

**A Summer Evaluation of Bat Roost Potential, Feeding and
Commuting Activity Within the Lands
At University College Dublin, Dublin 4**



Brian Keeley B.Sc. (Hons) in Zool. MCIEEM

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Introduction

University College Dublin (UCD) occupies a considerable area of the south Dublin city area bounded by Donnybrook and Clonskeagh and includes within its boundaries green spaces and hedgerow in decreasing abundance as the campus develops. Such green spaces offer bats the potential to feed and to move between different built up areas. The buildings on campus provide varying degrees of roost potential with more opportunities existing in older buildings and structures more removed from the more heavily illuminated areas.

Trees may serve as breeding sites, mating sites, hibernacula but probably feature most commonly as transitional roost sites in the Irish context given the age and dimensions of much of the tree cover in urban and suburban areas including UCD. There are a number of relatively large mature trees within the campus but these are often close to lighting or roads. To date, no tree roosts are known from the campus but this may be partially due to survey effort but it may also reflect a lower density of bats and therefore no shortage of roost sites in buildings etc.

Changes to the campus may reduce the lands available to bats as a feeding site and in some cases may even destroy their dwelling place through or during the partial or total demolition, restoration and renovation of buildings, felling or major surgery of mature trees and the subsequent construction activities and modifications to the site. In the current context, there are a small number of buildings from the substantial campus that are proposed for removal and tree removal is a very low potential for roost loss.

This assessment examines the bat activity within the footprint of the proposed development and in adjacent areas, considers the potential of the buildings proposed for demolition as roost sites and examines the previous data for UCD and the overall potential of this proposal for affecting the bat fauna within the site and immediate surroundings.

Methodology

The proposed development site at UCD, Dublin 4 was examined on the 22nd May 2016 as a bat detector survey from prior to sunset (21.23 hours) for one and three quarter hours and again prior to dawn on the 23rd May 2016 (sunrise at 05.15 hours). A bat detector survey re-commenced approximately one hour prior to dawn on the latter date to determine if bats were roosting in any buildings within the footprint of the proposal. The survey involved the use of a variety of bat detectors including the following: *Pettersson D240X, EM3 and 2 x Song Meter 2 BAT+ (SM2)*

The first two detectors were carried for the entirety of the survey while one of the SM2s was placed close to the main door at the Roebuck Castle university buildings from prior to dusk to 22.10 hours. All signals were analysed with Kaleidoscope Pro and Batsound software. This allows for automatic identification and two means of verification of the species identification for all signals. All signals were re-examined to determine identity of the bat fauna.

A second SM2 was placed on a wall to the south-eastern corner of the buildings so that a large area of the building was covered by monitors and by the walked transect. The SM2 at the main door was moved to the undeveloped green area towards the NOVA estate (and was carried from 22.10 hours up to 22.32 hours from Roebuck to the green area along the unlit walk and back along the road from NOVA towards Roebuck) while the SM2 to the rear of the building was moved into the courtyard of the buildings to consider the potential for returning bats within these buildings.

Both buildings at which the second SM2 was placed are proposed for removal to increase flow through the site and remove unsympathetic building elements.

The buildings proposed for removal and all adjoining buildings were examined on 30th May externally for evidence of bat entry or emergence. This would usually be characterised by staining where bats use a gap regularly to enter (from fur oil deposition) or from the accumulation of bat droppings below the point; on walls, window ledges, spider webs or the ground below).

Surveying of the buildings externally was carried out in June and July and a bat detector survey was undertaken on July 22nd 2016 up to dawn of July 23rd following a similar route to the May survey concentrating on the buildings that will be modified, the sports and green areas and the area through which the access road will pass.

The buildings at Roebuck Castle were examined on 7th September 2017 to determine if any bats were roosting within them.

Bat Conservation Ireland data was assessed for any previous records of bats within or adjoining the site.

Survey constraints

The survey was undertaken during the main bat active season (May to September) at a time when bats on the east coast of Ireland are likely to be feeding and choosing (or having chosen) roosts for breeding (if pregnant females) or for other life cycle elements. There were ideal conditions for survey on both dates as there was no breeze, there was no rain or high atmospheric pressure on the night of survey. This is likely to be a good representation of the bat fauna of the site.

Internal access to attics areas in Roebuck and to all upstairs areas and the second survey date in July allowed for a determination prior to and after breeding. The night in September 2017 allowed for a follow-up on the 2016 results.

Existing Environment

May

Three species of bat were noted by the SM2 positioned at the main door of Roebuck Castle and later moved to the green area to the east. These were common pipistrelle, soprano pipistrelle and Leisler's bat. Of these three, two of these species were noted during the walked transect; Leisler's bat and common pipistrelle. The first bat observed was a Leisler's bat that flew over Roebuck Castle shortly after dusk (21.45 hours flying directly west). This bat disappeared from view instantly.

No further bat activity was noted around Roebuck and the next bats observed were in the green area to the east close to NOVA. Here a Leisler's bat followed very shortly thereafter by a common pipistrelle were noted. The SM2 was being carried and re-located at this point and the signals of these bats were recorded by the monitor.

The bat activity is usually highest close to a roost early in the night and bat activity typically moves further from the roost site as the night progresses. Thus, the scarcity of bat activity around Roebuck would suggest that no bats were roosting within the immediate area with the exception of a possible Leisler's bat roost in the vicinity. This species was not heard preparing to emerge from the buildings and was not seen to return to the buildings at dawn and there were no droppings to indicate its presence either on the night or one week later (see below).

No bat activity was noted prior to dawn from the main observation area of the Roebuck buildings either by the active survey or by passive monitoring. In fact, the SM2 monitor placed at two of the buildings proposed for demolition (C1 and D) recorded no bat activity in its proximity. Hence no bats were present at emergence or return time at these buildings.

There were no bat signs in evidence from an examination of the buildings at Roebuck carried out in daylight one week later.

July Bat roosts within the survey area

1. Leisler's bat roost in former chapel at Roebuck
2. Leisler's bat roost in tree towards NOVA centre

1. Roebuck Chapel

Approximately 51 Leisler's bats emerged from the north-eastern corner of the former Chapel building (then converted to a lecture hall). These bats emerged from approximately sunset onwards (21.20 hours with sunset at 21.23 hours) and flew out of view within 10 seconds. Leisler's bats were infrequently encountered during the active survey period but were recorded occasionally on the remote monitor. No bats roosted here in 2017.

2. Tree along walk near NOVA centre

There was a Leisler's bat male calling from a mature tree within the grounds close to the proposed access road leading to the development. The exact tree could not be pinpointed but it was from a small number of mature trees to the east of the proposed road and this tree will not be removed within the current proposed tree clearance.

Other bat activity within the grounds included mainly common pipistrelles as in May with much less soprano pipistrelle activity. Common pipistrelle activity (individuals only) was high close to the football grounds (north of Roebuck Castle and the student accommodation) but this was probably attributable to one bat.

Brief common and soprano pipistrelle activity was noted by the monitors at Roebuck. In 2017, a single Leisler's bat pass and a single common pipistrelle bat pass were noted here.

Discussion

In summary, there is a maternity roost within the former chapel at Roebuck and a mating roost / perch within mature trees towards the NOVA centre. The chapel building will be demolished while the tree roost will be retained.

The three species of bat noted in previous surveys and observations both by the author and confirmed in 2015 (Bats At UCD, Belfield Campus Field Study, Summer 2015, Niamh Roche) at UCD were noted in May 2016. The most commonly encountered species was common pipistrelle.

Soprano pipistrelle activity was much less commonly encountered and was later overall than for common pipistrelle. Leisler's bat activity was low within the campus on the night of survey.

In this extensive assessment of bat activity at UCD, it was considered that there was good bat activity in the Oak Walk, although in all other areas, bat activity levels could be considered quite low despite the extensive green cover. This is likely, at least in part, to be caused by high levels of artificial night lighting impacting negatively on bat activity.

Modifications or Features introduced by the proposed development

- **Building demolition**

There will be a number of buildings that will be demolished in the Roebuck complex including the former chapel and a number of attached and adjacent buildings.

- **Vegetation alterations**

There will be a requirement to remove mature vegetation with immature or undeveloped trees and scrub. This would affect bats in a number of ways including the loss of shelter from wind and lighting and this may affect feeding areas and commuting activity. This will not have major conservation consequences for bats.

- **Lighting**

There will be an increased level of lighting associated with buildings, public paths and especially from the erection of sports' flood lighting. None of the bat species within the site are particularly light intolerant but lighting of roost sites is unwelcome for all bat species.

- **Noise and Vibrations**

There will be a protracted period of noise and vibration during demolition and construction. All of this will occur during the daytime and bats will be within buildings that will be retained or will have been excluded from buildings for demolition. The construction noise is unlikely to affect bats within the known roost and this building will eventually be demolished. It will not affect bats during feeding or commuting as it will be diurnal only.

Impacts Of The Proposed Development

Roost loss

There is loss of buildings around Roebuck, one a confirmed bat roost and some other buildings with roost potential. This is likely to be a permanent moderately negative impact.

Reduced Feeding

Reduced vegetation including the removal of scrub and even undeveloped and mature and immature trees may lead to reduced insect abundance. This will be a permanent moderately negative impact.

Disturbance from lighting

This may affect bat species, in particular, light-intolerant bat species (if present) 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 pipistrelle are less affected than all other Irish bat species. As there is only one other species known to be encountered on a repeat basis from this site, the soprano pipistrelle, it is predicted that this would be a permanent moderately negative impact.

Proposed Mitigation

Acquisition of a derogation licence from National Parks And Wildlife Service to permit the demolition of a bat roost

As bat roosts are protected it is a legal requirement that a derogation licence is acquired from NPWS of the Department of Culture, Heritage and the Gaeltacht. This will necessitate the provision of measures to prevent injury or death of bats.

The following measures are proposed as mitigation for the loss of the roost:

- Exclusion of bats from the current roost site by a bat specialist. This may require supervision of roof removal if bats are inactive prior to demolition. This need not occur until prior to the demolition of the roost building. This may be as much as 4 years into the project's commencement.
- Installation of a Heated Bat Roost Box within the roof of the Roebuck Castle buildings. The building proposed runs north-south from Roebuck Castle. This may be commenced (purchase and incorporation) upon planning approval.
- Installation of a Heated Bat Roost Box at the gate lodge. As for Roebuck Castle, this may be commenced (purchase and incorporation) upon planning approval.

- The above heated bat boxes are connected to the power supply by a plug and 10 metre cable (typically) and cost €25 per year to run.
- Provision of 3 x 2F Schwegler bat boxes in the interim period prior to completion of the construction of new buildings. All boxes shall be positioned under advice from a bat specialist.
- Incorporation of a 1WI Schwegler Summer and Winter Bat Box bat and attachment of 2 x 2FE Schwegler Wall-Mounted Bat Shelter bat boxes on buildings in Phase 1 of the development (see specifications in the Appendices).
- All of the building elements at Roebuck and all mature trees proposed for felling shall be examined for evidence of bats prior to demolition / felling by a bat specialist. This shall include an internal examination of the roof including attics if present.
- The works shall be undertaken in the year subject to a successful grant of permission for this phase of construction.
- The site shall be monitored annually until the scheme is developed

Demolition and tree felling timing

Demolition and tree felling should preferably be carried out at a time when bats are active and birds have completed nesting (September to early November) unless it can be confirmed from a rigorous examination that bats and birds are not within the buildings or trees. If demolition occurs in winter, the roof removal must be supervised by a bat specialist.

All buildings shall be examined for bats prior to demolition.

Lighting should be designed with controlled directionality and timing

It is recommended that flood lighting that can be accurately controlled is employed. The lighting must be of a design that limits spill-over into the surrounding landscape. Most flood lighting is a feature of winter time and in this respect there should be no impact upon breeding bats. Flood lighting must only be switched on when it is required (i.e. lighting must not be either switched on when there are no events or in advance of events to warm up or to fit to a schedule).

A record of the power consumption of the lights would provide a guide on the period of illumination and would indicate when there is tighter control required. The main potential for conflict lies in autumn when bats are still active and forming mating roosts.

Away from the sport's area, the following is proposed:

It is recommended that bollard lighting is employed where essential unless there is an equivalent means by which light overspill can be controlled. The source of light should be Light Emitting Diodes (LEDs) as this is a narrow beam highly directional highly energy efficient light source.

The lighting should allow for a light level of 3 lux at ground level (in areas away from the sport's area where light will be intense). It is easier to control both the direction and light level of low lighting because it is closer to the target area than brighter light sources. Lighting should preferably respond to a trigger (motion sensor on approach of vehicles or pedestrians) and be capable of dimming.

- No floodlighting (away from the sports field) should be used to avoid light spillage and to keep light below the horizontal.
- Hoods, louvres, shields or cowls should be fitted on the lights to reduce light spillage.
- Lights should be of low intensity and use several if required.
- Lights should be on a timer system to switch off relatively quickly in the absence of movement.
- Narrow spectrum lighting should be used with a low UV component.

Glass helps reduce the UV component emitted by lights.

- Lighting proposals must be evaluated by a bat specialist to ensure that no proposed roost boxes or important corridors from boxes to feeding area are illuminated that would render the boxes useless.

Planting of vegetation

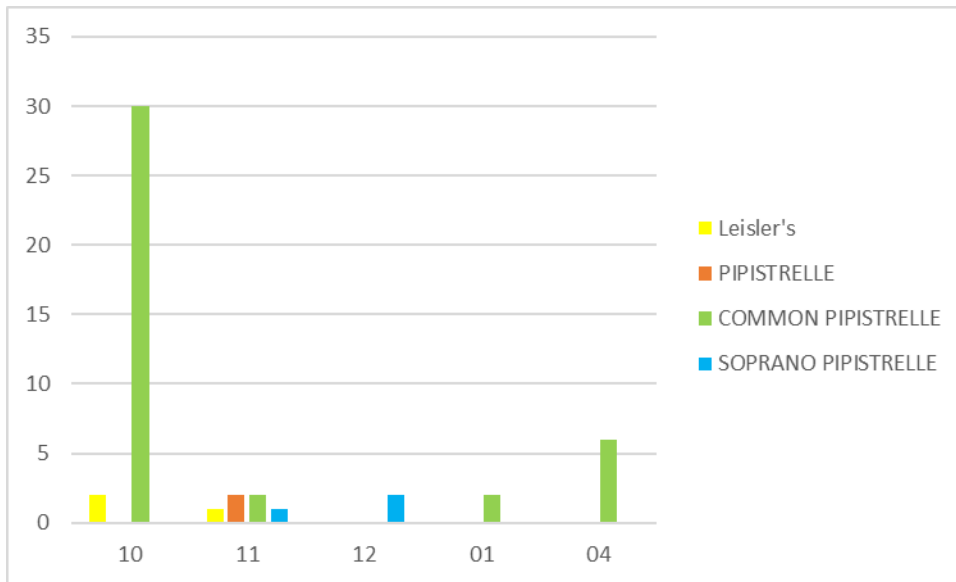
The planting of new hedgerow can help considerably in the reduction of light pollution and retention of dark corridors for wildlife. It is recommended that a hedge be planted to the west of the sports area to reduce the effects of the flood lighting.

Native and local plant species should be employed including typical plants such as oak (the greatest value for most wildlife), ash, 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. Non-native plants such as *Hebe* also provide good substrates for moths and other insects and hence provide feeding for bats.

Impacts Of The Development After Mitigation

It is predicted that there will be a low impact upon the bat fauna of the UCD campus from the proposed development in the long term. This is considered to be a moderate negative impact of short-term duration. This will follow on from a period of roost loss and feeding loss that will eventually reduce or fade away entirely as vegetation develops and bats adopt new roost sites. The loss of cover by way of the hedgerow cannot be fully mitigated until all construction on site has ceased and the hedgerow or planting will take time to develop.

Lighting will increase as a result of the proposal but given that bats are in low numbers within the grounds, the impact will be low. There are proposed measures for flood lighting with better control on spill-over light pollution and these should assist in lessening these effects.



Bat activity recorded by the Songmeter2 from Roebuck main door up to 22.10 and from the green space towards NOVA from 22.16 hours.

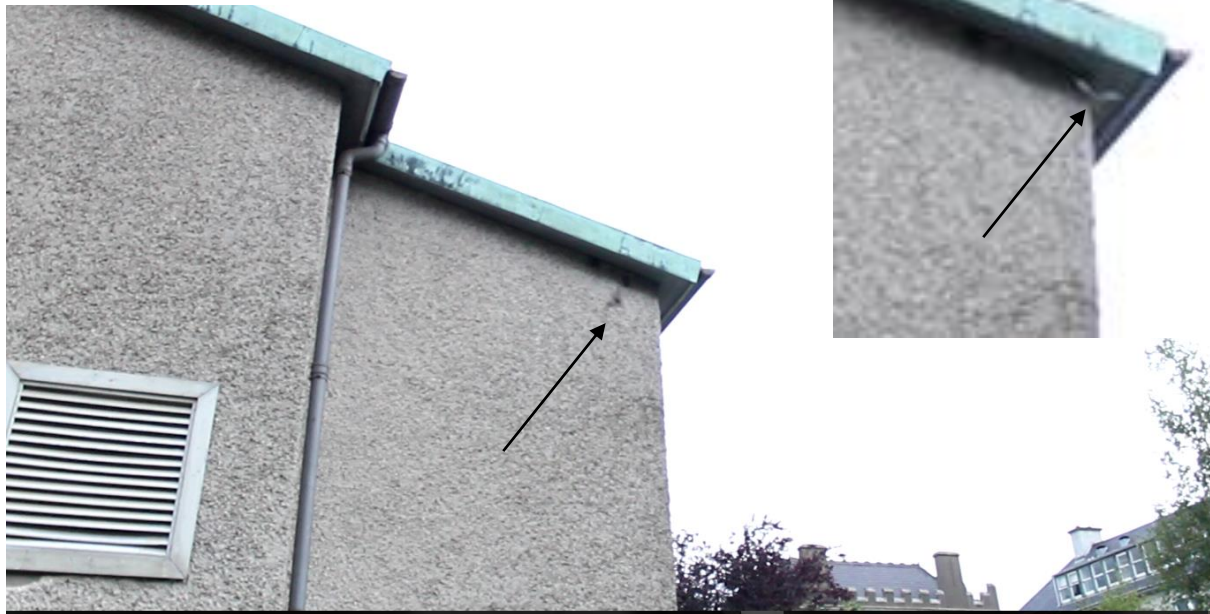
The first signals were noted here at 22.16 hours and up to 04.28 hours on the following morning. In all, there were 48 bat signals, of which at least 40 of these (and probably 42) were common pipistrelle. Soprano pipistrelles only accounted from 3 calls and equally Leisler's bats accounted for 3 calls on the monitor. Leisler's bat activity was also noted on the active survey at Roebuck at 21.45



Roebuck Castle looking towards one area that will be opened up by the proposed development

An SM2 in this area showed no bat activity during the night.

The yellow arrow denotes the proposed location for Leisler's bat heated box within the attic.



Leisler's bats returning to the roost in the fascia at the north-eastern corner of the former chapel



The buildings that would be removed as part of the proposed development
None of these buildings show evidence of bat usage



Trees with some roost potential on the perimeter of the UCD campus at Foster's Avenue

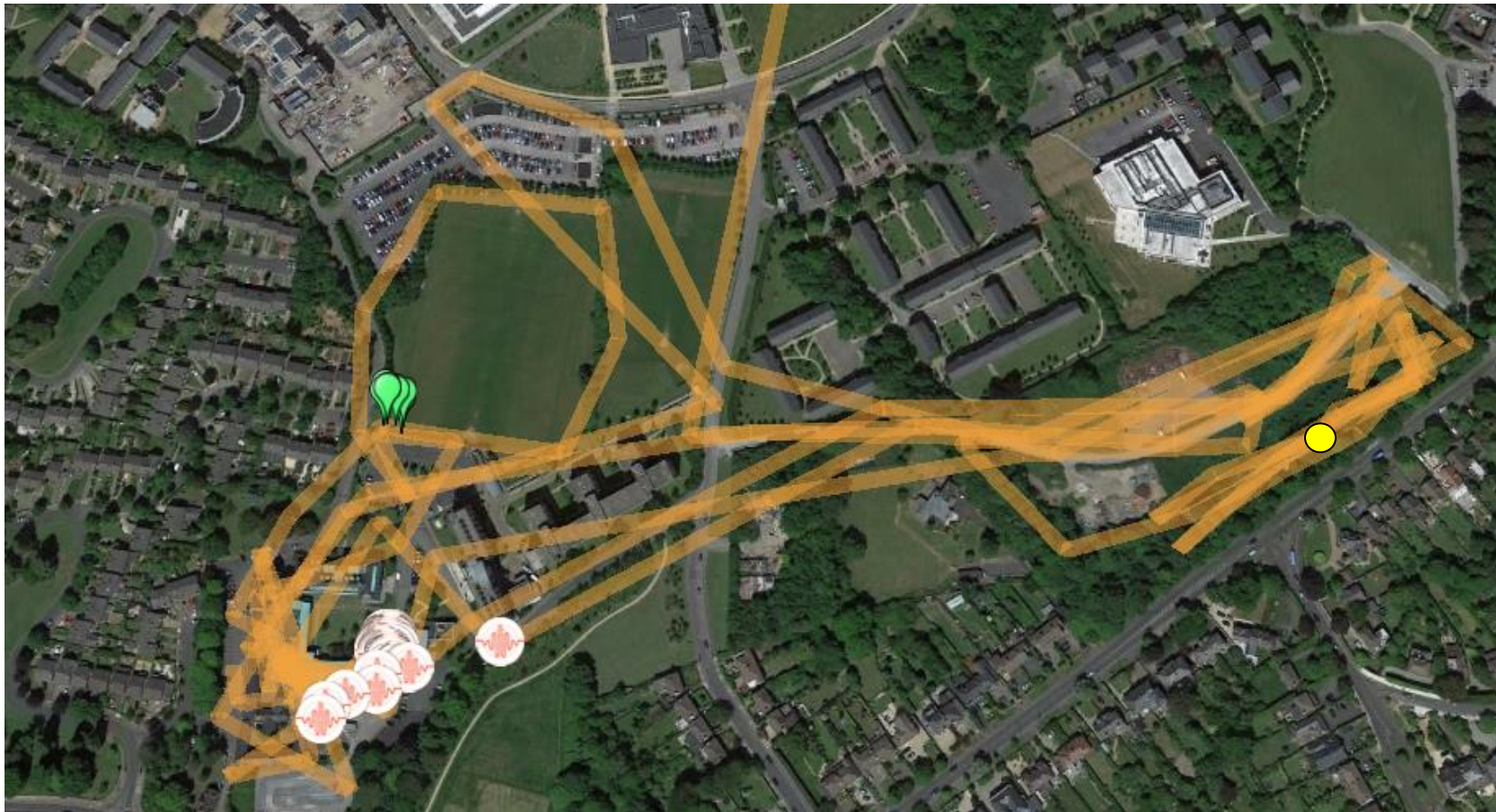


Sheltered walk and edge of this walkway where pipistrelle + Leisler's bat activity was noted



Site for Heated Bat Roost Box at Roebuck Castle

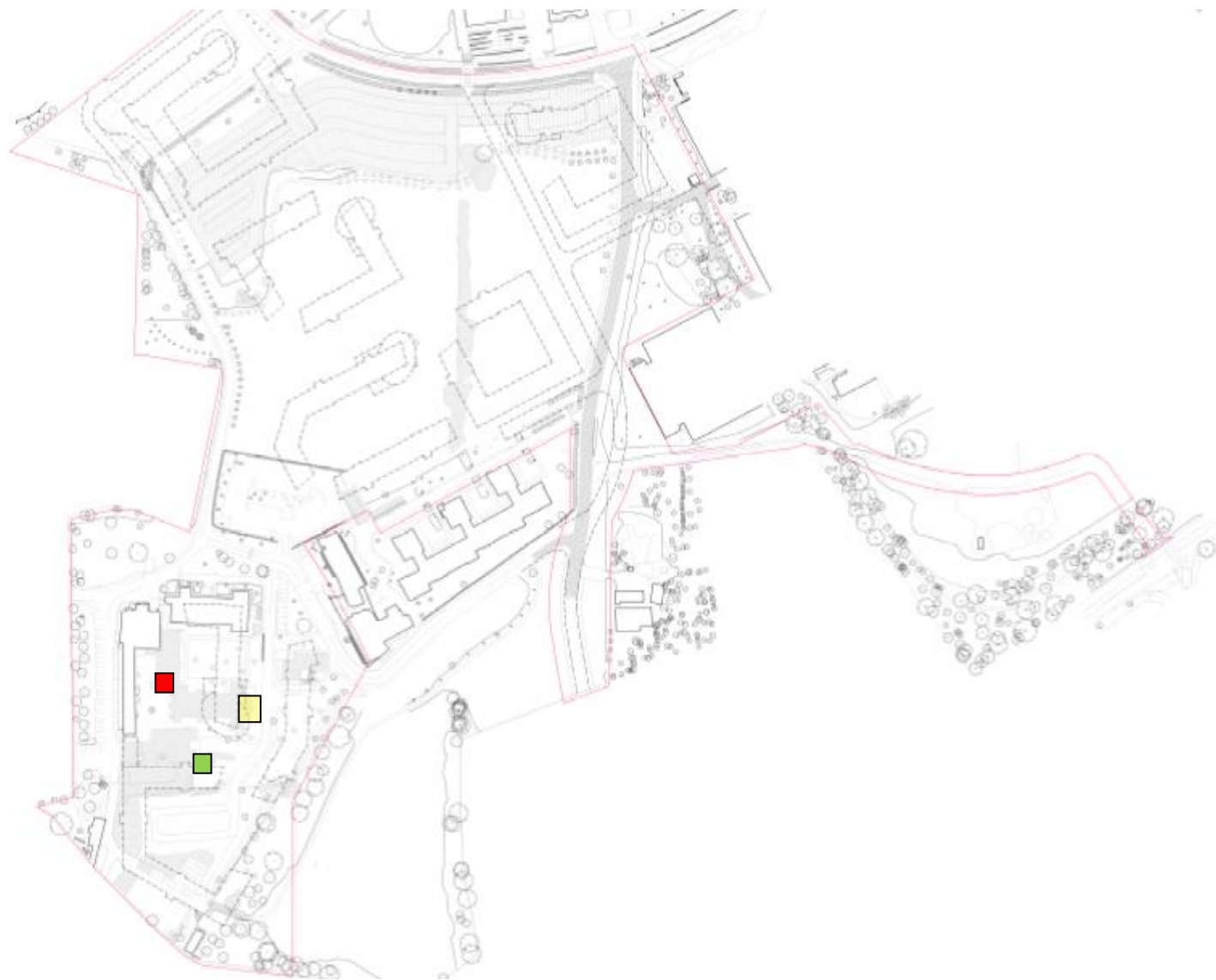
The louvred tower or the featured box may provide easy sites for incorporation of the bat box shown in the appendices. The slot allowing roost access from the outside should align with the access slit at the base of the box.



Bat activity within the site on July 30th 2016

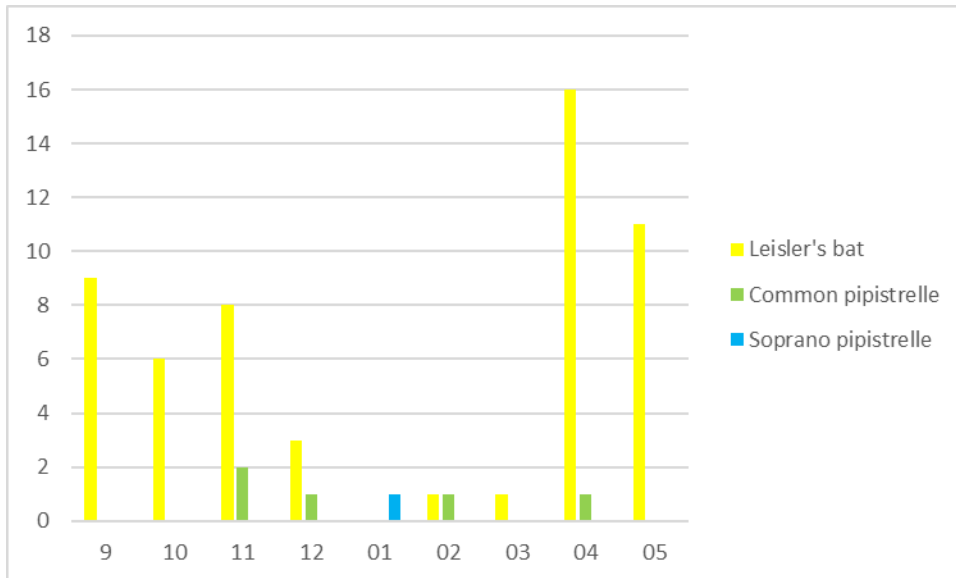
The white targets are signals of Leisler's bats while the green paddles represent common pipistrelle activity

The yellow circle denotes the position of a Leisler's bat mating roost within the mature trees along the pedestrian walk



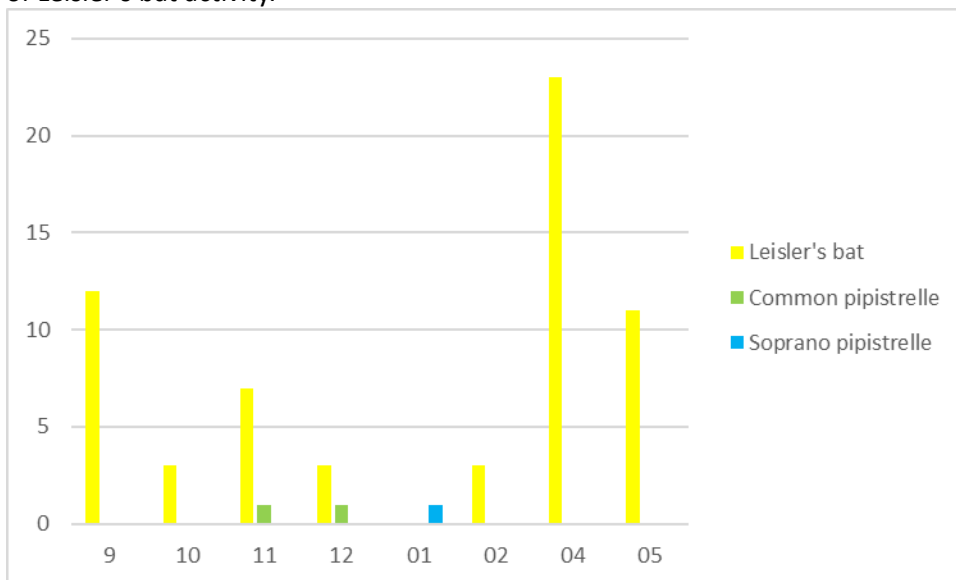
Location of Leisler's bat roost in the northeastern corner of the former chapel at Roebuck (yellow box) in July 2016

Bat monitors were positioned north and south of the roost (red – Anabat SD2 and green – SM2Bat+) showing mainly Leisler's bat activity and very low pipistrelle activity



Bat activity within the enclosed yard at Roebuck based on an Anabat SD2 recording throughout the night of 30th July 2016

There are almost exclusively Leisler's bat signals with brief encounters with a common pipistrelle at 23.13 hours (for almost one minute), 00.24 hours, 02.18 hours and 04.44 hours. This would suggest that there are no pipistrelle roosts within this area and corroborates the observations from the walked transect. There was a single soprano pipistrelle signal at 01.16 hours. In contrast, there were 55 periods of Leisler's bat activity.



Bat activity at Roebuck close to the chimney recording throughout the night of 30th July 2016

The activity mirrors the recordings made by the SD2 in another area of the yard

BCIreland data: search results 12 Jul 2016					
Search parameters: Roosts Transects Ad-hoc observation sites with observations of all bats within Roebuck to a distance of 1000m of O1859829277.					
Roosts					
Name	Grid reference		Species	Address	Species observed
Stillorgan Rd	O1830	Belfield, County Dublin	Unidentified bat		
Louvain	O1829	Clonskeagh;	Nyctalus leisleri; Unidentified bat		
Ad-hoc observations					
Survey	Grid reference	Date	Species		
EIA survey- Paul Scott	O176292	15/04/2011	Myotis spp.; Pipistrellus pipistrellus (45kHz); Pipistrellus pygmaeus; Unidentified bat		
EIA survey Paul Scott	O181301	24/05/2010	Pipistrellus spp. (45kHz/55kHz)		
EIA survey- Paul Scott	O181284	01/04/2001	Nyctalus leisleri		
EIS surveys - Brian Keeley	O1780028600	04/09/2003	Nyctalus leisleri; Pipistrellus pipistrellus (45kHz); Pipistrellus pygmaeus		
Faith Wilson	O177286	04/09/2003	Nyctalus leisleri; Pipistrellus pipistrellus (45kHz); Pipistrellus pygmaeus		

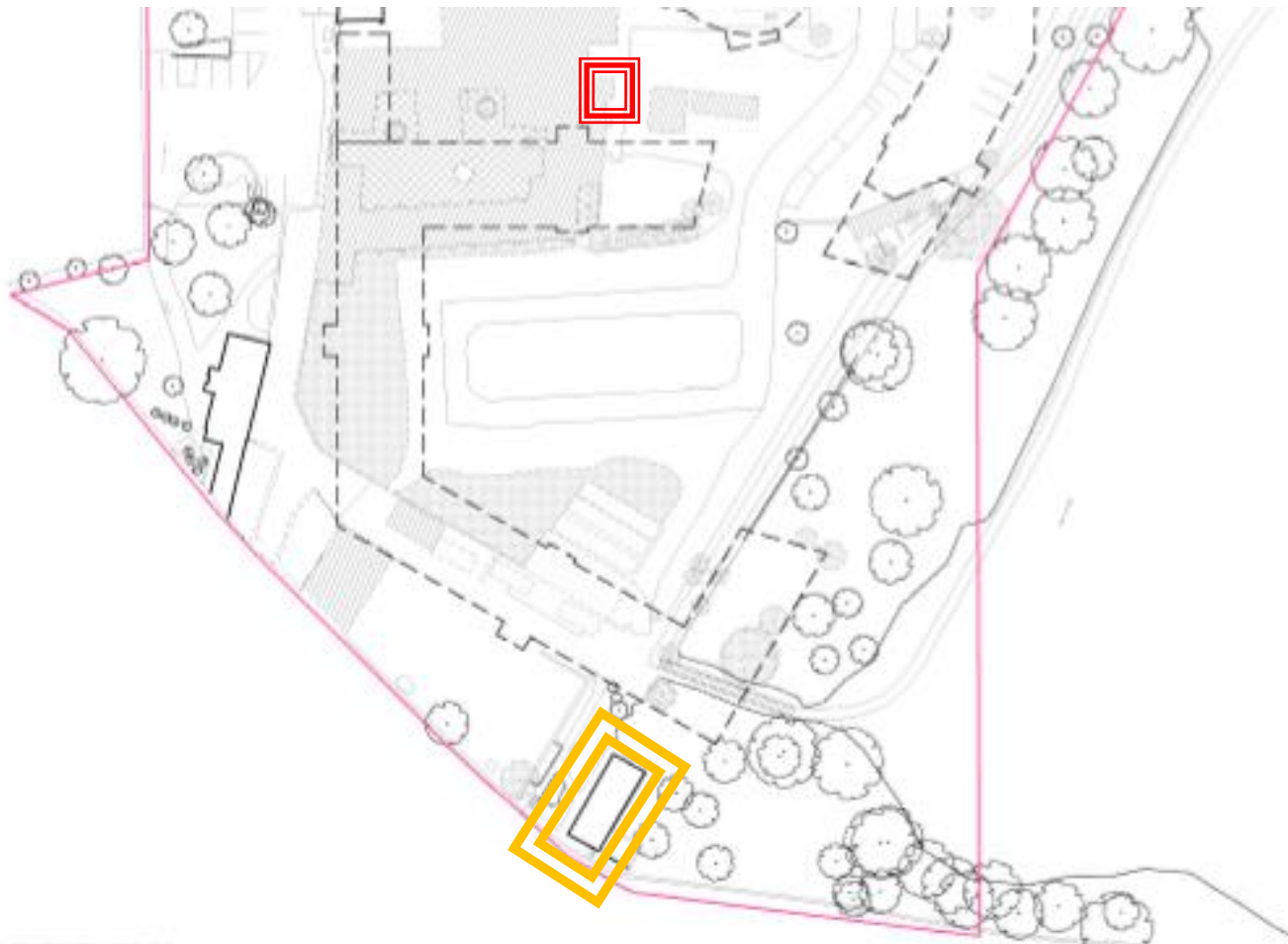
Roost records and other bat observations within 1 km of Roebuck (OSI grid ref O1859829277)

A large roost of Leisler's bats was present in both the Louvain housing and along the Stillorgan Road in the 1990s but these were both excluded. Extending the evaluation to a 10 km radius provides no clearer picture of bat distribution based on the data and the table of this query is not included here.

Species Versus Number of 30 second periods with bat passes recorded within the yard at Roebuck

This data is shown in graphic form on the previous page from Anabat SD2 recordings throughout the night of 30th July 2016

Hour	Leisler's bat	Common pipistrelle	Soprano pipistrelle	Total
9	9			9
10	6			6
11	8	2		10
12	3	1		4
1			1	1
2	1	1		2
3	1			1
4	16	1		17
5	11			11
Total	55	5	1	61



Proposed location for Leisler's bat roost site in gate lodge

The existing roost is marked in red while the proposed mitigation is proposed in gold
This will include a heated bat box and attic access

Heated Bat Roost Box

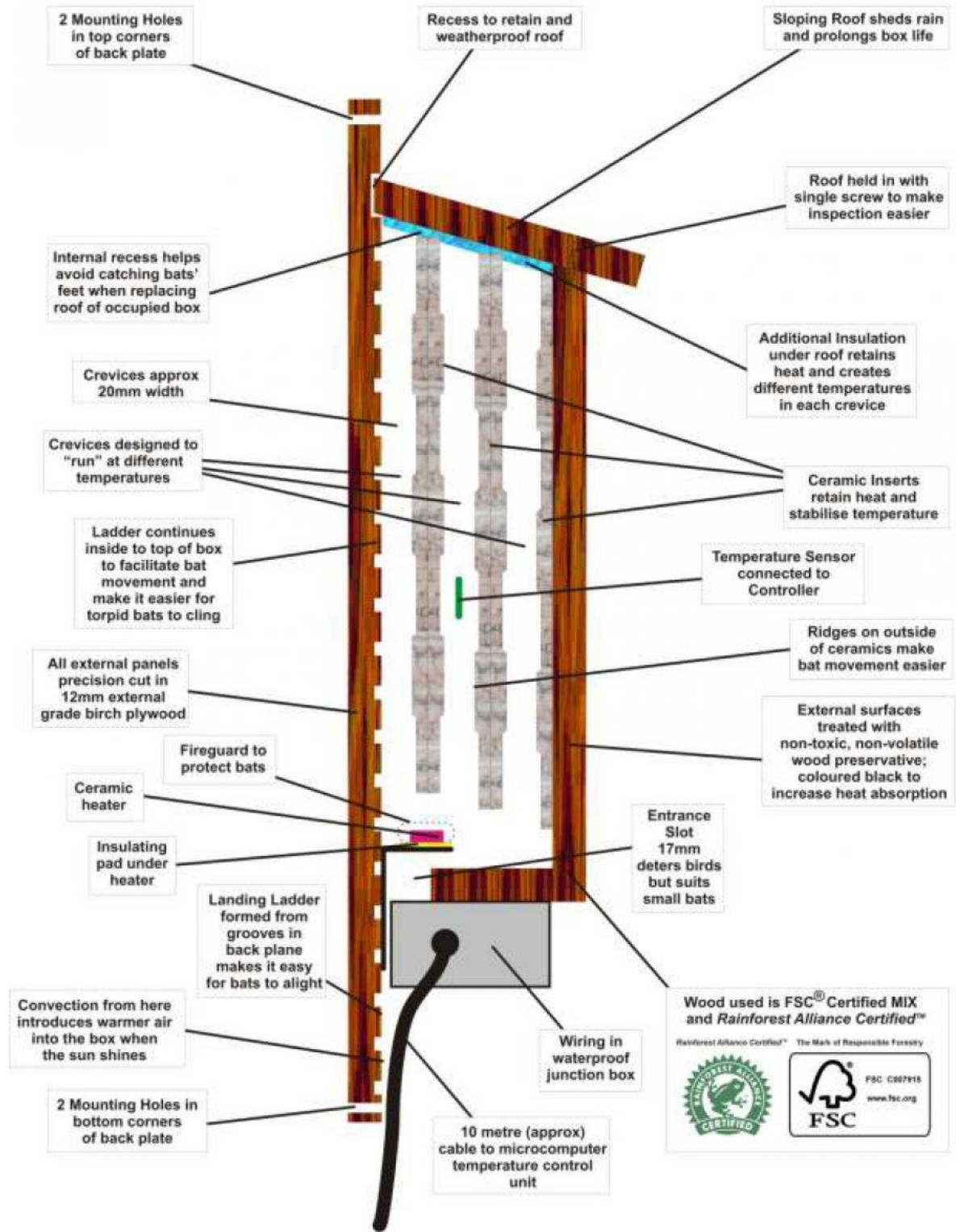


Specifications: Height: 49cm Width: 26cm Depth: 13cm Weight: 8kg Heating: 50W ceramic heating
Material: FSC certified exterior grade plywood

Features:

- * Draught-proofing enhances temperature stability inside the box.
- * Textured internal surfaces ensure bats find it easy to move around
- * Ceramic heater (50W) protected with wireframe fireguard for bats safety.
- * Self-regulating ceramic heater protects against overheating.
- * Electrical connections waterproofed to IP66 standards.
- * Controller sounds an alarm if it detects disconnection or the temperature is too high.
- * Status display on temperature controller shows current temperature and whether the heater is on.

Internal Cross-Section Showing The Three Crevices Within The Heated Bat Roost Box



1WI Schwegler Summer and Winter Bat Box



Specifications: Height: 54.5cm Width: 34.5cm Depth: 9.5cm Weight: 15kg

2FE Schwegler Wall-Mounted Bat Shelter (Pair provided)



Specifications

External dimensions: Height 30 cm, width 25 cm, depth 3 to 5 cm. Weight: approx. 2.5 kgs each.