Duke of Northumberland River (DNR),

Mogden-Isleworth Ait,

LB Hounslow

Furesfen

Tel/fax 020 8974 6670
Mob.0786 750 7086
Email alison@furesfen.co.uk
Website: www.furesfen.co.uk

Contents

CONTROL SHEET

Author	Alison Fure BSc, MSc C.ENV MCIEEM
Job Title.	
Purpose	External Use

The information provided within this report is true at the time of writing. It has been prepared in accordance with the guidance of the MCIEEM professional institution's Code of Professional Conduct. It cannot be used for any purpose other than stated above without the permission of the author. It cannot be made available to the pubic domain until all accounts have been settled.

Abbreviations and terminology

FORCE	Friends of the River Crane Environment
LNR	Local Nature Reserve
SINC	Site of Importance for Nature Conservation
LBG	London Bat Group
DNR	Duke of Northumberland River
PRF's	Potential Roost Features

Thanks to participants: Anna Smyk, Rob Gray, Chris Slack, Lydia Blake, Keith Knight, and Grace Gray and D. Simmons of Simlaw Ecology.

Map by P. Smith FORCE

SUMMARY

Four bat species were detected during the surveys: common and soprano pipistrelle bats, Daubenton's bat and a *Nyctalus* bat species- the latter only briefly.

Two species were found roosting in the central and north-eastern parts of the catchment; a pipistrelle roost in residential property around St. John's Park and a small roost of Daubenton's bats at the Church Lane Bridge by the confluence with the Thames.

Pipistrelle bats use the lower DNR corridor as a foraging area throughout the night; particularly the Sewage Works and on occasion, Silverhall Park.

The survey demonstrated anthropogenic disturbance of light spillage and glare from several sources.

Introduction

Background

1.1 A bat survey was commissioned by Hounslow Council with the collaboration of the Friends of the River Crane Environment (FORCE) and the assistance of Thames Water. This was to investigate the bat activity along a 2,000m stretch of the Duke of Northumberland River (DNR) between Mogden Sewage Works (to the south-west) and Isleworth Ait (to the north-east).

Site Description

1.2 The The DNR River is an artificial watercourse built in the 1530's to provide water power for mills and a water supply to Syon Priory and is a Site of Grade 2 Site of Borough Importance. FORCE have been engaged in the development and monitoring of a ninety seven hectare park, known as Crane Valley Park, within the London Boroughs of Hounslow and Richmond.

1.3 The group have been monitoring water quality, birds, eels etc. and it is hoped that the current round of surveys will assist with a citizen science approach to future monitoring of the bat species within the Crane Valley to inform habitat management. To this end, a range of monitoring equipment was provided to volunteers, along with some instruction.

Scope of this Report

1.4 This report outlines the methodology and findings of four emergence and activity surveys as well as static bat detector surveys at strategic sites along the route.

Aims of Assessment

1.5 The purpose of this assessment was to determine the bat species present and their use of the DNR corridor.

METHODOLOGY

Walkover survey

3.1 A walkover of the DNR was undertaken from the bank (24.5.16) in order to ascertain any niches, which might be available to wildlife along the corridor. Transect areas were recorded as well as suitable locations for static bat detection equipment. Potential Roost Features (PRF's) in trees were determined.

Emergence and Activity Surveys

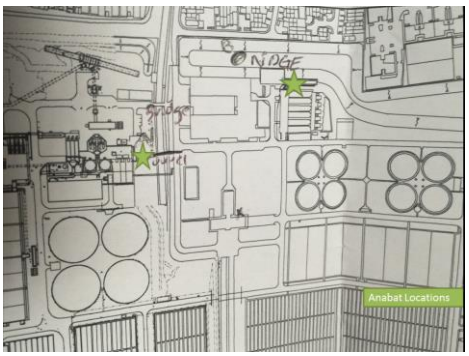
2.1 Four bat activity surveys were undertaken three/four weeks apart. Each dusk Transect survey began at least 15 minutes before sunset and continued until at least 1.15 hours after sunset.

2.2 During each survey, two teams of surveyors were deployed on separate sections of the DNR. Some surveyors were equipped with an Echo Meter Touch bat detector supported by an Apple iPad Mini 2 interface running IOS 8, on which all bat activity was recorded. Recordings were later analysed using Kaleidoscope Pro software to aid the identification of species according to Russ, 2012.

2.3 In addition, surveyors were equipped with a range of hand held bat detection equipment including recordable Bat Box 4 Frequency Division Duet with an Edirol recorder, Bat Box 3, and an Anabat Walkabout. Recordings taken from the Duet were played through BatSound and interpreted according to Russ (2012).

2.4 Static bat detection equipment, notably an Anabat was employed as follows:

- Lime tree near Watney's bridge 4 nights 9.6.16-13.6.16;
- Pedestrian bridge at Riverside walk 1 night 13.7.16;
- Silverhall Park 8 nights 20.7.16-28.7.16;
- Mogden SW DNR east side of DNR 28.7.16- 4.8.16; and
- Mogden SW west ridge 4.8.16-10.8.16.



Stars indicate the positions of the Anabat at Mogden SW

2.5 The surveys were conducted during suitable temperature and weather conditions The survey methods were in accordance with The Bat Conservation Trust's *Bat Surveys: Good Practice Guidelines – 3rd Edition* (Collins, 2016), and *The Bat Worker's Manual* (Mitchell-Jones and McLeish, 2004).

Surveyor Information

2.6 The surveys were undertaken by A Fure Class 2 Bat Licence (Natural England licence number 2015-10381-CLS-CLS) and Daniel Simmons of Simlaw Ecology Class 2 Bat Survey Licence (Natural England licence number 2015-03434-CLS-CLS). Both are full members of the Chartered Institute of Ecology and Environmental Management (CIEEM).

Limitations

2.7 This survey does not comprise a full assessment of the presence/likely absence of bat roosts within the trees.

RESULTS

Desk study

3.2 The desk study showed that four species of bat are recorded locally and no roosts are known. An Anabat situated on Isleworth Ait- to the east -has recorded the four characteristic species known in the catchment (H. Pearce, *pers comm*. September, 2016).

3.3 Daubenton's bats *Myotis daubentonii* are recorded navigating over the River Crane- to the south- and there is a known hibernaculum of this species at Cavalry Tunnel near Feltham Marshalling Yards.

3.4 There have been European Protected Species Mitigation Licence exclusions within the catchment at TQ149740 and TQ164750 indicating that roosts have been present.

3.5 Anecdotal records suggest a large pipistrelle roost on landholdings opposite the southern end of Isleworth Ait (G. Gray *pers. comm*). A soprano pipistrelle casualty, which may indicate a nearby roost, was returned to St. John's Road/Mogden 2015 (D. Simmons *pers. comm* 2016).

Table 1: Status of bats recorded in the local catchment.

Species	Frequency in London	Main roost sites
Common pipistrelle	Common	Buildings nearby (LBG) Roosts in buildings
Soprano pipistrelle	Common	Buildings and trees especially near water (LBG).
Daubenton's bat	Becoming less common in the Greater London area (Briggs, et a , 2007)	Trees, structures and underground sites Hibernation site at Cavalry Tunnel LBG data
Noctule bat *Nyctalus noctula*	Becoming less common in London	roosts in trees

Adapted from Mitchell-Jones (2007) LBG=London Bat Group records

Walkover survey

3.6 Mogden Sewage Works (28.7.16): Poplar and oak trees on top of the ridge around Mogden SW contain some woodpecker holes. There are few opportunities in office buildings although two bat droppings were found on a window ledge of the Administration Block (east elevation) during a visit to the roof and tower. Light pollution onto PRF's is a limiting factor.

3.7 Mogden to Riverside Walk: notable lack of tree PRF's until Woodlands. Good foraging opportunities (insects) lots of starlings, goldfinches and house sparrows noted. Good water quality, stream macrophytes include patches of amphibious bistort. Badgers are present in this part of the corridor.

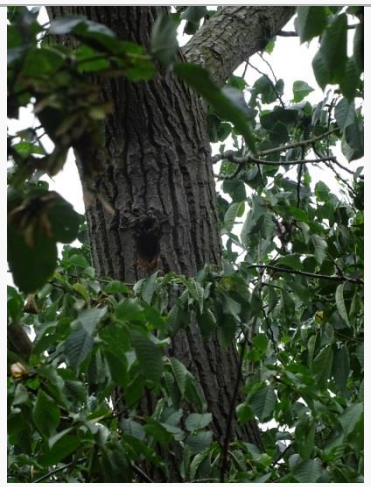
3.8 Riverside walk-St. Johns Park: Lack of PRF's except in housing and Plane trees in St. Johns Park and St John's church. Homogeneity of habitat (variation in grassland mowing). Access to the river not possible at Isleworth MOT Centre. River heavily shaded along Shirehorse Way, lack of macrophytes and plastic rubbish. Heron and moorhen. Lime tree suitable for siting an Anabat at Watney's bridge.

3.9 Gumley House (historic building + 10 acres) - Silverhall Park: High quality site with veteran trees with multiple PRF's including an ice well (opportunity for rubbish removal and insertion of bat bricks). Unfortunate loss of trees around the perimeter allowing spillage from street lighting. Recent collapse of mulberry trees. Opportunity for siting an Anabat on opposite side of river.

3.10 Silverhall to Isleworth Ait: Brightly lit although Georgian and Victorian historic buildings, often behind high walls including Warkworth House (1899); and All Saint's Church (only tower original) with associated woodland lime copse.

Table 2. Photographs –Trees

Photograph 1. PRF's St John's Gardens



Photograph 2. Mogden SW PRF's around perimeter trees

Photograph 3. Riverside walk- overhanging vegetation creates shading against light pollution- and safe roosting opportunities for ducks.

Photo 4 Collapsed Mulberrry Tree Silverhall Park

Table 3. Photographs Built environment: structures

Photograph 1. Dukes river encased in concrete at Mogden SW

Photograph 2. Ice well Silverhall Park

Photograph 3. Mill Platt: possible Daubenton's roost on the Thames- side of the bridge

Photograph 4 Brickwork at Watney's bridge

Emergence and activity surveys

3.11 Four bat species were recorded during the three hand held detector surveys and static bat detector surveys. Two species were briefly recorded during the latter: common and soprano pipistrelle bat, Daubenton's bat and a *Nyctalus* species possibly a Leisler's bat.

3.12 Two bat roosts were confirmed: a pipistrelle roost in residential property around St. John's Park and a small roost of Daubenton's bats at the Church Lane Bridge by the confluence with the Thames.

First survey 9.6.16: Transects at St. John's Park and Silverhall Park activity at Isleworth Ait. C. Slack, D. Simmons, A. Fure, R. Gray, A. Smyk

3.13 During the first survey there was a very low level of bat activity. A pipistrelle bat was thought to emerge from a property around the perimeter of St. John's Park.

3.14 At Silverhall park the first bat was encountered at (sunset + 17 minutes). Common and soprano pipistrelle bats were recorded hugging the riverside.

3.15 No bat activity was recorded over the Thames.

Second survey 13.7.16: Transects at Oak Lane, Mogden and Riverside Walk D. Simmons, A. Fure, R. Gray

3.16 The first bats encountered were the early emerging pipistrelle bats at the bridge between Woodlands and Octavia Road (sunset+ 11 minutes). Here there was continuous foraging.

3.17 Bats arrived much later at the Mogden Transect (sunset + 36 minutes). Insects were concentrated near the entrance to the culvert which is where the bat activity was located.

Third survey 9.8.16 Sunset 20.34 Transects at Isleworth Ait, St John's Park. R. Gray, C. Slack, D. Simmons, A. Fure.

3.18 St. John's Park: A soprano pipistrelle roost was confirmed at St John's Park. Emergence was from a house on the east side of the park at 20.57, where it had been recorded during the first survey. Several soprano pipistrelle passes were recorded around the park.

3.19 Isleworth Ait: the first bats were recorded moving from south to north at 20.57. Foraging began around the mill pond after 21.12. The pond was affected by light spillage. Occasional pipistrelle commuting passes were noted towards Silverhall Park.

3.20 A Daubenton's roost was thought present at the Church Lane bridge Isleworth as four passes were noted from 21.15 (sunset + 41minutes). This is within the emergence time for this species. Note that Church Street has recently been closed to through traffic.

Fourth survey 1.9.16 Mogden to Riverside walk. Sunset 19.46 D. Simmons, L. Blake, A. Fure, R. Gray, G. Gray, K. Knight.

3.21 Two species were recorded during the survey, both common and soprano pipistrelle bats. The earliest detected was a soprano pipistrelle bat at Riverside Walk at 20.07 (sunset+ 21 minutes).

3.22 At 20.15 a soprano pipistrelle was seen flying across the road from west to east. All subsequent passes were of commuting bats and none remained to feed until 20.30 when common pipistrelles were detected.

3.23 Occasional commuting soprano pipistrelles were detected along the southern section of Riverside Walk followed by some foraging of common pipistrelle bats. The level of activity was described as low.

3.24 At Mogden: the first soprano pipistrelle bat at 20.10, a single pass, possibly coming from the direction of the tunnel. After a brief gap, then constant activity started around 20.17 with feeding along the road running in front of the power house (at right angles to the river); along the road and up and in front of the trees.

3.25 Activity later increased with social calls. Common pipistrelles were later arrivals. Bats were feeding all along the road/tree line and over the settlement tanks and recorded on the west side of the tunnel.

3.26 There was less activity at the Tesco end (Mogden Lane) with the first bats detected at 20.20 (G.G and K.K.). Activity at Mogden was described as moderate with social activity occurring at sunset + 45minutes.

Courtesy L. Blake.

Static bat detector

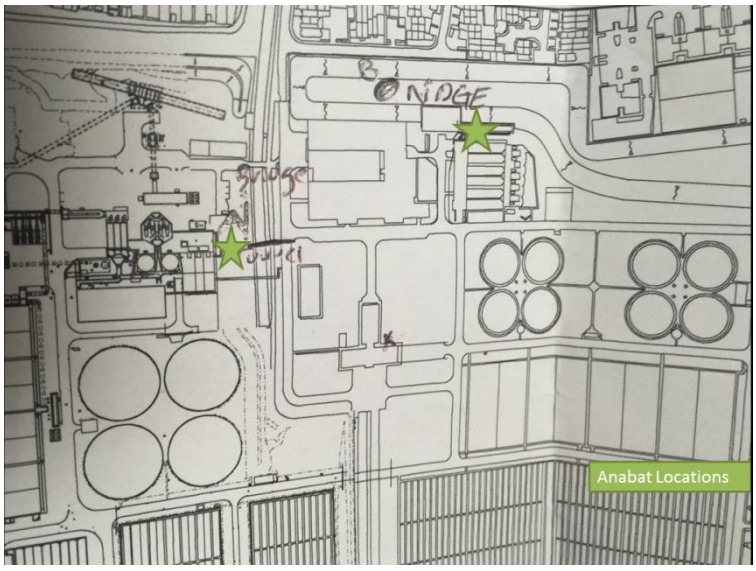
3.27 The Anabat recorded four bat species in total: common and soprano pipistrelle; a *Myotis* bat determined to be a Daubenton's bat and a *Nyctalus* bat species most likely a Leisler's bat.

3.28 The Anabat static bat detector left chained to a Lime tree near the Watney's bridge for 4 nights 9.6.16-13.6.16 detected very few bat passes. These were predominately of soprano pipistrelle with two common pipistrelle passes. On the first night there was only one registration but the second night had passes throughout the night.

3.29 At the Pedestrian bridge at Riverside walk (the night during the emergence survey 13.7.16); the first bat was encountered at 21.30. Three species were recorded with one pass of a *Nyctalus* bat in addition to common and soprano pipistrelle bats.

3.30 A large number of bat registrations were encountered by the Anabat at Silverhall Park (8 night's 20.7.16-28.7.16); this included common and soprano pipistrelle bat, all through the night until 5am. On the fifth night there were several passes of a *Myotis* species (most likely Daubenton's bat) after midnight. On the sixth night there was a *Nyctalus* bat species thought to be a Leisler's bat.

3.31 Two species were recorded Mogden SW DNR east side of works 28.7.16-3.8.16. Bats arrived late at the site but continued to forage throughout the night. Despite the long sample no Daubenton's passes were detected. Song- flighting activity was recorded.



3.32 Two species were recorded on the western ridge 4.8.16-10.8.16. The activity was similar inasmuch that the bats arrived late at the site and continued to forage all through the night.

Lighting

3.33 During the emergence surveys, high levels of street lighting were encountered. New LED lights were installed about a year ago. These have a sloping luminaire with no side-shields so the light travels horizontally through the environment. Lights should be angled downward to prevent glare and spillage around natural features.

3.34 All Saint's Church is flood lit (refer to GiGL newsletter September, 2016).

3.35 The open space at the east side of the pedestrian bridge at Riverside Walk is over-lit and acts as a barrier to animal movement. No bats were encountered at this location.

3.36 In addition, trees have been removed from the west side of Riverside Walk and new LED lights and tarmac (see photo) surveys have created an urban environment. Some of the path lights are more suited to roads than pathways.

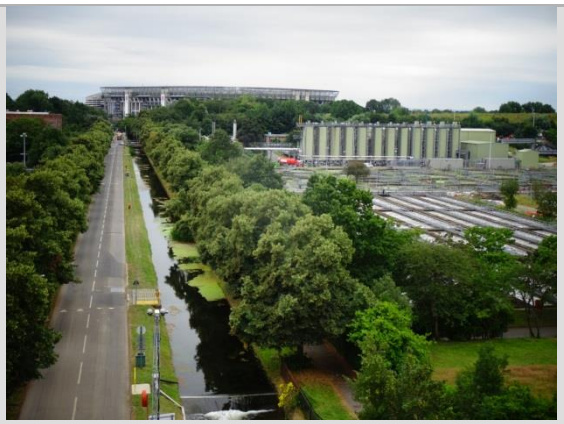
3.37 Oak lane LED lighting is also very bright (brighter than on the Thames Water operation site). However new LED street lighting has been fitted along the road at the Mogden Lane entrance recently but not yet wired in.

Table 3. Photographs –Light and dark

Photograph 1. Light along church road causes spillage and glare around the mill basin

Photograph 2. Removal of trees and new tilted LED lights urbanising the Riverside Walk

Photograph 3. Dark woodland ride at the top of the bund Mogden SW (where an Anabat was sited).



Photograph 4 Birds-eye view of the well-lit Dukes river from the top of the main TW offices looking towards the Rugby stadium

ASSESSMENT

Discussion of Findings

Bat Roosting Habitat

4.1 Four species were recorded during the surveys: common and soprano pipistrelle, Daubenton's and a *Nyctalus* species most likely a Leisler's bat. The latter was a brief overhead registration only.

4.2 Two roosts were confirmed: a property on the east side of St John's Park, and a Daubenton's roost possibly under the bridge at Church Street.

4.3 A maternity colony of soprano pipistrelle bats may have been present during the second survey at the bridge between Woodlands and Octavia Road. This is speculative but arises from the early presence of bats at sunset + 11minutes.

Bat Commuting and Foraging Habitat

4.4 There were no early bats at Mogden sewage works, but later in the evening bats remained to feed throughout the night making this an important foraging site.

4.5 The catchment was assessed as functioning as a commuting route between other local habitats and a foraging resource that is of high value to roosting bats in the local area.

Other Protected and Notable Species

4.6 Badgers are found in the corridor. Amphibious bistort was noted along Riverside Walk.

Conclusion

4.7 Lighting and other factors militate against bats being able to take advantage of PRF's along the river corridor. It does not prevent pipistrelle bats from reaching foraging areas. Daubenton's bats move from the Thames as far as Silverhall Park. Lighting at Mogden Sewage Works may act as a barrier for this species.

4.8 The increasing built-up footprint of developments, including artificial lighting, could have non-linear consequences for local bat populations. Particularly, there is concern where no positive measures for the encouragement of either Daubenton's or brown long-eared bats, both of which are present in the 'greener' parts of most London boroughs (Bat Atlas, LBG 2015).

4.9 Any implication that bat populations benefit from "lights as a food resource precisely because they draw invertebrates in," should not be tolerated. Bats feed from streetlamps, at great risk to themselves, only because their natural environment is already so depleted of accessible food sources. It is a sign of a degraded environment.

4.10 Without 'reining in 'the urbanisation, particularly along riverside walk, the corridor will become developed beyond the tolerance of bats and other species when their 'tipping point' will be exceeded.

4.11 As the wavelength of light decreases, the attractiveness to insects increases. High pressure sodium does attract some insects but on average 57% fewer insects than a Mercury vapour light source. This can lead to demographic insect losses and a third of the insects that fly around light will damage themselves or die leaving less prey for foraging bats (Eisenbeis, 2006; Bruce White and Shardlow, 2011).

4.1 Removal of areas of vegetation can lead to an increase in urbanisation. The extent and density of urbanized land-use is increasing, with implications for habitat quality, connectivity and city ecology. Little is known about 'densification' thresholds for urban ecosystem function and the response of nocturnal mammals (Hale *et al,* 2012).

4.2 In his study, common pipistrelle activity exhibited a relationship with the area of built land-cover which was much reduced beyond the threshold of ~60% built surface, implying the existence of a threshold or tipping point, of which light and light pollution plays a part.

RECOMMENDATIONS

Mitigation

4.3 Measures to maintain the ecological functionality of the catchment as a valuable commuting and foraging resource for bats, and increase roosting potential are provided in table 5.

Table 5. Mitigation Measures

Location	Bat Roost Potential	Summary Mitigation
Mogden	Buildings	Too well- lit to be of interest for roosting bats.
Riverside walk	Old/dead trees	New LED luminaires should be repositioned and removed to prevent horizontal travel of light. Additional screen planting is necessary along the verge to prevent light spillage onto water.
Silverhall park	Ice well Tree holes	Additional trees could be planted around the perimeter to prevent light pollution into the park; The ice well could be emptied of rubbish and bat bricks installed.
Mill Plat	Masonry in walls of mill pond/river wall and bridge	Light pollution from light on the northern side of the basin should be attenuated with a light shield (or switched off).
General	Historic buildings	More bat surveys should be requested for building alterations as there is currently a lack of examples on the planning file.

4.4 All species of bat found in Britain, and their roosts, receive protection under Schedule 2 of the Conservation of Habitats and Species Regulations 2010 (as amended) and Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). These legislative tools make it an offence for any person to:

- Deliberately **capture, injure or kill a bat**;
- Intentionally or recklessly **destroy a breeding or resting place (roost) of a bat**; and,
- Intentionally or recklessly **obstruct access for bats to a roost** or to otherwise significantly alter the structure of a roost so as to render it unsuitable to support roosting bats.

REFERENCES

Author's data, London Bat Group data and LBG Atlas2000-2016

Bruce White, C. and Shardlow, M. 2011. A review of the impact of artificial light on invertebrates. Buglife;

Briggs, P.A., Bullock, R. J., Tovey, J., (2007) Ten years of bat monitoring at the WWT London Wetland Centre, compared with National Bat Monitoring Programme trends for Greater London, London Naturalist no 86 London Natural History Society

Eisenbeis, G. 2006. Artificial night lighting and insects: attraction of insects to streetlamps in a rural setting in Germany. In Rich, C. and Longcore, T. eds Ecological consequences of artificial night lighting: 345–364. Washington, Island Press

Garland L., & Markham S., (2007) Is important bat foraging and commuting habitat legally protected?

Hale *et al,* 2012 The ecological impact of city lighting scenarios: exploring gap crossing thresholds for urban bats, in *Global Change Biology*, John Wiley & Sons Ltd., 21, 2473.

HMSO (2000) Countryside and Rights of Way Act 2000. HMSO, London.

HMSO (2006) Natural Environment and Rural Communities Act 2006. HMSO, London.

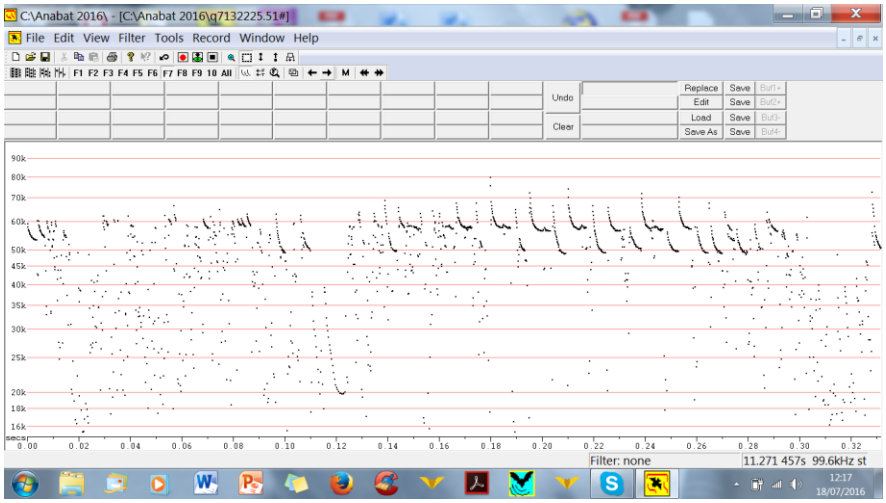
HMSO (2010) Conservation of Habitats and Species Regulations 2010. HMSO,

http://www.magic.defra.gov.uk

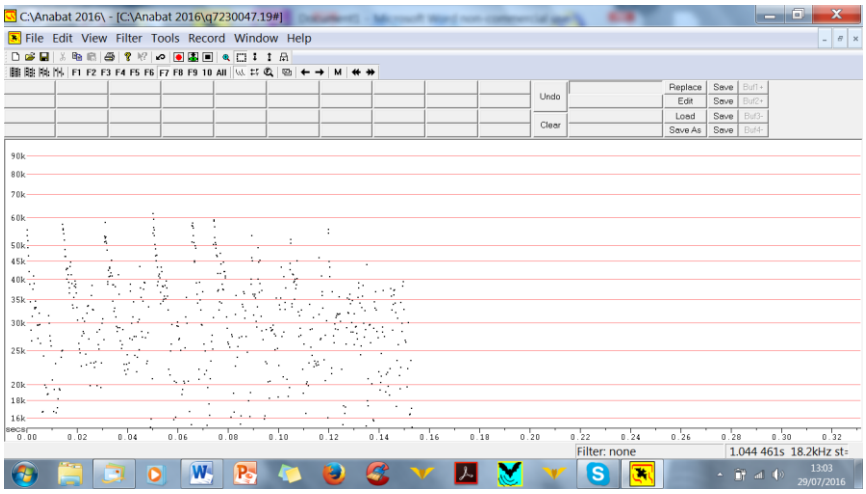
London Bat Atlas 2015 London Bat Group

Mitchell –Jones A.J. & McLeish A. P. (Ed's). (2004) **'**Bat workers Manual' JNCC

Appendix



2 species of Pipistrelle and social call in the middle DNR 22.25, 13.7.16



Above and below Myotis Silverhall park 00.47 - 00.49 23.7.16