°C; 50% cloud cover; 21km/h wind; no precipitation	Common pipistrelle	9
			Soprano pipistrelle	169
			Pipistrelle sp.	1
			<i>Myotis</i> sp.	24
	30/07/2013	18°C; 100% cloud	Common pipistrelle	10



Month	Date	Weather	Species	No. of Passes
	31/07/2013	cover; 15km/h wind; precipitation	Soprano pipistrelle	201
			Pipistrelle sp.	4
			<i>Myotis</i> sp.	9
		18°C; 100% cloud cover; 15km/h wind; precipitation	Common pipistrelle	65
			Soprano pipistrelle	247
			Pipistrelle sp.	2
			<i>Myotis</i> sp.	10
			Noctule	11
			Leisler's	2
Autumn	12/09/2013	14°C; 75% cloud cover; 5km/h wind; no precipitation	Common pipistrelle	7
			Soprano pipistrelle	8
	13/09/2013	13°C; 100% cloud cover; 11km/h wind; precipitation	Common pipistrelle	142
			Soprano pipistrelle	20
			<i>Myotis</i> sp.	4
	14/09/2013	13°C; 50% cloud cover; 8km/h wind; no precipitation	Common pipistrelle	4
			Soprano pipistrelle	9
			<i>Myotis</i> sp.	5
			Noctule	1
	15/09/2013	16°C; 100% cloud cover; 2km/h wind; precipitation	Common pipistrelle	21
			Soprano pipistrelle	21
			<i>Myotis</i> sp.	2
	16/09/2013	18°C; 100% cloud cover; 9km/h wind; precipitation	No bats recorded	

Myotis bat species are difficult to distinguish from call records alone as they overlap in the parameters that the surveyor analyses. Furthermore they can change their calls to their surroundings (Russ 1999). The most likely *Myotis* species to be picked up on activity survey judged by habitat, other records and the call parameters will be whiskered bats (Hundt 2012).



4.0 Interpretation

Bat roosts

The bat dusk emergence and dawn return surveys of Buildings 11, 12 and 14 and Trees 1, 11, 12, 13 and 14 did not record any bat roosts suggesting bat roosts are likely to be absent from the site.

Foraging and commuting bats

At least seven species of bat were recorded using the habitats across the Bartons Road site. The species recorded include common pipistrelle, soprano pipistrelle, noctule, serotine, Leisler's bat, brown long-eared bat and *Myotis* spp.

Common pipistrelle bats were the most frequently encountered species, as they were recorded on all transects on each activity survey visit as well as most frequently recorded by the automatic bat detector. Soprano pipistrelle was the second most frequently recorded bat at the site.

Over the three bat activity survey visits, the majority of bat activity on site appeared to be attributed to commuting bats, whilst foraging activity appeared to be concentrated to the hedgerow at the western boundary of the site and the field of semi-improved grassland towards the north-western extent of the site. The majority of bats recorded were common species including common and soprano pipistrelles but a number of rarer bats were also recorded less frequently, including noctule, Leisler's bat, serotine and brown long-eared bat.

Based on the assessment in Table 4, the commuting bat score on site is **16**; therefore, the **commuting bat value** on site is considered to be of up to '**local, parish or district**' level importance for commuting bats.

Based on the assessment in Table 5, the foraging bat score on site is **16**; consequently, the **foraging bat value** on site is considered to be of up to '**local, parish or district**' level importance for foraging bats.



4.1 Limitations to survey

The bat activity surveys were carried out between June and September, which are months within the optimal survey season for this type of survey.

The emergence / return surveys of buildings and trees were carried out in August and September, which is within the active season for bats. However, the dusk emergence survey of Building 11 in September falls outside the optimal period for detecting maternity roosts. This is not thought to have acted as a significant constraint to the survey given that a dusk emergence and dawn return survey of the building undertaken in August (within the optimal survey season) did not identify any roosts and an internal inspection undertaken in July failed to detect any bat droppings or other field signs which are likely to have been recorded if a maternity roost were present.

All surveys were completed when weather conditions were suitable (i.e. not during heavy rain, low temperatures or strong winds) as recommended within the Bat Conservation Trust guidance (Hundt, L., 2012).

The area surrounding building 19 was always surveyed first to avoid disturbing the dogs within the kennels at an unsociable time. All areas of the site were fully accessible during the surveys and therefore there were no limitations to completing the transects.

Some bat species, such as some bats of the *Myotis* genus, are more difficult to detect as their calls are quieter than other bats such as those of the *Pipistrellus* genus. As such, the louder bats are likely to have been identified more often than quieter species, which may have been under recorded.

The activity survey results will remain valid for a period of two years (i.e. until September 2015) and the emergence / return survey of buildings/trees will remain valid for a period of one year (i.e. until September 2014). It may be necessary to update these surveys after these times or if either the development design (i.e. potential impacts) or the habitat conditions on site change. This will help to establish if bat activity has changed in the interim period and will inform future mitigation measures, if necessary.

The behaviour of animals can be unpredictable and may not conform to standard patterns recorded in current scientific literature. This report therefore cannot predict with absolute certainty that animal species will occur in apparently suitable locations or habitats, or that they will not occur in locations or habitats that appear unsuitable.



5.0 Potential impacts of the development on bats

5.1 Effects on roosts

The bat dusk emergence and dawn return surveys of Buildings 11, 12 and 14 and Trees 1, 11, 12, 13 and 14 did not record any bat roosts suggesting bat roosts are likely to be absent from the site. Therefore, it is unlikely that there will be any impact on bat roosts as a result of the proposed development.

5.2 Effects on foraging / commuting habitat

The development proposals include the construction of residential properties, with associated access, car parking, and landscaping. The proposed development will potentially result in the loss of amenity grassland, introduced shrub, semi-improved grassland and limited areas of scattered scrub and broadleaved trees from the site boundaries which have been shown to provide foraging and commuting habitat for bats. The site was assessed to be of up to 'local, parish or district' level importance for commuting and foraging bats.

Retained boundary habitat features such as hedgerows, are likely to be used by foraging and commuting bats. These retained features have potential to be impacted by lighting during the construction and operational phases of the development. Some common bats, such as those of the *Pipistrellus* genus, are attracted to certain types of lighting as it attracts their invertebrate prey (J. Rydell and P. Racey, 1995). However, lighting can also illuminate the bats themselves and make them more vulnerable to being predated upon. Where inappropriate lighting occurs close to roost sites, bats may abandon their roost or delay their emergence, which limits their foraging opportunities. A number of the bat species recorded on site are more sensitive to lighting impacts and will actively avoid illuminated areas. Bats from the *Myotis* genus are more sensitive to ambient lighting and may be deterred from using areas of the site, if the lighting is not sensitively designed.

Loud noise and vibrations in the construction phase could potentially disturb roosting bats, where they potentially occur in proximity to the development footprint. Furthermore noise in the operational phase e.g. from increased public pressure within the area, could further disturb roosting bats and lead to habitat degradation. Additionally pet cats are known to predate on bats, increasing bat mortality rates.

Mitigation recommendations to offset the potential development impacts are provided in the following section.



6.0 Recommendations and mitigation

6.1 Survey recommendations

The results of the bat activity surveys will remain valid for two years (i.e. until September 2015) and the emergence / return surveys of buildings / trees will remain valid for one year (i.e. until September 2014). If works have not commenced by those times, it is recommended that the relevant survey data is considered for updating to determine whether there are any changes to bat roosting, foraging and commuting across the site. The survey should also be repeated if site conditions, design proposals change.

6.2 Avoidance

It is recommended that the mature trees are retained within the final development wherever possible. It is also recommended that light spillage into the boundary trees is avoided wherever possible, to retain darkened corridors suitable for bats around the site. Where it is not possible to retain these features, mitigation measures are proposed below.

6.3 Mitigation

In order to maintain the current status of the bats using the site to forage and commute, it is recommended that a suitably qualified ecologist continues to be consulted throughout the design stage so as to help avoid impacts to bats, and where this is not possible, to advise as to suitable mitigation measures.

The following mitigation measures are recommended to help offset the predicted impacts of the development proposals:

6.3.1 Tree retention and replacement

Ideally, it would be recommended that all mature trees are retained and protected within the development, and indeed the majority are to be retained, in particular those around the boundary of the site. However, it is understood that some trees, such as those within the centre of the site itself, will be removed and as such mitigation and compensation will be required within the masterplan in the form of tree planting. Please refer to Appendix C for recommended 'bat-friendly' plants.



6.3.2 Landscaping design

A diverse collection of native planting should be incorporated into the landscaping design within the proposed development site (refer to Appendix C for recommended 'bat-friendly' plants). Structurally diverse vegetation and inclusion of native evening-blooming plants will attract insects which in turn will help to enhance the site for foraging bats.

6.3.3 Lighting

The lighting across the development footprint should be sensitively designed with bats in mind, so that valuable foraging and commuting areas are retained and new roost sites are not impacted by ambient light. Permanent lighting on site should be minimised in proximity to any areas of habitat to be retained.

Where illumination is unavoidable, the following measures should be considered in order to avoid disrupting bat commuting corridors and foraging areas (refer to the Bat Conservation Trust *Bats and Lighting* document (Bat Conservation Trust, 2009) for further details):

- i) Careful aiming, placement and mounting of luminaires;
- ii) Minimising column heights and mounting of multiple luminaires on single columns in order to reduce column numbers; and
- iii) Post installation light monitoring.

Other possible mitigation measures could include:

- i) Illuminated road studs instead of lighting columns;
- ii) Glass lantern covers to filter UV light;
- iii) Flat lantern covers result in less light spill than dished covers;
- iv) Reduced brightness of lights;
- v) Increased spacing of lanterns;
- vi) Timed lighting to provide dark periods;
- vii) Directional lighting, using hoods, cowls, louvres and shields;

- viii) Avoid using reflective surfaces under lights; and
- ix) Use temporary close boarded fencing to shield light until dense vegetation is established for screening.

6.3.4 Reducing the risk of traffic collisions

Commuting and / or foraging bats may be killed when flying across roads, in particular those that sever linear corridors such as hedgerows. It is understood that the access to the development will be along the southern boundary of the site. If vegetation will need to be removed to accommodate the new access roads, as such the following measures detailed would help to permit bats access across habitat breaches. Such measures include the guiding of bats over a road, following existing vegetated corridors and supplementing gaps with landscaped planting. See plate 1 below for illustration.

Plate 1: Planting to encourage bats to fly over roads

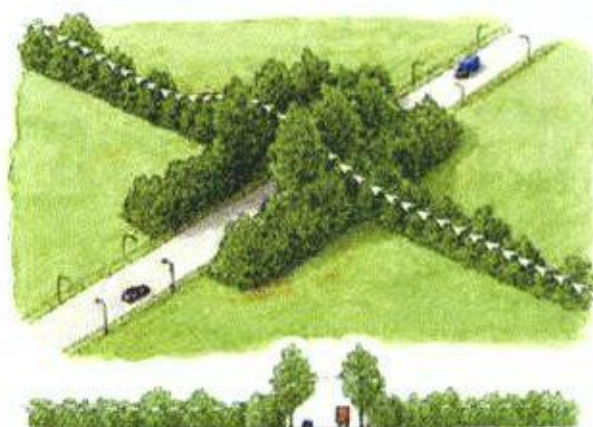


*Figure 1 planting to encourage bats to fly over roads or, on a smaller scale, hedgerow gaps.
Photo © Peter Twisk www.standardsforhighways.co.uk*

In addition lighting schemes along the road can also be used to guide bats to appropriate crossing points (see Section 6.3.3 above for further details).

6.3.5 Reducing the risk of predation by pets

Reducing the impact of predating cats on bats is not easy - one answer would be to recommend that new home owners keep their cat indoors from dusk to dawn, to allow roosting bats uninterrupted access to and from their roosts. However this measure is difficult to enforce. New roost sites for bats could be provided



Bartons Road, Havant: Bat Survey Report

in new buildings and existing trees across the site to provide increased safe roosting opportunities to bats. Any new roost sites must not be accessible to cats.

6.3.6 Construction recommendations

It is recommended that construction activity in proximity to mature trees and hedgerows ceases at sunset, if not before, to avoid delaying the emergence of locally roosting bats. Works should not re-commence in these areas until after dawn.

6.4 Enhancement

Whilst enhancement is not a legal requirement, it is encouraged on site as it helps to meet the government objectives for planning to protect and enhance biodiversity, in accordance with the *National Planning Policy Framework (NPPF)*.

A number of the measures outlined in the mitigation section, such as the planting of 'bat-friendly' plants have the potential to enhance the site for bats (Appendix C).

6.4.1 Artificial roost provision

Additional measures to enhance the site for bats include the provision of artificial bat roosts (i.e. bat boxes), which can be attached to trees that are being retained on the proposed development site or located within new buildings.

Numerous types of artificial bat roost and access provision are available and can be easily installed onto retained trees to benefit local bats. Information regarding commonly used bat boxes is provided in Appendix D. Artificial roosts should face to the south-west or south-east if possible and should not be illuminated. It is recommended that a minimum of four bat boxes are installed within the proposed development site in groups of two on each tree/building.

Tree bat boxes should be sited as high as possible (no lower than 2m) and clear of any overhanging branches so that the bats have direct and easy access to them. Ideally several boxes should be erected facing in differing directions around the trunk of the tree, so that if one box gets too hot or cold the bats can move to another. Boxes should be attached to the tree using an aluminium nail or tied in position using wire/leather.



Bartons Road, Havant: Bat Survey Report

The following Schwegler bat boxes can be installed on retained trees: General Purpose Bat Box 2F, Bat Box 1FF and Bat Box 1FD, which are suitable for brown long-eared, noctule, common pipistrelle and soprano pipistrelle bats. There are many other alternative suitable bat boxes, of varying price, on the market. Bat box products can be sourced directly from the supplier (e.g. Schwegler) or can be obtained through wildlife equipment websites such as Wildcare: <http://www.wildcareshop.com/index.php> or Alana Ecology: <http://www.alanaecology.com/>.



7.0 References

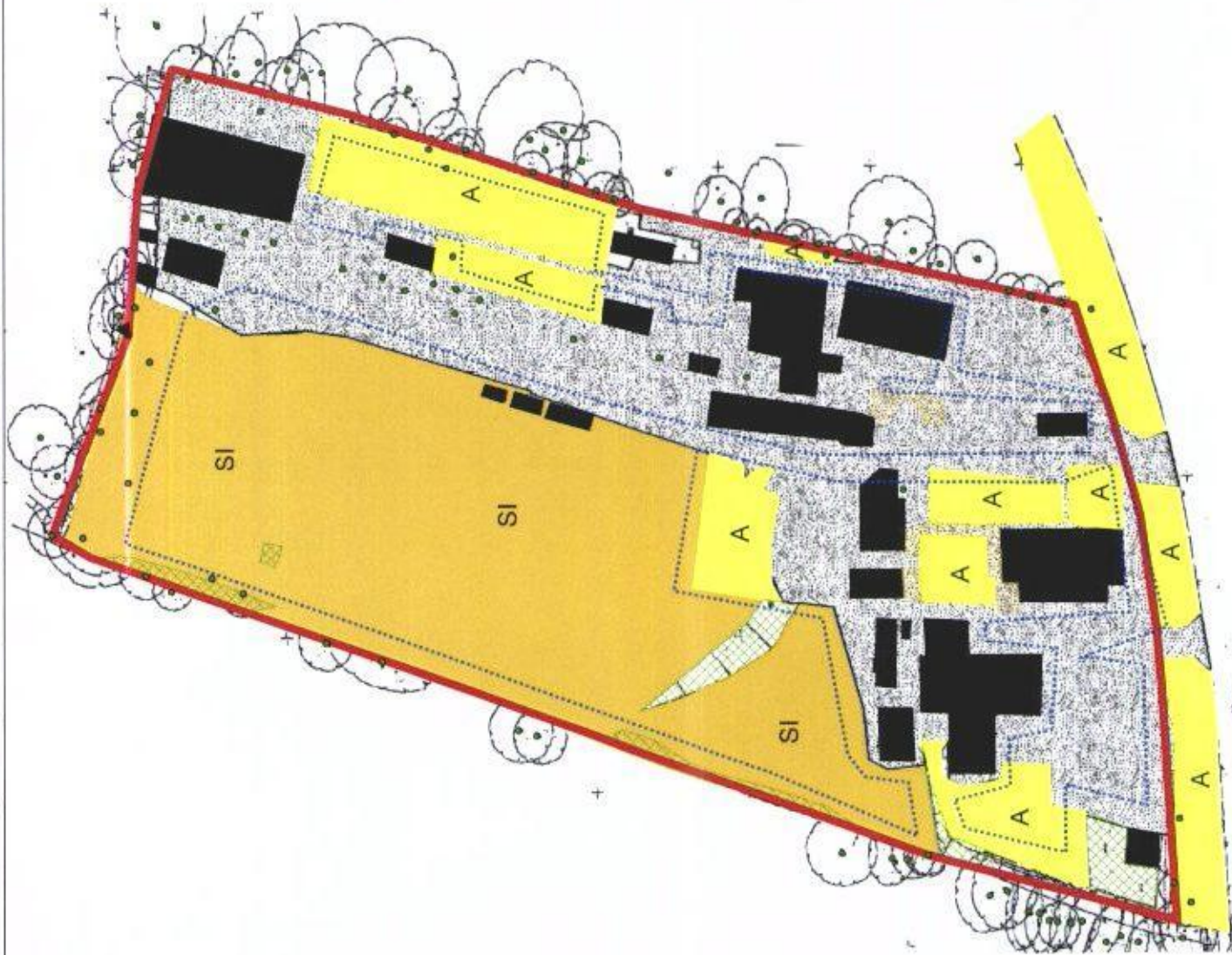
- Bat Conservation Trust, (2009). *Bats and Lighting in the UK*. Bats and the Built Environment Series. Bat Conservation Trust, Peterborough, UK. Available from:
http://www.bats.org.uk/data/files/bats_and_lighting_in_the_uk_final_version_version_3_may_09.pdf [Viewed 11/11/2013]
- Department for Communities and Local Government (DCLG), (2012). *National Planning Policy Framework (NPPF)*. DCLG, UK.
- Hundt, L., (2012). *Bat Surveys: Good Practice Guidelines 2nd edition*. Bat Conservation Trust, Peterborough, UK.
- Ecology and Environmental Management (IEEM) In Practice magazine – *Valuing Bats in Ecological Impact Assessment*, No. 70, December 2010
- Mitchell-Jones, A. J., (2004). *Bat Mitigation Guidelines*. English Nature, Peterborough, UK.
- Russ, J. A. (1999). *The Bats of Britain and Ireland: Echolocation Calls, Sound Analysis, and Species Identification*. Alana books
- Rydell J. & Racey P.A., (1995). Street lamps and the feeding ecology of insectivorous bats. *Symposia of the Zoological Society of London*, 67,291–307.
- Wray, S., Welss, D., Long, E. & Mitchell-Jones, T., (2010). Valuing bats in ecological impact assessment. Institute of Ecology and Environmental Management (IEEM) In Practice, No 70, pp 22-25. IEEM, Winchester, UK.
- WYG (2013) Bartons Road, Havant: Extended Phase 1 Habitat Survey Report. WYG, Southampton, UK.
- WYG (2013) Bartons Road, Havant: Internal Roof Void and Endoscopic Inspection of Buildings letter. WYG, Southampton, UK.



APPENDICES



Appendix A - Figures



Legend

- Transect route
- ▲ SM2 location
- Broad leaved scattered trees
- Site boundary
- Introduced shrub
- Dense / continuous scrub
- Amenity grassland
- Buildings
- Hardstanding
- SI Neutral semi-improved grassland

0 10 20 40 Metres

The Loft, St Clair's Farm
Wickham Road
Droxford
Hants
SO32 3PW
Tel: 01489 872928
Fax: 01489 872939
email: ecology@wyg.com



WYG Environment

Bartons Road, Havant

**Bat activity transect route
and SM2 location**

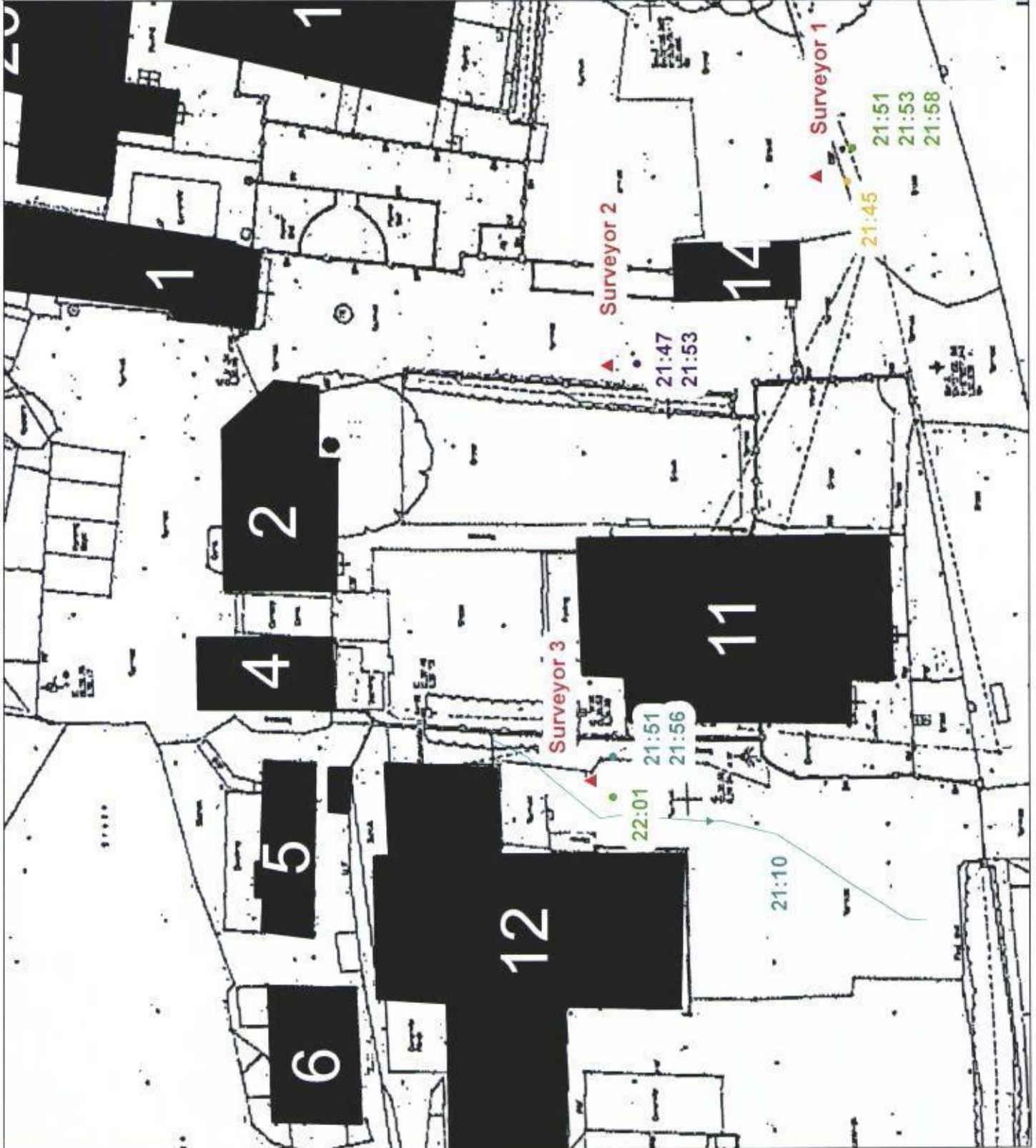
Drawn by: Date:	Checked By: Date:	Approved By: Date:
EH 10/04/14	MN 10/04/14	---
Project No:	Office Type	Drawing No.
A081595	45	94 Figure 1
	Revision	

Base map provided by Hampshire Land Surveys Ltd



Legend

- ▲ Surveyor
- Bat sp. (heard not seen)
- Common pipistrelle (heard not seen)
- Leisler's (heard not seen)
- Soprano pipistrelle (heard not seen)
- Soprano pipistrelle



The Loft, St Clair's Farm
Wickham Road
Droxford
hants
SO32 3PW
Tel: 01489 872929
Fax: 01489 872939
email: ecology@wyg.com

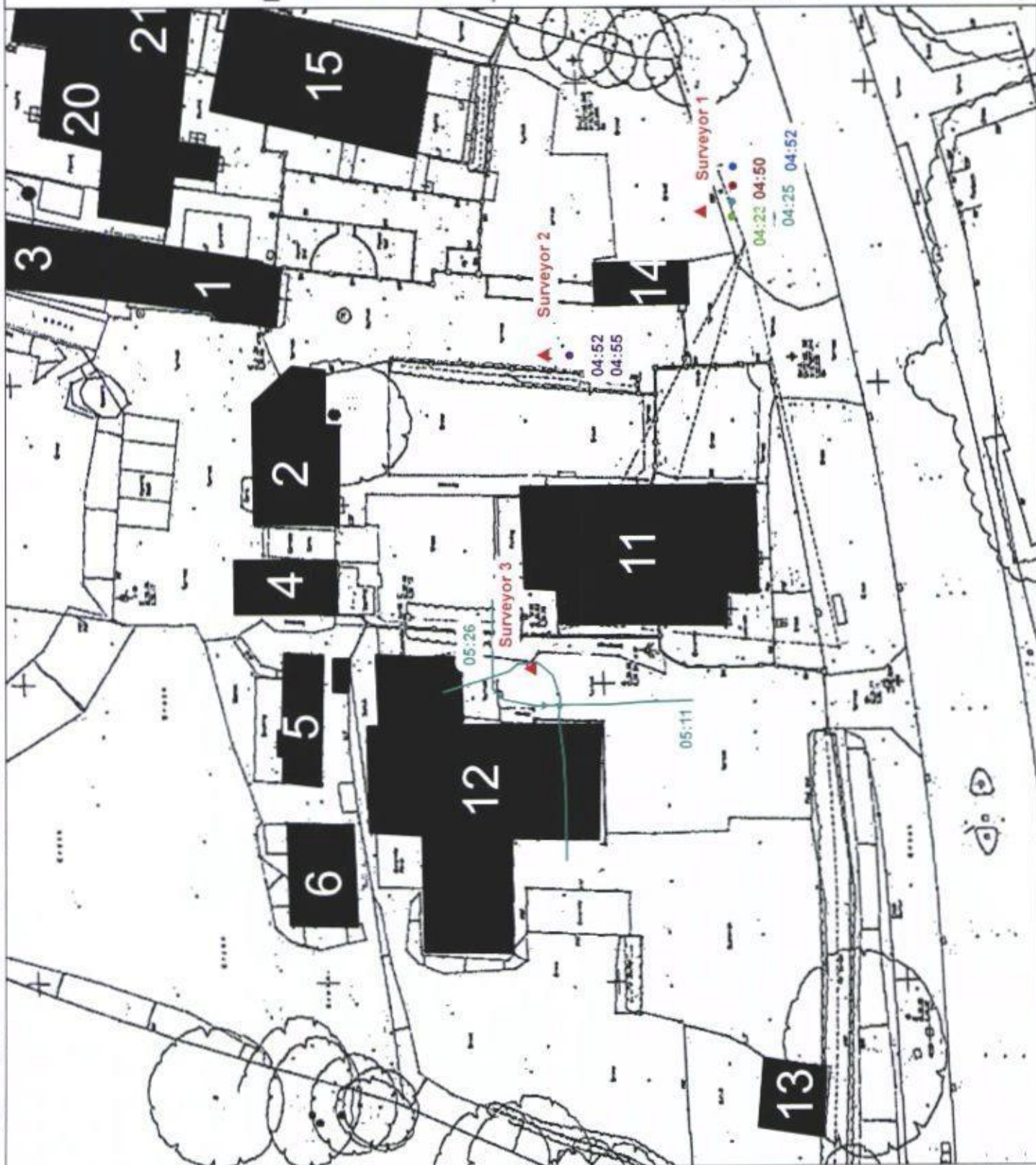


WYG Planning & Environment
Bartons Road, Havant

Dusk Emergence Survey
Building 12 & 14, 12th August 2013

Not to scale	Drawn by Date:	Checked By Date:	Approved By Date:
	JH 07/05/14	EH 07/05/14	NT 07/05/14
Project No:	Office Type	Drawing No.	Revision
A081595	45	94	Figure 2

Base map provided by Hampshire Land Surveys Ltd



Legend

- ▲ Surveyor
- Bat sp. (heard not seen)
- Brown long-eared bat (heard not seen)
- Common pipistrelle (heard not seen)
- Myotis sp. (heard not seen)
- Soprano pipistrelle (seen not heard)
- Soprano pipistrelle

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



Tel: 01489 872929
Fax: 01489 872939
email: ecology@wyg.com

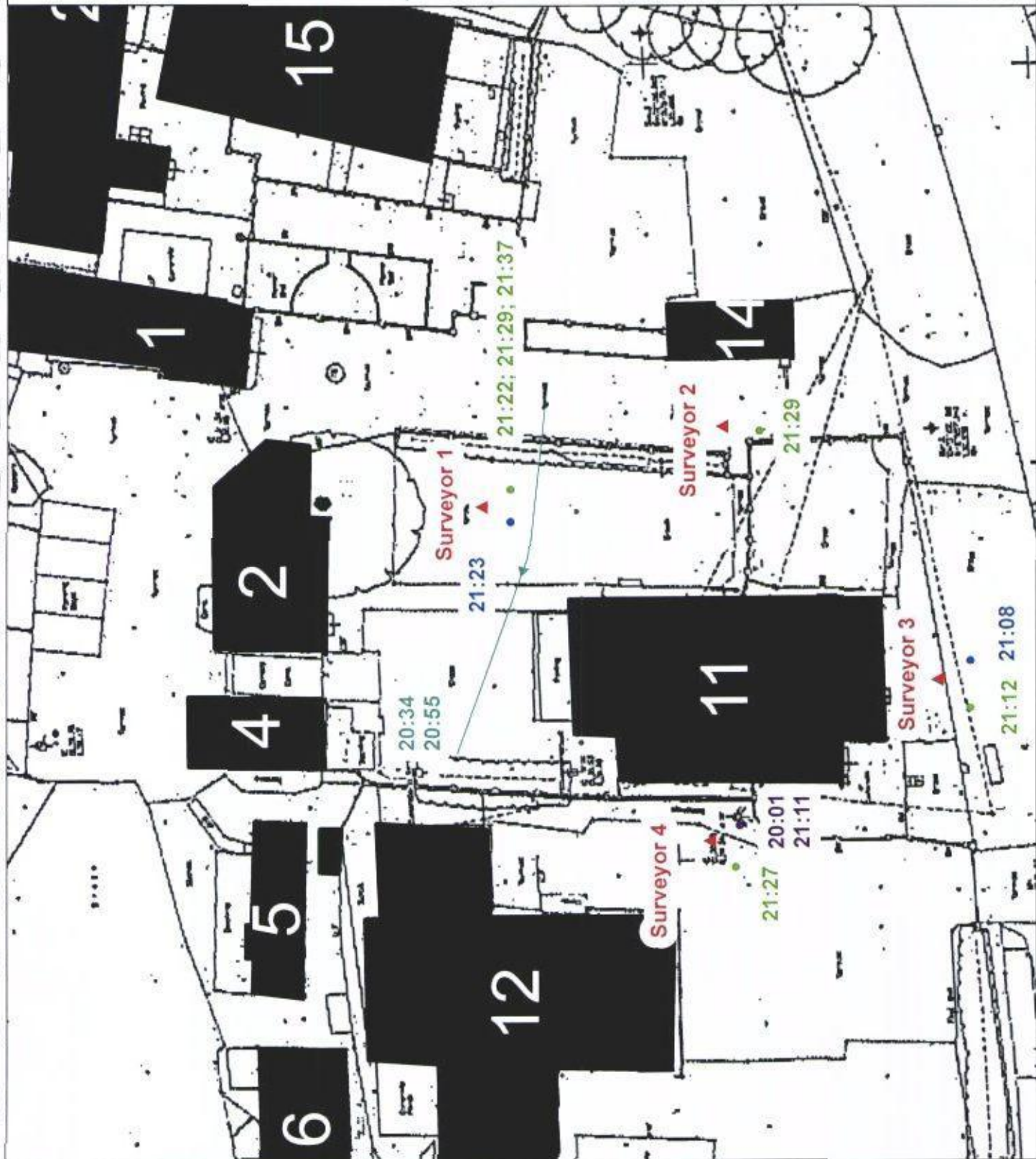
contractors should call 01489 872929

Bartons Road, Havant

Dawn Return Survey
Building 12 & 14, 13th August 2013

Map for scale	Drawn by: Date:	Checked by: Date:	Approved by: Date:
	24 02/05/14	EH 02/05/14	NT 07/05/14
Project No:	Survey Type	Drawing No.	Revision
A061595	45	94	Figure 3

Base map provided by Hampshire Land Surveys Ltd



Legend

- ▲ Surveyor
- Myotis (heard not seen)
- Common pipistrelle (heard not seen)
- Soprano pipistrelle
- Bat sp. (heard not seen)

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



Tel: 01489 872929
Fax: 01489 872939
email: ecology@wyg.com

WYG Planning & Environment

Bartons Road, Havant

Dusk Emergence Survey
Building 11. 19th August 2013

Not to scale	Drawn By: DGH	Checked By: DGH	Approved By: DGH
Project No: A081595	Date: 19/08/13	EH: 02/05/14	NT: 07/05/14
	Office Type: 45	Drawing No: 94	Revision: Figure 4

Note: map provided by Hampshire Land Surveys Ltd



Legend

▲ Surveyor

● Common pipistrelle (heard not seen)

● Bat sp. (heard not seen)

The Loft, St Clair's Farm

Wickham Road

Tel: 01489 872929

Droxford

Hants

email: ecology@wyg.com

SO33 3PW



WYG Planning & Environment

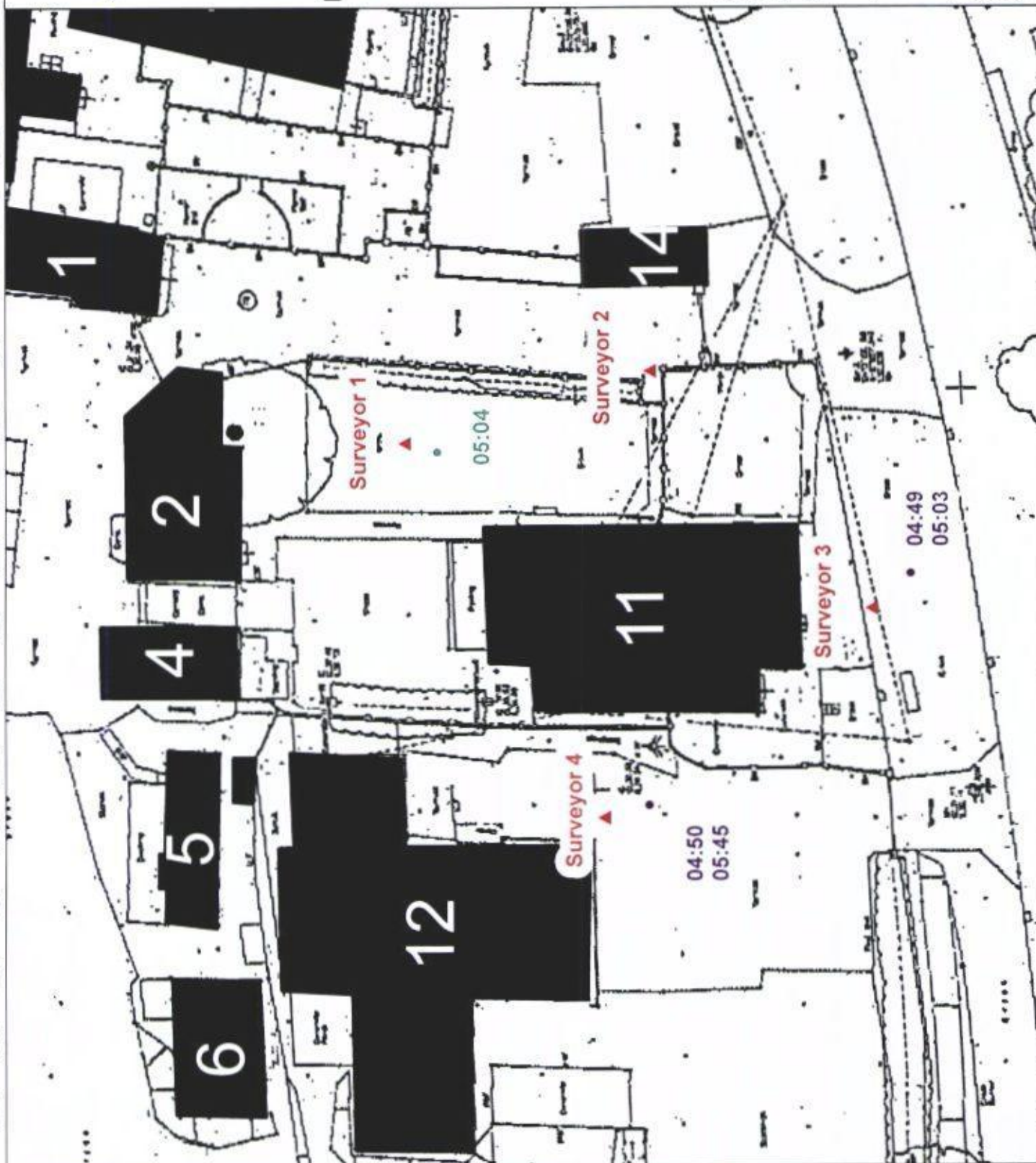
creative minds with limits

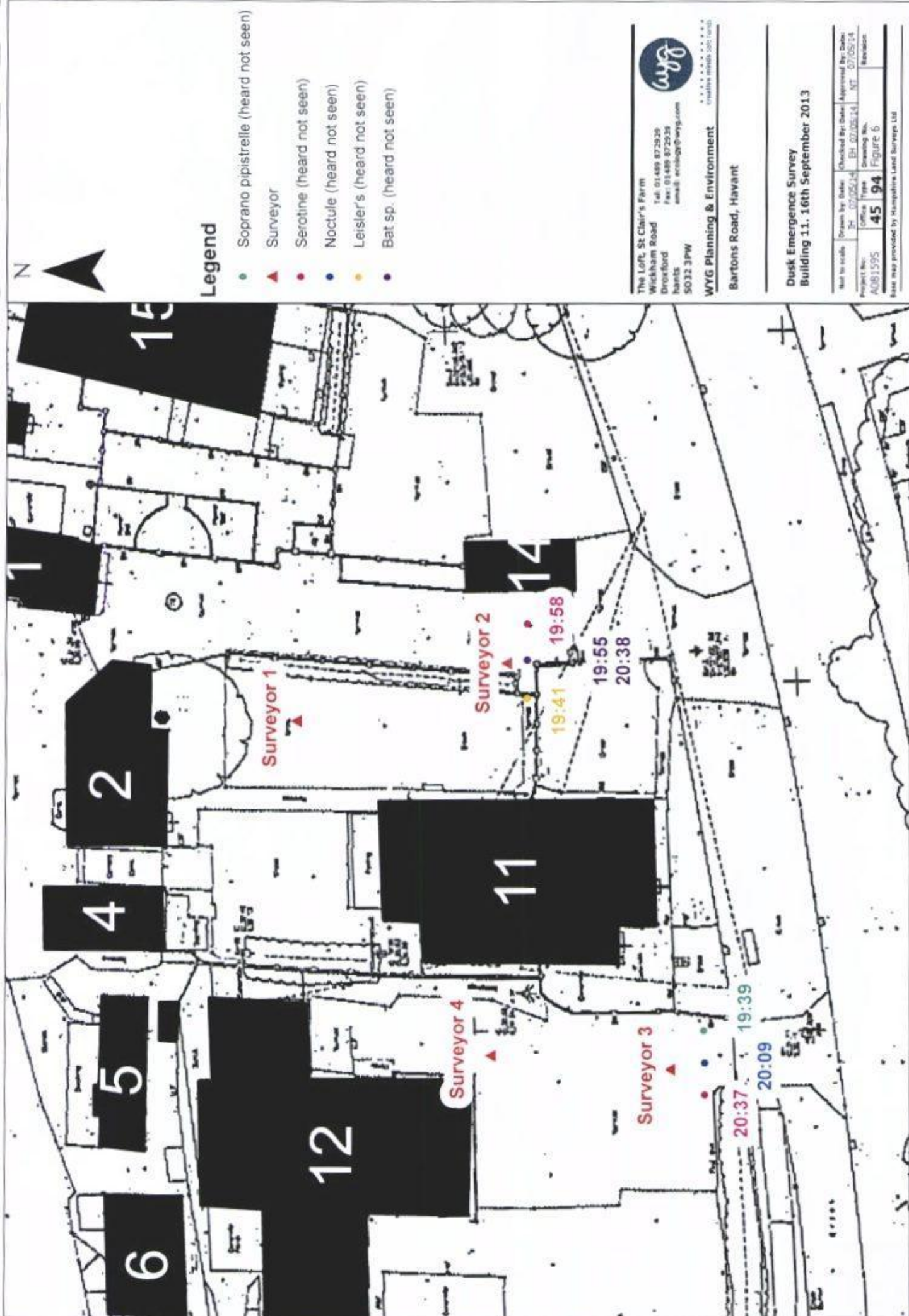
Bartons Road, Havant

Dawn Return Survey
Building 11. 20th August 2013

Not to scale	Drawn by: Date:	Checked By: Date:	Approved By: Date:
	SH 02/05/14	EH 02/05/14	NT 02/05/14
Project No:	Office	Type	Drawing No.
A081595	45	94	Figure 5
Revision			

Base map provided by Hampshire Land Surveys Ltd





The Loft, St Clair's Farm
 Wickham Road
 Droxford
 Hants
 SO31 3PW

Tel: 01489 872929
 Fax: 01489 872936
 email: ecology@wyg.com

wyg

WYG Planning & Environment
 Bartons Road, Havant

**Dusk Emergence Survey
 Building 11. 16th September 2013**

Map to scale	Drawn by: Sides	Checked by: Sides	Approved by: Sides
Project No: A081595	Office: 45	Field: 94	Figure: 6
	Revision		

Base map provided by Hampshire Land Surveys Ltd



Legend

- Trees surveyed
- Site boundary
- Myotis (heard not seen)
- Noctule (heard not seen)
- Soprano pipistrelle (heard not seen)
- Leisler's (heard not seen)
- Surveyors
- Common pipistrelle (heard not seen)
- Myotis sp.
- Soprano pipistrelle



The Loft, St Clair's Farm
Wickham Road
Dronfield
hants
SO32 3PW
Tel: 01489 872929
Fax: 01489 872939
email: ecology@wyg.com



WYG Planning & Environment
Bartons Road, Havant

Dusk Emergence Survey
Trees. 28th August 2013

Drawn by: Date:	Checked By: Date:	Approved By: Date:
JH 02/05/14	EN 02/05/14	NT 02/05/14
Project No:	Office Type	Drawing No.
A081595	45	94
	Figure 7	Revision

Base map provided by Hampshire Land Surveys Ltd



Legend

- Trees surveyed
- Surveyors
- Site boundary
- Bat sp. (heard not seen)
- Bat sp.
- Myotis sp. (heard not seen)
- Noctule (heard not seen)
- Pipistrelle sp. (heard not seen)



The Loft, St Clair's Farm
Wickham Road
Droxford
Hants
SO32 3PW
Tel: 01489 872929
Fax: 01489 872939
email: ecology@wyg.com

WYG Planning & Environment

Bartons Road, Havant

Dawn Return Survey
Trees, 29th August 2013

Not to scale	Drawn by: Date:	Checked By: Date:	Approved By: Date:
	JH 07/05/14	EH 07/05/14	NT 07/05/14
Project No:	Office	Type	Drawing No.
AC081595	45	94	Figure 8
Revision			
Base map provided by Hampshire Land Surveys Ltd			



Legend

— Site boundary

• Bat sp.

• Common pipistrelle (heard not seen)

↕ Common pipistrelle

• Soprano pipistrelle (heard not seen)

↕ Soprano pipistrelle

The Loft, St Clair's Farm

Wickham Road

Tel: 01489 872020

Fax: 01489 872930

hants

email: ecology@wyg.com

S032 3PW



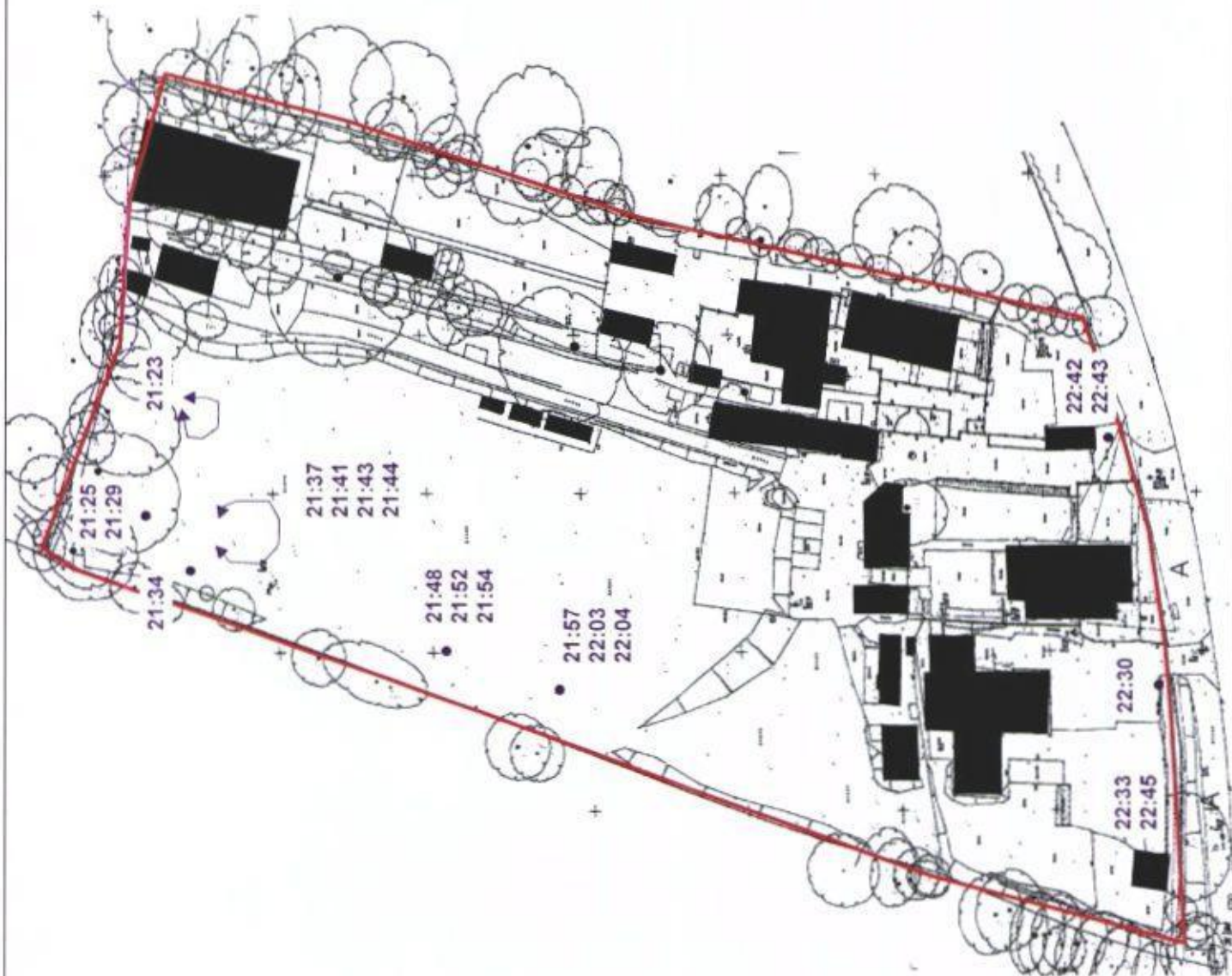
WYG Planning & Environment

Bartons Road, Havant

Dusk Activity Transect Survey
Spring. 4th June 2013

Not to scale	Drawn by: DWG	Checked By: Date:	Approved By: Date:
	JH	07/06/14	EH 07/06/14
Project No:	Office	Drawn No.	Revision
A081595	45	94	Figure 9

Base map provided by Hampshire Land Surveys Ltd.



Legend

- Bat sp. (heard not seen)
- ↔ Bats sp.
- Site boundary

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



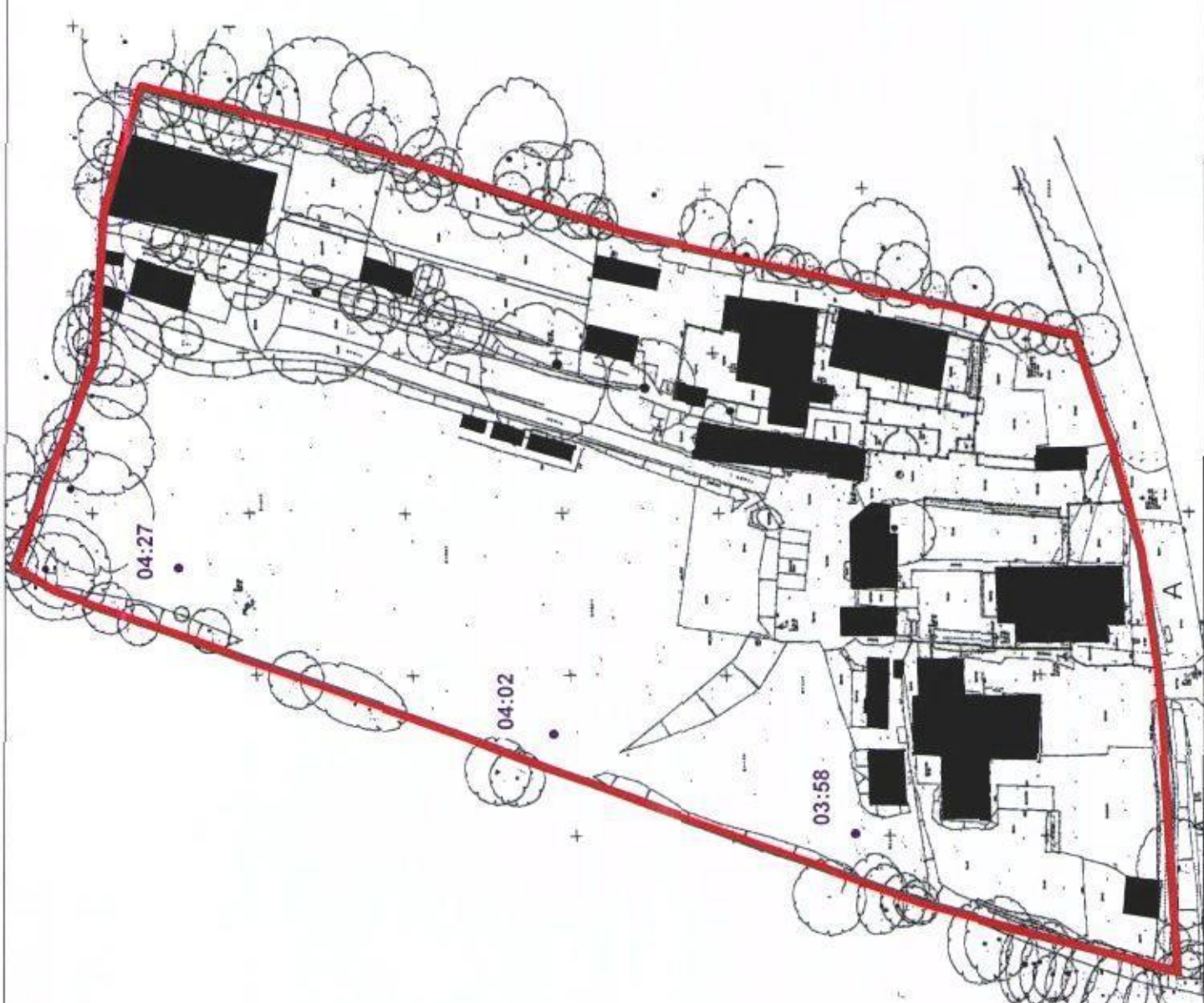
WYG Planning & Environment

Bartons Road, Havant

Dusk Activity Transect Survey
Summer. 1st August 2013

Not to scale	Drawn By: DJS	Checked By: DJS	Approved By: DJS
Project No: A081595	Office: 45	File: 94	Revision: 10
Drawing No: 45 94 Figure 10			

Base map provided by Hampshire Land Surveys Ltd



Legend

- Bat sp. (heard not seen)
- Site boundary

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



Tel: 01489 872929
Fax: 01489 872939
email: ecology@wyg.com

WYG Planning & Environment

Bartons Road, Havant

Dawn Activity Transect Survey
Summer, 2nd August 2013

Not to scale	Drawn By: Dales	Checked By: Dales	Applied By: Dales
Project No:	Office	Type	Drawing No.
A081595	45	94	Figure 11
			Revision

Base map provided by Hampshire Land Surveys Ltd



Legend

- Soprano pipistrell (heard not seen)
- Common pipistrelle (heard not seen)
- ↔ Serotine
- Site boundary



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

Tel: 01489 827828

Fax: 01489 827838

email: ecology@wyg.com

WYG Planning & Environment

Bartons Road, Havant

Dusk Activity Transect Survey
Autumn. 16th September 2013

Not to scale	Drawn by: Date: JH 02/05/14	Checked By: Date: EH 02/05/14	Approved By: Date: NT 02/05/14
Project No: A081595	Office Type: 45	Drawing No: 94	Revision: Figure 12

Base map provided by Hampshire Land Surveys Ltd





Appendix B – Data search results



Bartons Road, Havant: Bat Survey Report

Taxon Name	Common Name	Status	Grid Ref.	First Year	Last Year	No. of Records	Max Count
<i>Eptesicus serotinus</i>	Serotine	Sensitive EU_Hab_4 HBAP WCA_s5s94b WCA_s5s94c HabReg_s2	SU7107	2010	2010	5	21
<i>Myotis mystacinus / brandtii</i>	Whiskered / Brandt's bat	Sensitive WCA_s5s94b WCA_s5s94c HabReg_s2	SU7107	2001	2001	1	1
<i>Nyctalus noctula</i>	Noctule bat	Sensitive EU_Hab_4 UKBAP WCA_s5s94b WCA_s5s94c HabReg_s2	SU7107	2010	2010	1	1
			SU7109	2003	2003	1	1
<i>Pipistrellus</i>	Pipistrellus	Sensitive WCA_s5s94b WCA_s5s94c HabReg_s2	SU713073	2010	2010	1	1
			SU716082	2002	2002	1	1
			SU727100	2003	2003	1	1
			SU732071	2002	2002	1	0
			SU745079	2008	2008	1	1
			SU746079	1999	1999	1	1
<i>Pipistrellus pipistrellus</i>	Common pipistrelle	Sensitive EU_Hab_4 HBAP WCA_s5s94b WCA_s5s94c HabReg_s2	SU717084	2001	2001	2	0
			SU717084	2001	2001	2	0
			SU717084	2001	2001	1	0
			SU724087	2007	2010	2	6
			SU724087	2007	2010	2	6
			SU749078	2010	2010	1	13
			SU749078	2010	2010	1	13
<i>Pipistrellus pygmaeus</i>	Soprano pipistrelle	Sensitive EU_Hab_4 UKBAP HBAP WCA_s5s94b WCA_s5s94c HabReg_s2	SU718069	2010	2010	1	1
			SU718069	2010	2010	1	1
			SU749078	2010	2010	1	2
			SU749078	2010	2010	1	2



Bartons Road, Havant: Bat Survey Report

<i>Plecotus</i>	Plecotus	Sensitive WCA_s5s94b WCA_s5s94c HabReg_s2	SU745079	2008	2008	2	0
<i>Plecotus auritus</i>	Brown long-eared bat	Sensitive EU_Hab_4 UKBAP WCA_s5s94b WCA_s5s94c HabReg_s2	SU723093 SU726099 SU727097 SU737073 SU746079	1997 1999 1999 2002 1999	1997 1999 1999 2002 1999	1 1 1 1 1	1 0 25 0 0

Status codes and abbreviations:

EU_Hab_4 Annex IV of the Habitats Directive

UKBAP UK Biodiversity Action Plan priority species

HBAP Hampshire Biodiversity Action Plan species

WCA_s5s94b Schedule 5 Section 9 Part 4b of the Wildlife and Countryside Act 1981 (as amended)

WCA_s5s94c Schedule 5 Section 9 Part 4c of the Wildlife and Countryside Act 1981 (as amended)

HabReg_2 Schedule 2 of Conservation of Habitats and Species Regulations 2010 (European Protected Species animal)



Appendix C – Native/wildlife friendly plant species



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=hardy annual, HHA=half-hardy annual, P=perennial, W=wild flower.

Flowers for borders

St John's Wort	Hypericum	P	March- March - Oct
marigolds	Calendula	H/A	March - Oct
aubretia	a. deltoidea	P	March-June
honesty	Lunaria rediva	HB	March
forget-me-not	Myosotis sp	A/P	March - May
elephant ears	Bergenia	P	April
Wallflowers	Erysimum	B	April - June
Cranebills	Geranium sp	P	May - Sept
Yarrow	Achillea	P	May - July
Poppies	Papaver sp.	A	May - July
Damers violet	Hesperis matronalis	P	May - August
Red Valerian	Centranthus ruber	P	May - Sept
Poached egg plant	Limnithes	HA	June - Aug
Knapweed	Centaura nigra	P	June - Sept
Phacelia		HA	June - Sept
Ox-eye daisy	Leucanthemum vulgare	P	June - Aug
Evening primrose	Oenothera biennis	B	June-Sept
Candytuft	Iberis umbellata	HA	June - Sept
Sweet William	Diandria barbatus	B	June - July
Blanket flowers	Gaillardia	P	June -
Verbena	V.bonariensis	HHA	June - Oct
Scabious	Aritalia arvensis	P	July-Aug.
Night-scented stock	matthiola bicornia	HA	July-Aug
Pincushion flower	Scabious sp	A/P	July - Sept
Cherry pie	Heliotrope	HHA	July - Oct
Mexican aster	Cosmos sp.	A/P	July - Oct
Cone flower	Rudbeckia sp	A/P	August-Nov.
Mallow	lavatera sp.	P	August-Oct
Michaelmas daisy	Asier 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	Moranda dalyra		June - Sept
Sweet Cicely	Myrrhis odorata		April - June
Hyssop	Hyssopus officinalis		July - Sept
Feverfew	Tanacetum parthenium		June - Sept
Borage	Borago officinalis		May - Sept

Rosemary	Rosemary officinalis	March - May
Lemon balm	Melissa officinalis	
Coriander	Copernium sativum	June - August
Lavender's	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
Goulder rose	Viburnum opulus	shrub
Gorse	Ulex sp.	shrub
Plants for pond edges and marshy areas		
Purple loosestrife	Lythrum salicaria	W
Meadow sweet	Filipendula ulmaria	W
Lady's smock	Cardamine pratensis	W
Water mint	mentha aquatica	W
Angelica	Angelica sylvestris	W
Hemp agrimony	Eupatorium cannabinum	W
Marsh marigold	Caltha palustris	W
Cresping Jenny	Lysimachia nummularia	W
Fringed water lily	Nymphaeodes peltata	W
Water forget-me-not	Myosotis scorpioides	W

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 seal to watch your garden come to life!



Appendix D – Bat boxes

BAT BOXES 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. This box is attractive to the smaller British bats.

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

Diameter: 16cm

Height: 33cm

Weight: 4kg

HIBERNATION BOX FOR CREVICE DWELLING SPECIES



This box is designed to provide a protected environment, particularly through the cold winter months when bats hibernate. It has three internal wooden panels imitating crevices.

Schwegler 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 extremely long lasting and rot- and predator-proof.

This very heavy box (30kg) is supplied complete with special fixing brackets. It is important to fit it very securely if mounting above the ground, and to site it well away from public areas.