

**A Bat Assessment of Scholarstown Road,
and an Evaluation for
Potential Impacts of the Proposed Housing
on the Bat Fauna**



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Introduction

Bats are a widespread element of the Irish fauna. They are known to occur from much of the rural landscape, but they are also present within the urban environment and here they occupy buildings and occasionally trees for short or long periods. Houses and other buildings are a vital element of the annual cycle of all Irish bat species and at no time more so than the period May to August, but many bats may also avail of buildings as hibernation sites. Summer is the easiest time to identify the presence of bats due to the often-increased numbers present, the high level of activity and the milder, drier weather allowing bat signs to accumulate.

The presence of bats in winter may be impossible to determine in many buildings unless there is adequate access to confirm either signs of bat usage or the presence of the bats themselves. Signs may still be available to confirm this at a later stage in the year if the roost area is accessible to a trained observer.

Changes to a site including demolition, extension to or modification of existing buildings as well as new construction may remove or modify bat roosting sites and may also affect their feeding and commuting activity.

Bats are protected by Irish and EU law and to prevent unlawful injury or death, it is essential that a full understanding of the site is available in advance to protect the resident bats from unintentional harm and to create a pathway by which a legal derogation and exemption may be designed in consultation with the National Parks and Wildlife Service of the Department of Culture, Heritage and the Gaeltacht.

The site at Two Oaks, Scholarstown Road, Knocklyon is a large green site in urban terms and there are a number of mature trees within the fields surrounding a bungalow and a two-storey house. The proposed development would see the removal of these houses and a set of stables to the northern edge of the site. This assessment will address the potential for bat roosting within the buildings and trees and the level of bat feeding and commuting within the site and around the surrounding vegetation within which the project is proposed.

Methodology

The proposed site of housing on Scholarstown Road was examined on 31st May 2019 in daylight and again by means of a bat detector survey from prior to sunset (which was at 21.41 hours) for one and a half hours approximately and again prior to sunrise (05.05 hours) on 1st June, 2019 for one hour. The site was visually inspected for the presence of bats with the aid of a high-powered beam, a GoScope Premium fibrescope by examination of all accessible areas of the existing buildings. This included entry into all attics.

All walls and windows and doors of the single storey bungalow and the two-storey house were fully examined for evidence of bat occupancy or previous usage indicated by the presence of bat droppings or staining. The stables within the site were examined for any evidence of bat occupancy prior to sunset and again during the night.

The mature trees within the grounds were examined from ground level for evidence of bats and any audible sounds of larger bat groupings were sought (bats may become noisier in the summer if the temperatures are high or prior to emergence).

The houses were examined during the night and prior to dawn internally and externally both for bat activity and for any evidence of previous occupancy by way of droppings or staining or corpses. The trees were examined for any evidence of emerging or returning bats.

All outbuildings including a garden shed, stables within the site were examined for bats.

The bat detector assessment that commenced prior to sunset was undertaken equipped with an Echometer3 (EM3) full spectrum receiver with a screen displaying the ultrasonic signals received and also recording all ultrasonic signals received to a SD card for later analysis. The surveyor observed the single storey bungalow from prior to sunset after which time the outbuildings and mature oak trees were assessed. Once the level of bat activity at the bungalow had been established, the two-storey building was examined.

Surveying continued for the next 1.5 hours within the site and involved a walked transect that considered all hedgerow and mature trees as well as approaching all buildings for continued assessment of bat activity around them

A second detector, a Songmeter2BAT+ (SM2) was positioned on a fence post along hedgerow leading from the stables and away from the bungalow. This SM2 was later positioned at the single mature oak towards the rear of the site following the emergence assessment and remained here up to sunrise.

A third detector (another SM2) was placed at bungalow at sunset to evaluate bat activity here. This SM2 was later moved up to the edge of the two-storey house to continue evaluation here throughout the night and to provide any evidence of returning bats approaching sunrise.

Survey Constraints

Weather conditions in late May and early June 2019 were mixed and some nights were cool approaching cold by sunrise. However, on the night of survey, weather conditions were well suited to bat activity at sunset and there was no wind (a slight breeze) or rain. Morning temperatures were mild, allowing continued bat activity. The colder mornings typical of May 2019 did not hamper the current assessment.

This is a representative survey of the site given the size of the site and the availability of habitat suitable for bats within and around the site.

Existing Environment

Species of bat roosting within the Two Oaks site Grid Reference of site O1253226877

None

All bats exited the site approaching sunrise. It was evident from the direction of movement of activity approaching sunrise that Pipistrelles were roosting close to or within the neighbouring estate house (Rosmore House) and left the site primarily flying westwards along the perimeter in the northwest. Other bats along the edge of the avenue to Rosmore House were also noted flying northerly. Leisler's bats were seen to exit the site in a southerly direction and this species may be roosting quite a distance from the site.

Species of bat feeding within the site

Leisler's bat	<i>Nyctalus leisleri</i>
Common Pipistrelle	<i>Pipistrellus pipistrellus</i>
Soprano Pipistrelle	<i>Pipistrellus pygmaeus</i>

The most obvious bat activity within the site was of Leisler's bats as this species has a strong voice and flies in open areas but there was also more sustained activity of this species than would be noted in such a small area within an urban area. Leisler's bats were noted very early into observations (21.43 hours with sunset at 21.41 hours) and was also the last species noted within the site prior to sunrise (last bat noted at 04.40 hours).

Common Pipistrelles were noted feeding along all hedgerow and less commonly in the open and this species was first noted at 22.06 hours and final signals at 04.26 hours. Soprano pipistrelle activity was much lower but was first noted at 22.01 hours in the vicinity of the bungalow.

BCIreland data: search results 11 Jun 2019					
Search parameters: Roosts Transects Ad-hoc observation sites with observations of all bats within 1000m of O1253226877.					
Roosts					
Name	Grid reference	Grid ref easting	Grid ref northing	Address	Species observed
60 Cremore	O1227	312000	227000	Templeogue ; Dublin 16;	Unidentified bat
Ad-hoc observations					
Survey	Grid reference	Grid ref easting	Grid ref northing	Date	Species
EIA survey- Paul Scott	O130273	313000	227300	21/10/2010	Common pipistrelle

Modifications or Features introduced by the proposed development

✦ Demolition of all existing buildings

There will be demolition of all structures and outbuildings within the site. This presents the potential for a long-term slight to moderate negative impact if a roost were destroyed without any mitigation. It would constitute a breach of the Wildlife Act 1976 and 2000 and the Habitats Directive and associated statutory instruments.

None of these buildings has been shown to be a bat roost.

✦ **Vegetation alterations**

There will be a requirement to remove some of the vegetation from the site to facilitate the project. This will include two mature oak trees that have been classified as Category U, which are in poor condition and are recommended for removal by the tree specialist. These are tree tag 885 (a dead oak) and 872 (infected with *Meriplus giganteus*).

✦ **Lighting**

There will be an increased level of lighting as there will be increased density of housing. There will be increased lighting for the construction and operation of the new buildings. This would lead to the disturbance of light intolerant or shy species while the more urban-adapted species will be affected to a lesser extent.

Pipistrelles and Leisler's bats are less affected by light than all other species, but Pipistrelles will avoid light where possible. Leisler's bats may be attracted to lighting later into the night-time to feed on moths that themselves are attracted or disorientated by the lights.

Impacts of The Proposed Development

Potential roost loss

Demolition creates a risk of roost loss. This could lead to injury or death to a species protected under the Wildlife Act and Habitats Directive (if a roost were present and not identified) and would therefore constitute a breach of the Irish and EU legislation. There is no evidence that the buildings are in use as bat roosts from the survey of the end of May / start of June 2019. Bats move in and out of roosts on a regular basis and individuals may be present at times other than a specific survey without any evidence.

Disturbance from lighting

Lighting will be utilised for two different functions:

- 1) Access and safety and 2) Security and policing. The former is to allow ease of use at night. The latter is to ensure a perceived higher security level. This may affect light-intolerant bat species during foraging and if directed at emergence points would affect all bat species, even those that will feed in illuminated areas.

Species such as Leisler's bat and common pipistrelles are less affected than almost all other Irish bat species and this would not be a significant impact. At worst, it would be a permanent moderately negative impact.

Reduced Feeding

Reduced vegetation including the removal of any of the trees within the site may lead to reduced insect abundance. On the night of survey, three species were noted, two on a great number of occasions.

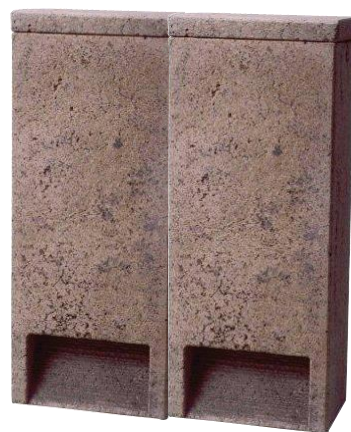
This will be a permanent slight negative impact.

Proposed Mitigation

Incorporation of 12 bat boxes (Schwegler types 2F and 2FR) is proposed into the site to provide bat roost opportunities. All bat boxes must be *unlit* and should be at least 2.5 metres above ground height and preferably 3 metres or higher.



2F



2FR tubes lined up and interconnecting

Plate 1: Schwegler Bat Boxes

The 2F bat boxes shall be installed on mature trees that are to be retained and the 2FR bat tubes are to be incorporated into buildings. Three boxes shall be attached to each of two trees unless there are better opportunities created by modifying this arrangement according to the bat specialist.

All mature trees shall be checked for the presence of bats prior to felling

All the mature trees within the site shall be examined for the presence of bats prior to felling by a bat specialist. Should bats be noted in any tree, it is a protected structure and a derogation must be sought as discussed above. Furthermore, should buildings still be in place by the end of 2019, they must be examined by a bat specialist for the presence of bats. If bats are present, the building is a protected structure and derogation must be acquired from NPWS to allow exclusion of bats under specific conditions as proposed or supported by NPWS.

Planting of vegetation

Where there is an opportunity to provide vegetative cover, native and local plant species should be employed including typical plants such as oak (the greatest value for most wildlife), hawthorn, blackthorn, elder, gorse, bramble, in addition to other species such as dog rose with an encouragement of species such as *Clematis* and other species attractive to moths.

Lighting

Lighting should be controlled to avoid light pollution of green areas and should be targeted to areas of human activity and for priority security areas. Motion-activated sensor lighting is preferable to reduce light pollution. None of the remaining mature trees or trees proposed for planting shall be illuminated. The lighting proposal for this development (Residential Lighting Spill Analysis Rev 06 2nd October 2019 by O'Connor Sutton Cronin) has taken the following recommendations into account while adhering to Council requirements.

- Dark corridor for movement of bats along the grounds of the site. Lighting should be directed downwards away from the treetops. The lighting report states “It is important to maintain Dark Zones for foraging bats in areas where lighting is not necessary. However, where lighting is required, this lighting will be placed at a minimum height using the lowest lux value permitted for health and safety.” P4 or S4 for traffic must be an average of 5 lux with a minimum of 1 lux
- All luminaires shall lack UV elements when manufactured and shall be LED
- A warm white spectrum (ideally <2700 Kelvin but as low as the Council limitations allow) shall be adopted to reduce blue light component. The lighting chosen achieves 3000 Kelvin.
- Luminaires shall feature peak wavelengths higher than 550nm
- Tree crowns shall remain unilluminated

- Planting shall provide areas of darkness suitable for bats to feed and commute through the site.

IMPACTS OF THE DEVELOPMENT AFTER MITIGATION

It is predicted that this development will have no direct impact upon the conservation status of bats. There will be a slight loss in feeding opportunities for bats due to vegetation loss and increased building density. Over time, this will reduce as vegetation develops.



Area surveyed on Scholarstown Road for bat roosting, feeding and commuting activity

Appendices

Figure 1 depicting the transect walked within the proposed development site

Figure 2 depicting bat activity within the site on the date of survey (31st May)

Trees with high roost potential within the site Tables of bat activity

Spectrograms of bat signals recorded

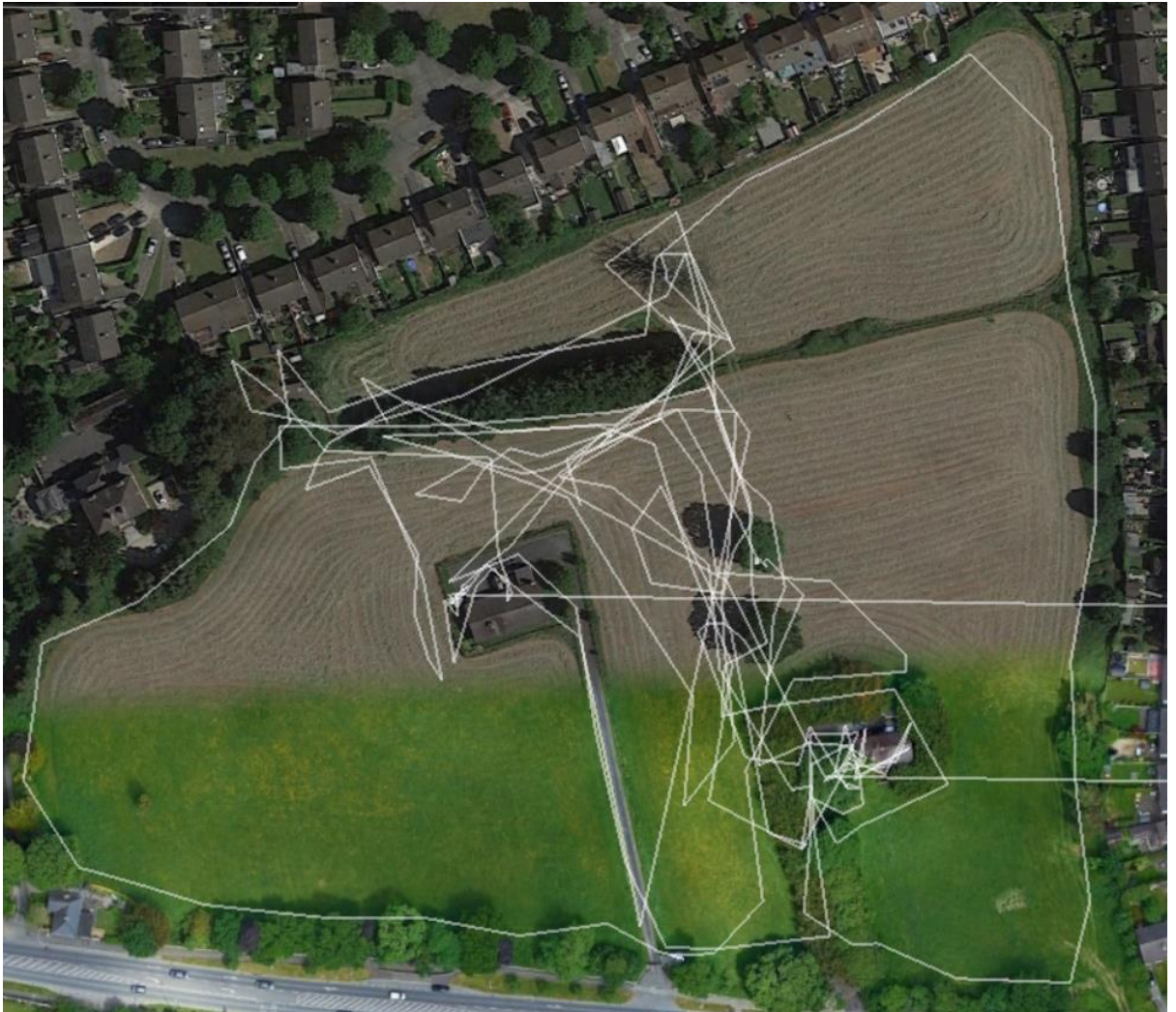


Figure 1 depicting the transect walked within the proposed development site



Figure 2: Bat activity within the Two Oaks site 31st May to 1st June 2019

Legend

- | | | | |
|----------------|---|--------------|----------------------------|
| Yellow arrows | Leisler's bat activity | Green arrows | Common pipistrelle |
| Yellow paddle | Leisler's bat signals | Green paddle | Common pipistrelle signals |
| Straight lines | Direction in which bats were moving when observed | | |
| Yellow oval | Main area of activity for Leisler's bat | | |



Trees with high roost potential within the site



Figure 3: Locations for the 12 bat boxes proposed for the site

It is proposed that six bat boxes (in the yellow ovals above -Schwegler 2FR bat tubes x 2 aligned together) would be provided in the area above the apartment lifts, three on the mature tree in the green area and three on the tree towards the south-eastern rear of the site (green ovals above)

Bat activity recorded on a SM2 monitor (bungalow at dusk and two-storey house at dawn)

Date	Time	Auto Id	Manual Id
31/05/2019	21:43:38	Leisler's Bat	Leisler's Bat
31/05/2019	21:44:08	Leisler's Bat	Leisler's Bat
31/05/2019	21:44:38	Leisler's Bat	Leisler's Bat
31/05/2019	21:45:08	Leisler's Bat	Leisler's Bat
31/05/2019	21:45:38	Leisler's Bat	Leisler's Bat
31/05/2019	21:46:08	Leisler's Bat	Leisler's Bat
31/05/2019	21:48:38	Leisler's Bat	Leisler's Bat
31/05/2019	21:49:08	Leisler's Bat	Leisler's Bat
31/05/2019	21:53:38	Leisler's Bat	Leisler's Bat
31/05/2019	21:54:08	Leisler's Bat	Leisler's Bat
31/05/2019	21:54:38	Leisler's Bat	Leisler's Bat
31/05/2019	21:58:08	Leisler's Bat	Leisler's Bat
31/05/2019	21:59:08	Leisler's Bat	Leisler's Bat
31/05/2019	21:59:38	Leisler's Bat	Leisler's Bat
31/05/2019	22:00:08	Leisler's Bat	Leisler's Bat
31/05/2019	22:00:38	Leisler's Bat	Leisler's Bat
31/05/2019	22:01:08	Leisler's Bat	Leisler's Bat
31/05/2019	22:01:38	Leisler's Bat	Soprano Pipistrelle Leisler's Bat
31/05/2019	22:02:08	Leisler's Bat	Leisler's Bat
31/05/2019	22:02:38	Leisler's Bat	Leisler's Bat
31/05/2019	22:03:08	Leisler's Bat	Leisler's Bat
31/05/2019	22:03:38	Leisler's Bat	Leisler's Bat
31/05/2019	22:04:08	Leisler's Bat	Leisler's Bat
31/05/2019	22:04:38	Leisler's Bat	Leisler's Bat
31/05/2019	22:05:08	Leisler's Bat	Leisler's Bat
31/05/2019	22:08:38	Leisler's Bat	Common Pipistrelle Leisler's Bat
31/05/2019	22:09:08	Common Pipistrelle	Common Pipistrelle Leisler's Bat
31/05/2019	22:09:38	Common Pipistrelle	Common Pipistrelle Leisler's Bat
31/05/2019	22:10:08	Leisler's Bat	Leisler's Bat
31/05/2019	22:10:38	Leisler's Bat	Leisler's Bat
31/05/2019	22:11:08	Leisler's Bat	Leisler's Bat
31/05/2019	22:12:08	Common Pipistrelle	Common Pipistrelle Leisler's Bat
31/05/2019	22:12:38	Common Pipistrelle	Common Pipistrelle Leisler's Bat
31/05/2019	22:13:08	Common Pipistrelle	Common Pipistrelle Leisler's Bat
31/05/2019	22:13:38	Leisler's Bat	Leisler's Bat
31/05/2019	22:14:08	Leisler's Bat	Leisler's Bat
31/05/2019	22:14:38	Soprano Pipistrelle	Soprano Pipistrelle Leisler's Bat
31/05/2019	22:15:08	Soprano Pipistrelle	Soprano Pipistrelle Leisler's Bat
31/05/2019	22:15:38	Soprano Pipistrelle	Soprano Pipistrelle Leisler's Bat
31/05/2019	22:16:08	Leisler's Bat	Soprano Pipistrelle Leisler's Bat
31/05/2019	22:16:38	Common Pipistrelle	Common Pipistrelle Leisler's Bat
31/05/2019	22:17:08	Leisler's Bat	Common Pipistrelle Leisler's Bat
31/05/2019	22:17:38	Leisler's Bat	Common Pipistrelle Leisler's Bat
31/05/2019	22:18:08	Common Pipistrelle	Common Pipistrelle Leisler's Bat

31/05/2019	22:18:38	Common Pipistrelle	Common Pipistrelle Leisler's Bat
31/05/2019	22:19:08	Common Pipistrelle	Common Pipistrelle Leisler's Bat
31/05/2019	22:19:38	Common Pipistrelle	Common Pipistrelle Leisler's Bat
31/05/2019	22:20:08	Common Pipistrelle	Common Pipistrelle Leisler's Bat
31/05/2019	22:20:45	Common Pipistrelle	Common Pipistrelle
31/05/2019	22:21:15	Common Pipistrelle	Common Pipistrelle Leisler's Bat
31/05/2019	22:21:45	Common Pipistrelle	Common Pipistrelle Leisler's Bat
31/05/2019	22:22:15	Common Pipistrelle	Common Pipistrelle Leisler's Bat
31/05/2019	22:22:45	Common Pipistrelle	Common Pipistrelle Leisler's Bat
31/05/2019	22:23:15	Common Pipistrelle	Common Pipistrelle Leisler's Bat
31/05/2019	22:23:45	Common Pipistrelle	Common Pipistrelle Leisler's Bat
31/05/2019	22:24:15	Common Pipistrelle	Common Pipistrelle
31/05/2019	22:24:45	Common Pipistrelle	Common Pipistrelle
31/05/2019	22:25:15	Common Pipistrelle	Common Pipistrelle Leisler's Bat
31/05/2019	22:25:45	Common Pipistrelle	Common Pipistrelle
31/05/2019	22:26:15	Common Pipistrelle	Common Pipistrelle
31/05/2019	22:26:45	Soprano Pipistrelle	Soprano Pipistrelle Leisler's Bat
31/05/2019	22:27:15	Soprano Pipistrelle	Soprano Pipistrelle Leisler's Bat
31/05/2019	22:27:45	Common Pipistrelle	Common Pipistrelle Leisler's Bat
31/05/2019	22:28:15	Common Pipistrelle	Common Pipistrelle Leisler's Bat
31/05/2019	22:28:45	Common Pipistrelle	Common Pipistrelle
31/05/2019	22:31:00	Common Pipistrelle	Common Pipistrelle
31/05/2019	22:31:30	Common Pipistrelle	Common Pipistrelle
31/05/2019	22:32:00	Common Pipistrelle	
31/05/2019	22:32:30	Soprano Pipistrelle	
31/05/2019	22:33:00	Common Pipistrelle	
31/05/2019	22:33:30	Common Pipistrelle	
31/05/2019	22:34:00	Common Pipistrelle	
31/05/2019	22:34:30	Leisler's Bat	
31/05/2019	22:35:00	Common Pipistrelle	
31/05/2019	22:35:30	Leisler's Bat	
31/05/2019	22:36:00	Soprano Pipistrelle	
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31/05/2019	22:38:00	Common Pipistrelle	
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31/05/2019	22:42:30	Common Pipistrelle	
31/05/2019	22:43:00	Common Pipistrelle	
31/05/2019	22:45:00	Leisler's Bat	
31/05/2019	22:46:30	Common Pipistrelle	
31/05/2019	22:51:00	Common Pipistrelle	
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31/05/2019	23:21:00	Leisler's Bat	
31/05/2019	23:23:00	Soprano Pipistrelle	

31/05/2019	23:24:30	Leisler's Bat	
31/05/2019	23:30:30	Leisler's Bat	
31/05/2019	23:34:30	Soprano Pipistrelle	
31/05/2019	23:35:00	Soprano Pipistrelle	
31/05/2019	23:35:30	Soprano Pipistrelle	
31/05/2019	23:43:00	Leisler's Bat	
31/05/2019	23:50:00	Leisler's Bat	
31/05/2019	23:50:30	Leisler's Bat	
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01/06/2019	00:02:00	Common Pipistrelle	
01/06/2019	00:11:00	Leisler's Bat	
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01/06/2019	00:21:00	Common Pipistrelle	
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01/06/2019	01:44:30	Common Pipistrelle	
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01/06/2019	01:52:00	Common Pipistrelle	
01/06/2019	01:52:30	Common Pipistrelle	
01/06/2019	01:58:30	Leisler's Bat	
01/06/2019	02:05:00	Leisler's Bat	
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01/06/2019	02:25:30	Common Pipistrelle	
01/06/2019	02:26:00	Common Pipistrelle	

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01/06/2019	03:06:30	Leisler's Bat	
01/06/2019	03:07:00	Leisler's Bat	
01/06/2019	03:07:30	Leisler's Bat	
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01/06/2019	03:12:00	Common Pipistrelle	
01/06/2019	03:13:00	Leisler's Bat	
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01/06/2019	03:31:00	Common Pipistrelle	Common Pipistrelle
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01/06/2019	04:06:30	Leisler's Bat	Leisler's Bat
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01/06/2019	04:11:30	Leisler's Bat	Leisler's Bat
01/06/2019	04:12:00	Leisler's Bat	Leisler's Bat
01/06/2019	04:12:30	Leisler's Bat	Leisler's Bat
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01/06/2019	04:14:00	Noid	Common Pipistrelle Leisler's Bat
01/06/2019	04:15:00	Common Pipistrelle	Common Pipistrelle Leisler's Bat
01/06/2019	04:15:30	Leisler's Bat	Leisler's Bat

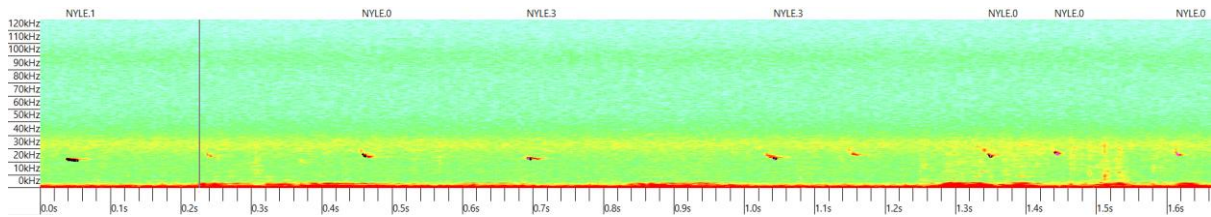
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01/06/2019	04:19:00	Leisler's Bat	Leisler's Bat
01/06/2019	04:19:30	Leisler's Bat	Leisler's Bat
01/06/2019	04:20:00	Leisler's Bat	Leisler's Bat
01/06/2019	04:20:30	Leisler's Bat	Leisler's Bat
01/06/2019	04:21:00	Leisler's Bat	Leisler's Bat
01/06/2019	04:21:30	Leisler's Bat	Leisler's Bat
01/06/2019	04:22:00	Leisler's Bat	Leisler's Bat
01/06/2019	04:22:30	Leisler's Bat	Leisler's Bat
01/06/2019	04:23:30	Leisler's Bat	Leisler's Bat
01/06/2019	04:24:00	Leisler's Bat	Leisler's Bat
01/06/2019	04:25:00	Leisler's Bat	Leisler's Bat
01/06/2019	04:25:30	Leisler's Bat	Leisler's Bat
01/06/2019	04:26:00	Leisler's Bat	Leisler's Bat
01/06/2019	04:26:30	Leisler's Bat	Leisler's Bat
01/06/2019	04:27:00	Leisler's Bat	Leisler's Bat
01/06/2019	04:27:30	Leisler's Bat	Leisler's Bat
01/06/2019	04:29:00	Leisler's Bat	Leisler's Bat
01/06/2019	04:34:00	Soprano Pipistrelle	Soprano Pipistrelle Leisler's Bat
01/06/2019	04:34:30	Leisler's Bat	Leisler's Bat
01/06/2019	04:35:00	Leisler's Bat	Leisler's Bat
01/06/2019	04:37:00	Leisler's Bat	Leisler's Bat

Bat activity recorded by a SM2 monitor (trees towards the north and mature oak tree in the north)

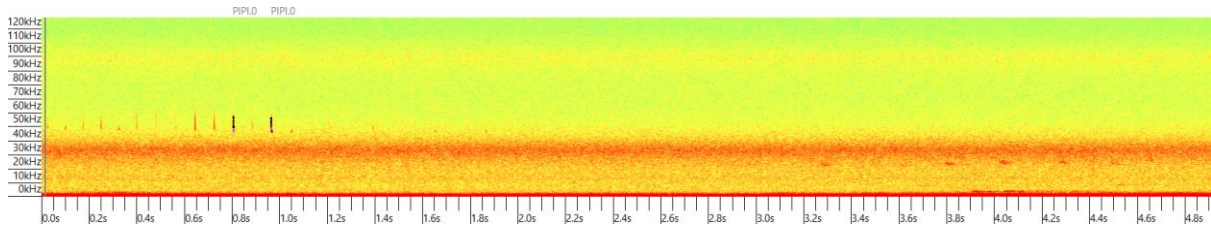
Date	Time	Auto Id	Manual Id
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31/05/2019	21:44:56	Leisler's Bat	Leisler's Bat
31/05/2019	21:45:26	Leisler's Bat	Leisler's Bat
31/05/2019	21:45:56	Leisler's Bat	Leisler's Bat
31/05/2019	21:46:26	Leisler's Bat	Leisler's Bat
31/05/2019	21:46:56	Leisler's Bat	Leisler's Bat
31/05/2019	21:47:26	Leisler's Bat	Leisler's Bat
31/05/2019	21:47:56	Leisler's Bat	Leisler's Bat
31/05/2019	21:49:26	Leisler's Bat	Leisler's Bat
31/05/2019	21:49:56	Leisler's Bat	Leisler's Bat
31/05/2019	21:54:26	Leisler's Bat	Leisler's Bat
31/05/2019	21:54:56	Leisler's Bat	Leisler's Bat
31/05/2019	21:55:26	Leisler's Bat	Leisler's Bat
31/05/2019	21:58:56	Leisler's Bat	Leisler's Bat
31/05/2019	21:59:26	Leisler's Bat	Leisler's Bat
31/05/2019	22:01:00	Leisler's Bat	Leisler's Bat
31/05/2019	22:01:30	Leisler's Bat	Leisler's Bat
31/05/2019	22:02:00	Leisler's Bat	Leisler's Bat
31/05/2019	22:02:30	Leisler's Bat	Leisler's Bat
31/05/2019	22:03:00	Leisler's Bat	Leisler's Bat
31/05/2019	22:03:30	Leisler's Bat	Leisler's Bat
31/05/2019	22:04:00	Leisler's Bat	Leisler's Bat
31/05/2019	22:04:30	Leisler's Bat	Leisler's Bat
31/05/2019	22:05:00	Leisler's Bat	Leisler's Bat
31/05/2019	22:05:30	Leisler's Bat	Leisler's Bat
31/05/2019	22:06:00	Leisler's Bat	Leisler's Bat
31/05/2019	22:06:30	Leisler's Bat	Leisler's Bat
31/05/2019	22:07:00	Leisler's Bat	Leisler's Bat
31/05/2019	22:08:00	Leisler's Bat	Leisler's Bat
31/05/2019	22:08:30	Leisler's Bat	Leisler's Bat
31/05/2019	22:09:30	Leisler's Bat	Leisler's Bat
31/05/2019	22:10:00	Leisler's Bat	Leisler's Bat
31/05/2019	22:10:30	Leisler's Bat	Leisler's Bat
31/05/2019	22:11:00	Leisler's Bat	Leisler's Bat
31/05/2019	22:11:30	Leisler's Bat	Leisler's Bat
31/05/2019	22:12:00	Leisler's Bat	Leisler's Bat
31/05/2019	22:12:30	Leisler's Bat	Leisler's Bat
31/05/2019	22:13:00	Leisler's Bat	Common Pipistrelle Leisler's Bat
31/05/2019	22:13:30	Leisler's Bat	Leisler's Bat
31/05/2019	22:14:00	Leisler's Bat	Leisler's Bat
31/05/2019	22:14:30	Leisler's Bat	Leisler's Bat
31/05/2019	22:15:00	Leisler's Bat	Leisler's Bat
31/05/2019	22:15:30	Leisler's Bat	Leisler's Bat
31/05/2019	22:16:00	Leisler's Bat	Leisler's Bat

31/05/2019	22:16:30	Leisler's Bat	Leisler's Bat
31/05/2019	22:17:00	Leisler's Bat	Leisler's Bat
31/05/2019	22:17:30	Leisler's Bat	Leisler's Bat
31/05/2019	22:18:00	Leisler's Bat	Leisler's Bat
31/05/2019	22:18:30	Leisler's Bat	Leisler's Bat
31/05/2019	22:19:00	Leisler's Bat	Leisler's Bat
31/05/2019	22:19:30	Leisler's Bat	Leisler's Bat
31/05/2019	22:20:00	Leisler's Bat	Leisler's Bat
31/05/2019	22:20:30	Leisler's Bat	Leisler's Bat
31/05/2019	22:21:00	Leisler's Bat	Leisler's Bat
31/05/2019	22:21:30	Leisler's Bat	Leisler's Bat
31/05/2019	22:22:00	Leisler's Bat	Leisler's Bat
31/05/2019	22:22:30	Leisler's Bat	Leisler's Bat
31/05/2019	22:23:00	Leisler's Bat	Leisler's Bat
31/05/2019	22:23:30	Leisler's Bat	Leisler's Bat
31/05/2019	22:24:00	Leisler's Bat	Leisler's Bat
31/05/2019	22:24:30	Leisler's Bat	Leisler's Bat
31/05/2019	22:25:00	Leisler's Bat	Common Pipistrelle Leisler's Bat
31/05/2019	22:25:30	Common Pipistrelle	Common Pipistrelle Leisler's Bat
31/05/2019	22:26:00	Leisler's Bat	Leisler's Bat
31/05/2019	22:26:30	Leisler's Bat	Leisler's Bat
31/05/2019	22:27:30	Leisler's Bat	Leisler's Bat
31/05/2019	22:28:00	Leisler's Bat	Leisler's Bat
31/05/2019	22:28:30	Leisler's Bat	Common Pipistrelle Leisler's Bat
31/05/2019	22:29:00	Leisler's Bat	Common Pipistrelle Leisler's Bat
31/05/2019	22:29:30	Common Pipistrelle	Common Pipistrelle Leisler's Bat
31/05/2019	22:30:00	Common Pipistrelle	Common Pipistrelle
31/05/2019	22:31:00	Noid	Common Pipistrelle
31/05/2019	22:32:30	Common Pipistrelle	Common Pipistrelle
31/05/2019	22:33:00	Common Pipistrelle	Common Pipistrelle
31/05/2019	22:33:30	Common Pipistrelle	Common Pipistrelle
31/05/2019	22:34:30	Leisler's Bat	Leisler's Bat
31/05/2019	22:35:00	Leisler's Bat	Leisler's Bat
31/05/2019	22:35:30	Leisler's Bat	Leisler's Bat
31/05/2019	22:36:00	Leisler's Bat	Soprano Pipistrelle Leisler's Bat
31/05/2019	22:36:30	Soprano Pipistrelle	Common Pipistrelle Soprano Pipistrelle Leisler's Bat
31/05/2019	22:39:00	Soprano Pipistrelle	Soprano Pipistrelle
31/05/2019	22:48:08	Common Pipistrelle	Common Pipistrelle
31/05/2019	23:19:00	Leisler's Bat	Leisler's Bat
31/05/2019	23:24:30	Leisler's Bat	Leisler's Bat
31/05/2019	23:25:00	Leisler's Bat	Leisler's Bat
31/05/2019	23:33:30	Leisler's Bat	Leisler's Bat
31/05/2019	23:50:00	Common Pipistrelle	Common Pipistrelle
31/05/2019	23:52:00	Common Pipistrelle	Common Pipistrelle
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31/05/2019	23:53:00	Soprano Pipistrelle	Soprano Pipistrelle

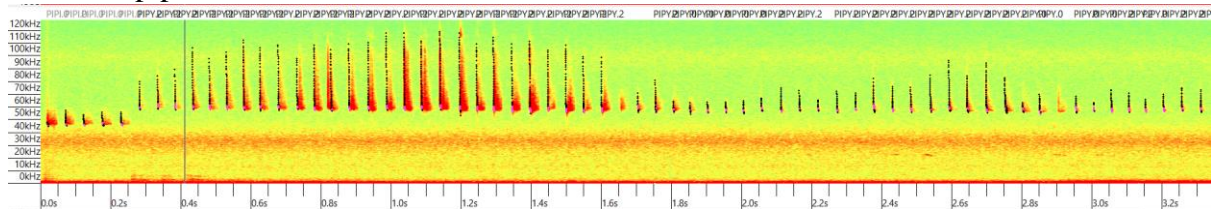
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01/06/2019	00:33:08	Leisler's Bat	Leisler's Bat
01/06/2019	00:34:08	Common Pipistrelle	Common Pipistrelle
01/06/2019	00:43:08	Leisler's Bat	Leisler's Bat
01/06/2019	00:55:38	Common Pipistrelle	Common Pipistrelle
01/06/2019	00:58:38	Common Pipistrelle	Common Pipistrelle
01/06/2019	01:51:00	Common Pipistrelle	Common Pipistrelle
01/06/2019	02:16:30	Common Pipistrelle	Common Pipistrelle
01/06/2019	02:23:00	Soprano Pipistrelle	Pip
01/06/2019	02:23:30	Common Pipistrelle	Common Pipistrelle
01/06/2019	02:41:38	Common Pipistrelle	Common Pipistrelle
01/06/2019	02:46:00	Common Pipistrelle	Common Pipistrelle
01/06/2019	02:46:30	Common Pipistrelle	Common Pipistrelle
01/06/2019	03:13:30	Leisler's Bat	Leisler's Bat
01/06/2019	03:27:30	Common Pipistrelle	Common Pipistrelle
01/06/2019	03:28:00	Common Pipistrelle	Common Pipistrelle
01/06/2019	03:39:38	Leisler's Bat	Leisler's Bat
01/06/2019	03:44:00	Leisler's Bat	Leisler's Bat
01/06/2019	03:48:30	Leisler's Bat	Leisler's Bat
01/06/2019	03:58:00	Common Pipistrelle	Common Pipistrelle
01/06/2019	03:58:30	Leisler's Bat	Leisler's Bat
01/06/2019	04:02:30	Leisler's Bat	Leisler's Bat
01/06/2019	04:03:30	Pina	Common Pipistrelle
01/06/2019	04:11:30	Leisler's Bat	Leisler's Bat
01/06/2019	04:12:30	Common Pipistrelle	Common Pipistrelle
01/06/2019	04:13:00	Common Pipistrelle	Common Pipistrelle
01/06/2019	04:13:30	Common Pipistrelle	Common Pipistrelle
01/06/2019	04:14:00	Pina	Common Pipistrelle
01/06/2019	04:18:00	Common Pipistrelle	Common Pipistrelle
01/06/2019	04:18:30	Common Pipistrelle	Common Pipistrelle
01/06/2019	04:19:00	Common Pipistrelle	Common Pipistrelle
01/06/2019	04:21:00	Leisler's Bat	Leisler's Bat
01/06/2019	04:23:30	Leisler's Bat	Leisler's Bat
01/06/2019	04:24:00	Leisler's Bat	Leisler's Bat
01/06/2019	04:24:30	Leisler's Bat	Leisler's Bat
01/06/2019	04:28:38	Leisler's Bat	Leisler's Bat
01/06/2019	04:31:38	Leisler's Bat	Leisler's Bat
01/06/2019	04:32:38	Leisler's Bat	Leisler's Bat
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01/06/2019	04:40:38	Leisler's Bat	Leisler's Bat



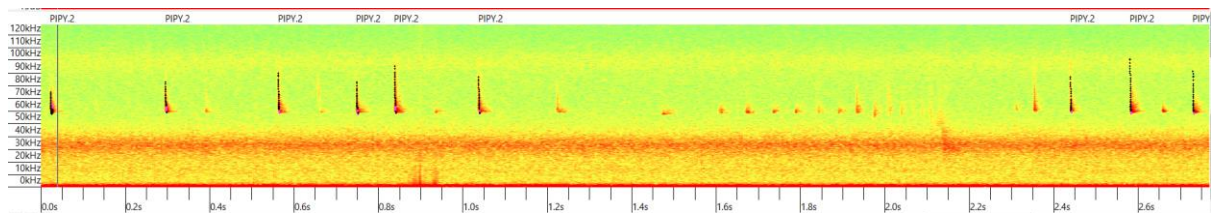
Leisler's bat signal at 21.44 hours at the treeline to the north of the site



Common pipistrelle and Leisler's bat at 22.13 hours at the treeline to the north of the site



Common and soprano pipistrelles and Leisler's bats at 22.36 hours at the treeline to the north of the site



Soprano pipistrelle at 00.05 hours at the treeline to the north of the site