Eire Ecology

Environmental Consultants

Bat Survey Report

Gort Streetscape, Co. Galway.

DOCUMENT DETAILS

Client:	Galway County Council
Project Title:	Gort Streetscape
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Prepared By:	John Curtin
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EXECUTIVE SUMMARY

This document reports on the findings of bat surveys conducted in 2024 within the town of Gort, Co. Galway. Surveys were commissioned by Galway County Council's Regeneration Team to examine potential impacts on bats by proposed upgrade works to the streetscape of Gort.

Surveys included roost assessment of trees and structures, walked surveys using bat detectors and thermal scopes, longer duration static monitoring focusing on areas of highest bat potential and an assessment of lighting. The aim was to examine current bat usage around the town and assess future impacts as the town grows.

Five static detectors were placed within the site for ten nights in June and July, with two statics placed close to the Gort River, a known ecological corridor that provides connectivity between surrounding Special Areas of Conservation designated for the protection of Lesser Horseshoe bats. This species has a restricted range in Ireland, limited to six western counties – Clare, Cork, Galway, Kerry, Limerick and Mayo. Due to the specific requirements of this species, such as a necessity to hibernate in underground sites, dense vegetation for foraging and linear features for commuting, it is given added legislative protection, being the only Annex II (Habitats Directive) bat species found in Ireland.

Lighting can impact bats in a number of ways, white lights can attract insects away from dark zones, providing an advantage to light tolerant bat species while negatively impacting rarely woodland and water species such as Daubenton's and Lesser Horseshoe. In addition, light can have a barrier effect blocking previously important routes.

A DNA study (Dool et al. 2016) of Irish Lesser Horseshoe bats found genetic differentiation suggesting that overtime the species core ranges have lost connectivity and are becoming fragmented. An assessment of potential ecological corridors between important Lesser Horseshoe bat roosts, mapping existing treelines, rivers as well as street lights conducted by the Vincent Wildlife Trust (VWT) using a modelling program; circuitscape has found potential corridors are becoming more tenuous over time.

Our surveys show Lesser Horseshoe bats recorded along the Gort River both north and south of the town however, a brightly lit 200m section from the Bridge to the Riverwalk has created a barrier preventing Daubenton's and Lesser Horseshoe bats from passing through the town. While the regeneration program will improve some of these lights, not all are operated by Galway County Council. It is hoped that this document can be used to open dialogue with the private companies along this stretch to implement lighting changes that will see the Gort River Ecological Corridor restored.

Over time as the town expands it is inevitable that other routes currently used by Lesser Horseshoe bats will be impacted thereby increasing the necessity of protecting and restoring the river corridor.

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1 INTRODUCTION

This report details the findings of bat surveys carried out as part of the Gort Public Realm Enhancement Project which will develop the spaces between the buildings, shifting the focus away from the motor vehicle and toward the experience of inhabitants and visitors. Spaces will be created for recreation and social activity, improving liveability, making the town an attractive proposition for new investment and to promote it as a good place to live, work, and visit. The site as referred to in this report is made up of smaller constituent areas located though-out the town. The plan also aims to enhance the Gort River as an Ecological Corridor for Lesser Horseshoe bats by changes to the existing lighting regime.

This report aims to;

- Examine the area of works for the presence of bats or their roosts.
- Identify species of bats using the sites and identify regions of higher bat activity to focus conservation efforts on.
- Potential impacts of bats by the proposed development.

The surveys undertaken are in line with recommendations of the Bat Conservation Trust 'Good Practice Guidelines, 4th edition, (Collins, 2023) and The Irish Wildlife Manual No. 134' (Marnell, 2022). The survey was designed and carried out by John Curtin B.Sc. (Env.). John has over ten years' experience of carrying out bat surveys and has completed copious surveys during this time. John has also completed the Bat Conservation Ireland, Bat Detector Workshop and Bat Handling Workshop which are the standard training for the carrying out of bat surveys in Ireland. He follows the Bat Conservation Ireland 'Good Practice Guidelines'(Aughney et al., 2008)'. In addition, John is a longtime active member of Bat Conservation Ireland, which monitor bat populations in Ireland, and facilitate the education of bat communities to the public.

The site lies in close proximity to Coole-Garryland Complex SAC, Lough Cutra SAC and East Burren Complex SAC; sites that have been designated due to the presence of the Annex II species; Lesser Horseshoe bat (*Rhinolophus hipposideros*). In addition, there are several cave and building roosts for this species found within the locality.

Surveys reveal the presence of seven species of bat: Common Pipistrelle (*Pipistrellus pipistrellus*), Soprano Pipistrelle (*Pipistrellus pygmaeus)*, Leisler's bat (*Nyctalus leisleri*), Brown Long-eared Bat (*Plecotus auritus*), Natterer's bat (*Myotis nattereri*), Daubenton's bat (*Myotis daubentonii*) and Lesser Horseshoe bat (*Rhinolophus hipposideros*).

Figure 1-1: Aerial view concept of Marketplace and Northern proposed carpark

Figure 1-2: Diagram for Gort Public Enhancement project.

2 DESKTOP STUDY

2.1 BATS IN IRELAND – LEGISLATIVE PROTECTION

There are two main pieces of legislation which cover wildlife protection in Ireland – the Wildlife Act and the Habitats Regulations. These are outlined below, with particular reference to the protection afforded to bat species in Ireland.

The Wildlife Acts 1976 and 2000

The primary pieces of national legislation for the protection of wildlife in Ireland are the Wildlife Act (1976) and the Wildlife [Amendment] Act (2000). All species of bats in Ireland are listed on Schedule 5 of the 1976 Act, and are therefore subject to the provisions of Section 23, which make it an offence to:

- Intentionally kill, injure or take a bat
- Possess or control any live or dead specimen or anything derived from a bat
- Willfully interfere with any structure or place used for breeding or resting by a bat
- Willfully interfere with a bat while it is occupying a structure or place which it uses for that purpose

The Habitats Regulations 1997-2005

The EC Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (Habitats Directive 1992) seeks to protect rare and vulnerable species and the habitats in which they are commonly found and requires that appropriate monitoring of populations be undertaken. All bat species found in Ireland are listed under Annex IV of the Directive, while the lesser horseshoe bat is afforded further protection under Annex II. The Habitats Directive has been transposed into Irish law by the European Communities (Natural Habitats) Regulations 1997. All bat species are listed on the First Schedule and Section 23 of the regulations makes it an offence to:

- Deliberately capture or kill a bat
- Deliberately disturb a bat
- Damage or destroy a breeding site or resting place of a bat

Provision is made in the Regulations for the environment minister to grant, in strictly specified circumstances set out in that Regulation, a derogation license permitting any of the above activities "*where there is no satisfactory alternative and the derogation is not detrimental to the maintenance of the populations of the species to which the Habitats Directive relates at a favourable conservation status in their natural range*".

2.2 SITE LOCATION

The site lies within the town of Gort (53.06524, -8.81771 approximately 1.2km from the Coole-Garryland Complex SAC (site code: 000252), 2.9km from Lough Cutra SAC (site code: 000299), 3km from the East Burren Complex SAC (site code: 001926), 4.3km from the Kiltartan Cave (Coole) SAC (site code: 000286) and 5.2km from the Caherglassaun Turlough SAC (site code: 000238); sites which have been designated due to the presence of the Annex II species; Lesser Horseshoe bat and are the closest designated areas for this species to the subject site. (see **Figure 2-1** below).

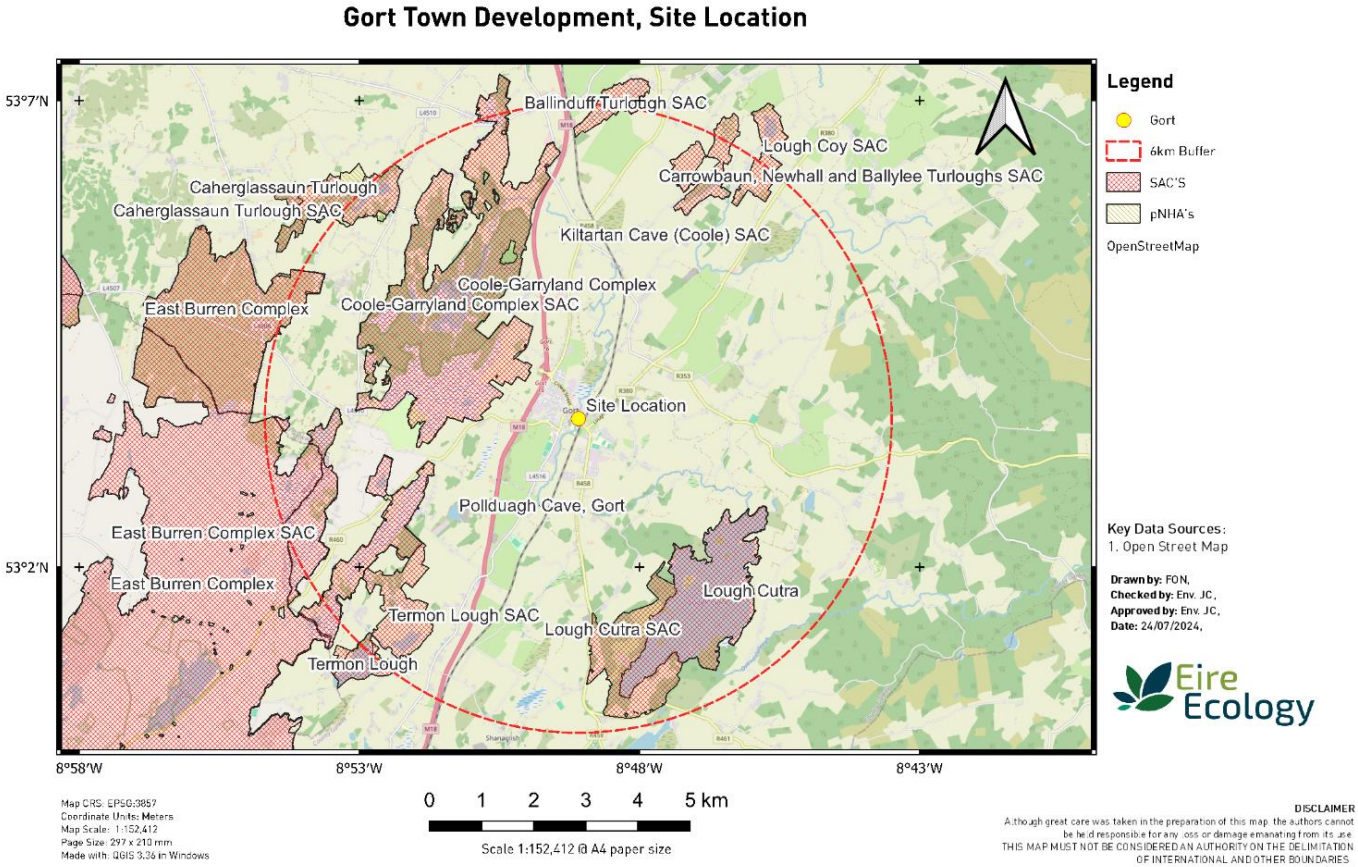


Figure 2-1: Location of proposed development to designated sites

1.1.1 Lesser Horseshoe Bat *Rhinolophus hipposideros*

The Lesser Horseshoe Bat: Wildlife Manuals No. 85 (2015) shows the subject site sits in the South Galway / Clare ranges.

Coole-Garryland Complex SAC (site code: 000252) lies approximately 1.2km from the site. This SAC contains a building (Garryland Lodge) which has been renovated specifically to make it suitable for use by bats. Lesser Horseshoe numbers have exceeded 150 in summertime since 2017 and reached 219 in 2021. The building is also used as a hibernation roost with numbers varying depending on the weather but averaging 40 bats over the last 5 winters (2017–2021).

Lough Cutra SAC (site code: 000299) lies approximately 2.4km from the proposed site. Lough Cutra is a large oligo/mesotrophic freshwater lake lying on limestone, but with much sediment washed down from the sandstone hills above. This lake is situated about 4 km south-east of Gort, Co. Galway. A series of connected woodlands on the western side of the lake has been included as foraging habitat for the Lesser Horseshoe Bats which roost at the site. An internationally important colony of Lesser Horseshoe Bats occur here. Woodland occurs around much of the lakeshore, as well as on a number of islands. Wet woodland on peat is dominated by Rusty Willow and Alder (*Alnus glutinosa*). An old record of Irish Spurge (*Euphorbia hybernica*) probably comes from drier woodland which occurs in the Lough Cutra Demesne. These woodlands provide feeding grounds for Lesser Horseshoe Bats. Between 1999 and 2001 up to 93 bats have been recorded in hibernation at Lough Cutra Castle and it is thought likely that a summer nursery roost also occurs here.

The **East Burren Complex SAC** (site code: 001926) lies approximately 3km from the site. The site supports an internationally important population of Lesser Horseshoe Bat, with an estimated 400 individuals. There are two known nursery roosts, a transition roost and four known winter sites, the latter all in natural limestone caves. Pipistrelle and Brown Long-eared Bats also occur. All of these species are listed in the Red Data Book, the former also on Annex II of the E.U. Habitats Directive. The Lesser Horseshoe Bat is a small, delicate bat which is confined to six western counties, Mayo, Galway, Clare, Limerick, Kerry and Cork. It forages close to woodland and at the edges of water. The Irish population of this species is estimated to be about 12,000 individuals and may be the largest national population in Europe. The Pipistrelle Bat is the smallest bat to occur in Ireland and is the commonest and most widespread species. Pipistrelle Bats forage where small insects gather, in gardens, along hedgerows and trees, over ponds and along rivers. The Brown Long-eared Bat is the second most common bat in Ireland and is easily identified by its long ears which are nearly as long as its body. The Brown Long-eared Bat forages in and along woodland where they glean insects off foliage.

The **Kiltartan Cave (Coole) SAC** (site code: 000286) lies approximately 4.3km from the site. Kiltartan cave is a natural limestone cave situated north of Coole Park in Co. Galway, just off the main Galway-Ennis Road. It is used as a hibernating site for the Lesser Horseshoe Bat. The Lesser Horseshoe Bat, an Annex II species, uses the cave as a hibernation site. Numbers of Lesser Horseshoe Bats counted prior to the serious flooding in 1994/95 varied between 44 and 70. During the floods the cave was filled to the entrance. Following the floods, bat numbers remained low (10-15) until January 2001, when 41 individuals were counted. Most hibernating bats are found on the right-hand side of the cave entrance, in a passage historically known as the 'Bat Passage', which runs north for 40 m and is floored by boulders.

Caherglassaun Turlough SAC (site code: 000238) lies approximately 5.2km from the site and a bat roost exists within the site. Lesser Horseshoe Bat and Natterer's Bat, which is listed in the Irish Red Data Book, roost here. Lesser Horseshoe Bat is listed on Annex II of the E.U. Habitats Directive, and Ireland has the largest national population in Europe. Loss of suitable summer habitat and disturbance during hibernation are the major threats to this species.

2.2.1.1 Connectivity between Lesser Horseshoe bat roosts.

A DNA study (Dool et al. 2016) of Irish Lesser Horseshoe bats found genetic differentiation suggesting that overtime the species core ranges have lost connectivity and are becoming fragmented thus it is vital that ecological corridors roosts are maintained and restored. The Vincent Wildlife Trust have recently performed analysis for Galway City Council using Circuitscape where street lighting and bat friendly landscape features such as hedgerows and treelines were examined. They found a single tenuous route still available for Lesser Horseshoe bats through the city. This highlights the importance and relevance of two of the Lesser Horseshoe conservation objective attributes relevant to the subject site; linear features and light pollution.

Linear features

This species follows commuting routes from its roost to its foraging grounds. Lesser horseshoe bats will not typically cross open ground. Consequently, linear features such as hedgerows, treelines and stone walls provide vital connectivity for this species.

Light pollution

Lesser horseshoe bats are very sensitive to light pollution and will avoid brightly lit areas. Inappropriate lighting around roosts may cause abandonment; lighting along commuting routes may cause preferred foraging areas to be abandoned, thus increasing energetic costs for bats.

2.3 Bat Species Recorded in the Surrounding Area

The BCI database was consulted for details on bat records held for the site and the surroundings. The database was consulted on the 25/07/2024 for details on historical records from the site for the surrounding area. Results are outlined in Table 2-1. Species recorded roosting within a 3km radius of the site include Lesser Horseshoe and Daubenton's bats. Brown Long-eared and Leisler's bats have been recorded roosting outside this zone.

Table 2-1: Irish bat species recorded in the BCI database

Species name	Distance of record from site	Last record	Details	Designation	Potential connectivity with subject site (for roost records)
Lesser Horseshoe Bat (*Rhinolophus hipposideros*)	1.19km	2000	Souterrain. Droppings found in 2000	EU Habitats Directive Annex II & Annex IV Protected Species: Wildlife Acts	Within the 2.5km Core Sustenance Zone (CSZ) for this species (BCT, 2020) for this roost. Connectivity via hedges although R458 separates site
	1.8km	2010	Cave winter roost to 22 bats in 2001 and 12 bats in 2010		Potential connectivity along treelines and hedgerows. Within the 2.5km CSZ for this roost.
	1.9km	2006	Cave winter roost to 50 bats in 1996 (summer) and 2 bats in 2006.		Within the 2.5km CSZ for this roost. Connectivity via hedgerows.
	2.1km		Souterrain. Winter roost		Within the 2.5km CSZ. Connectivity via Gort River although town in-between
Daubenton's Bat (*Myotis daubentonii*)	Vague 100m square 1.7km S	2013	Cave roost recorded during NPWS roosts survey (1996) and up to 93 individual bats recorded at undisclosed location.		Within the 2km CSZ for this roost.
Brown Long-eared Bat (*Plecotus auritus*)	3.9km to the North of site	2006	Building roost recorded during EIS survey (2006) and closest individual bat recorded 1.4km from site		Just outside the 3km CSZ for this roost.
Lesser Noctule (*Nyctalus leisleri*)	Vague 100m 5.4km north	2014	Building and tree roosts recorded during EIS survey (2005) and individual bat recorded during numerous surveys including BioBlitz, EIS Survey, BCIreland Car Based Bat Monitoring Scheme.		Outside the 4km CSZ for this roost.

2.3.1 Previous Bat Surveys conducted within Gort

2.3.1.1 RESI residential development - Ennis Road (Pl Ref: 23/60437)

Survey conducted on a site along the Ennis Road recorded lesser horseshoe bat activity following the railway track and potentially the river beyond, indicating a commuting corridor potentially exists through the town.

3 SURVEY FINDINGS

3.1 SURVEY METHODOLOGIES

3.1.1 Habitats on site

The subject site refers to several individual areas designated for public enhancement located throughout Gort town in Co. Galway. The site consists of four main areas: County Council Land (proposed carpark), The Marketplace, Canon-Quinn Park, Barrack Street and adjoining roads.

The Marketplace is a concrete pavilion and has minimal vegetation. No hedgerows, trees or scrub are present and extensive lighting is in place in the form of streetlights making it largely unsuitable for bats.

County Council Lands located close to the Council building consists of spoil, bare ground trees and grassland. While the lands are suitable for feeding bat, it is isolated and has low connectivity to areas outside the town, surrounded by built up housing estates, commercial buildings and roads.

Canon-Quinn Park is an open green area bordered by planted trees of varying sizes, the largest being a row of Leylandii on the east border of the park. There is little connectivity for bat species, and initial static surveys indicate minimal activity probably due to excessive lighting. There are plans to introduce sources of connectivity into the park, and activity is expected to increase in the park if appropriate measures are implemented.

The Barrack Street proposed carpark is a small area consisting of bare ground, recolonising bare ground and a ruin / wall, located adjacent to the Barrack Street Garda Station. This area, while not showing potential for roosting bats, is located approx. 50m from the Gort River. A dry overflow ditch where the river had previously been diverted around the old Barracks provides connectivity to the northern section of the Gort River.

Bridge Street. While the main street has minimal potential for bats, the Gort River flows north-east through the town. This ecological corridor is bordered by pasture, predominantly improved agricultural grassland and wet grassland habitat alongside associated hedgerows and treelines.

The surrounding lands are well represented with treelines, hedgerows and water courses. These provide good connectivity for bats within the area. Figure 3-1 shows these main study areas.

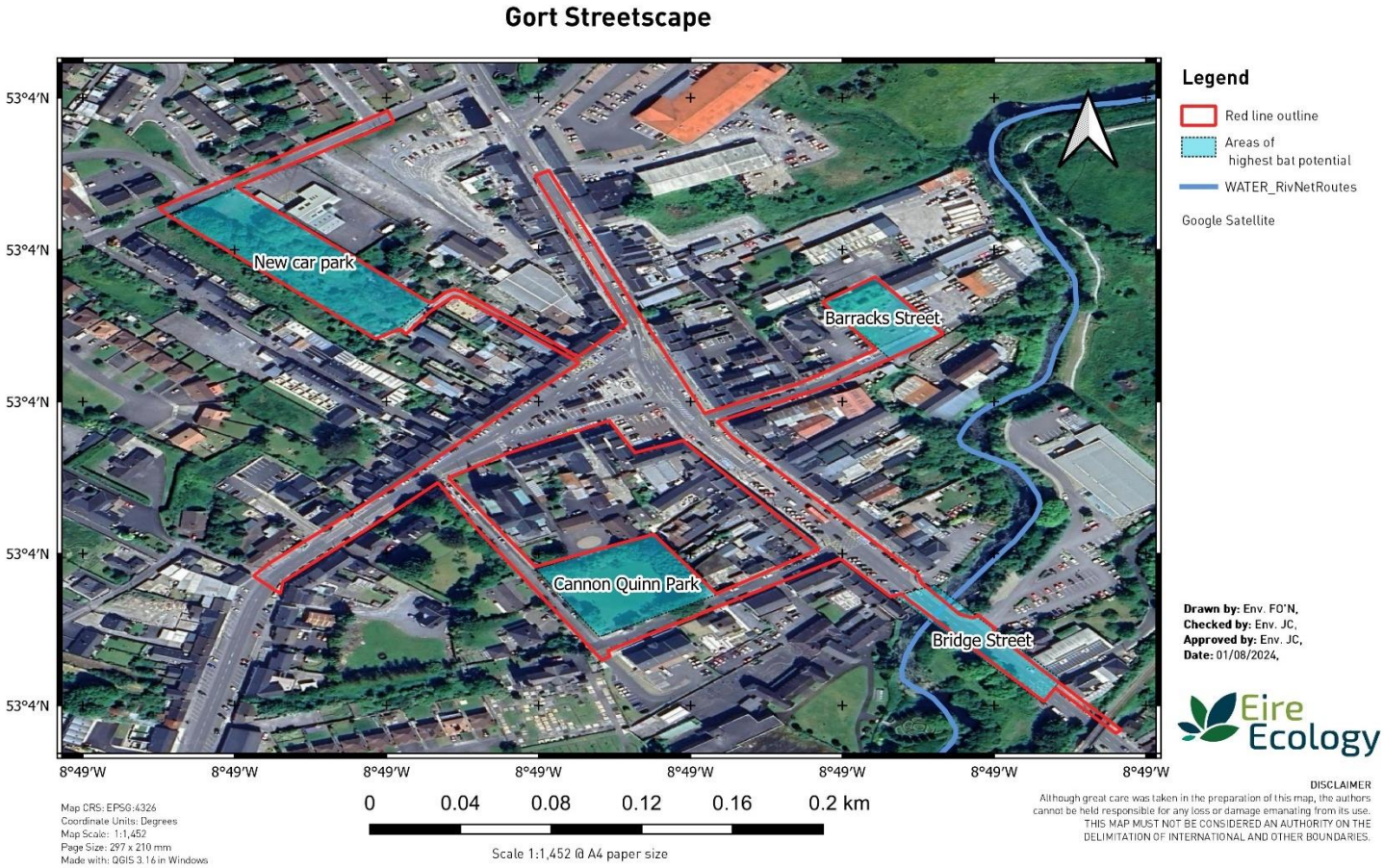


Figure 3-1: Aerial view displaying four site areas.

3.1.2 Preliminary Ecological Appraisal (PEA)

The proposed development is not altering buildings within the town thus direct impacts on potential bat roost features is limited to trees and a stone wall within the Barrack Street Section and a section of ruin where the north western car park is proposed.

An inspection of trees and structures was undertaken to assess for potential to host a bat roost on the 23rd of March 2024. Trees are a highly important feature of landscapes in that they provide roost sites throughout the year as well as being essential sources of insect prey. Therefore, the removal of such trees reduces the availability of shelter and feeding sites for bats (NRA 2005).

3.1.2.1 Structures.

A section of stone wall located within the Barracks Street area was assessed for its potential to host a bat roost. The structure does not contain a roof and has an invasive creeper; Old Man's Beard (*Clematis vitalba*) can be found in abundance here. The preliminary assessment suggests the structure has low potential as a bat roost (*potentially suitable for individual bats but not suitable as a regular roost or by larger numbers;* BCT 2023). Another ruin was also examined within waste grounds to the north west.

Much of this building had no roof and the initial inspection suggest it has low bat potential. The site is however bounded by buildings with higher roosting potential.

3.1.2.2 Trees

The use of trees as roost sites is well established. Discovery of such roosts may be established by a variety of means including the use of a bat detector survey or alternatively by examination of all suitable crevices and cavities; commonly referred as Potential Roost Features (PRF's). Trees most likely to serve as bat roosts should be identified by a bat specialist from a walk-through of the route, from aerial photography or from a tree survey report.

High potential roost features (PRF's) used by bats include;

Knot-Holes – dead branch
Flush-Cuts – chainsaw cut of branch
Tear-Outs – wind or snow, often well below canopy
Double-Leaders - 2 stems of equal diameter emerge from same spot, cavity is located below split. Increased chance of roost where entrance hole is small
Wounds & Cankers - Rough edge, indistinct shape of entrance
Butt-Rot - decay at the base of a tree
Hazard-Beams - longitudinal splits in lateral limbs and (less frequently) upright stems allowing light to be seen through the gap typically found on Quercus, Salix and horse chestnut
Subsidence, Shearing & Helical-Splits - typically on the convex side of a bend
Lightning-Strikes – from crown to base.
Impact-Shatters – branch hit by falling tree etc.
Desiccation-Fissures – dead wood
Transverse-Snaps – branch / stem snapped however still attached
Lifting-bark
Unions – 2 independent branches (or double leader) fuses. Frequently Beech and Scots pine
Ivy - typically where the root forms a mat against the tree – rare for bat usage.

In total 2 trees were assessed to have bat roosting potential for singular bats (Potential Roost Feature – Individuals; PRF-I). Both these trees are located in Canon Quinn Park and the current lighting regime excludes here would not enable bats to use them.

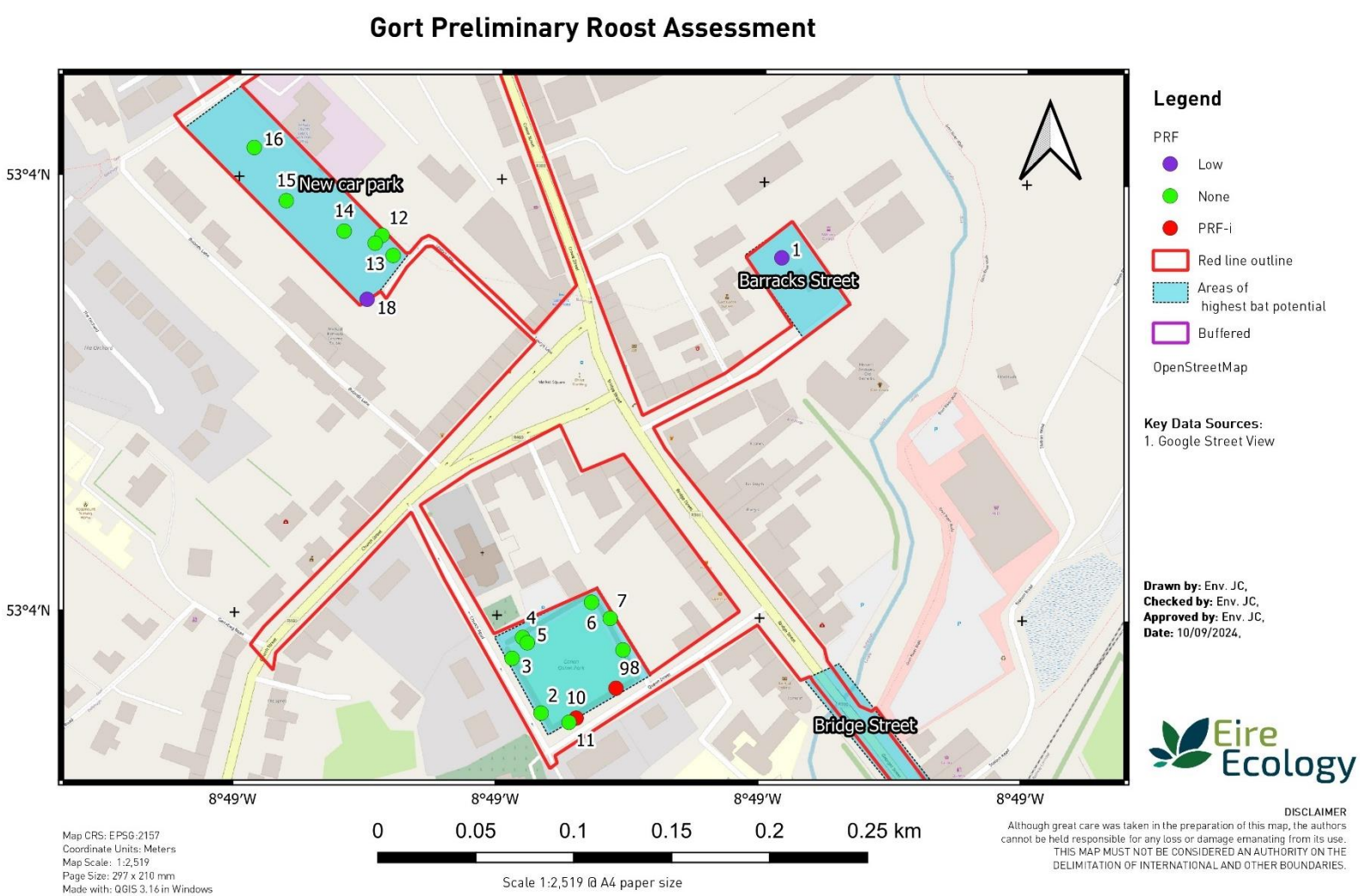


Figure 3-2: PRF locations

3.1.3 Night-time Surveys

Nighttime surveys were conducted in Gort town on the 17th of July and the 16th of September 2024. These surveys consisted of multiple surveyors recording activity levels at various points throughout the town. The purpose of surveys was to examine for roosting bats that could be impacted by the development, observe bat interactions such as commuting routes, feeding areas, and examine if there are current impediments to bats within the town.

- Underneath the bridge on bridge street.
- On bridge street examining for emerging bats from ruined wall.
- Site by the County Council office where new car park is proposed.
- Cannon park

The bat detectors used during the surveys were Wildlife Acoustics Inc. (Massachusetts, USA) EM touch pro 2s which are triggered to record when a bat call is emitted louder than 18dB for 1sec. These detectors use full spectrum sampling; detecting all frequencies simultaneously, meaning that multiple bat calls can be recorded at the same time. In addition, three NVA's (Night Vision Aids) were used to aid spotting emerging bats;

- Canon XA10 with two IR Nightfox torches
- Guidetrack Pro 19mm thermal scope
- Guidetrack Pro TK612 thermal scope

3.1.3.1 Key findings from night time surveys

3.1.3.1.1 Emergence surveys at Barracks street

No bats emerged from the ruin and activity was very low given excess lighting. The first recording occurred at 22:20 when a Common Pipistrelle was noted flying for approx. 5 minutes (31 minutes after sunset). A distant Leisler's and Soprano Pipistrelle were also recorded. Overall activity was very low.

3.1.3.1.2 Emergence survey at proposed car park by County Council building.

Soprano and Common Pipistrelle observed entering the site from the Crowe Street direction from 20:05 (20 minutes after sunset). Site has low light levels. Ruin on site had no bats emerging. There are some old stone building located along Lowry's lane to the south that have good bat potential although no emerging bats were found.

3.1.3.1.3 Bridge.

The survey at the bridge revealed the presence of Leisler's bat, Common, Soprano Pipistrelle and Daubenton's bats. Activity was exclusive to the south west side (convent direction). Daubenton's were observed flying up to the bridge before turning back. The July survey had multiple Pipistrelles hunting at once (minimum of five).

3.1.3.1.4 Canon Quinn Park

A transect through this area showed no bat activity.

3.1.4 Static bat detector surveys

Five Song Meter Mini full spectrum bat recorders were deployed within the 4 areas with suitable habitat for bats (County Council Lands, Canon-Quinn Park, on the river adjacent to the Barrack Street area, on the southern side of the bridge within a dark zone by the river and along the train tracks) for 10 nights from the 31st of May to the 10th of June, and again from the 19th of July to 30th of July.

Each bat pass does not correlate to an individual bat but is representative of bat activity levels. Some species such as the pipistrelles will continuously fly around a habitat and therefore it is likely that a series of bat passes within a similar time frame is one individual bat. On the other hand, Leisler's bats tend to travel through an area quickly and therefore an individual sequence or bat pass is more likely to be indicative of individual bats.

Detectors were programmed to commence half an hour before sunset and finish half an hour after sunrise to ensure that bat species that emerge early in the evening and return to roosts late are recorded.

The data was analyzed with Wildlife Acoustic's Kaleidoscope Pro; version 5.6.6). This software identifies many of the calls made by Irish bats. All calls were manually verified. Results presented below show some Myotis calls the surveyor is confident the bat is Natterer's bat and other Myotis Species. Distinguishing between Myotis species recordings is difficult at times (unless distinctive social calls are recorded) thus several calls are recorded to genus level only. These could be either Whiskered, Daubenton's or Natterer's bat. Detector 3, located by the river to the north of the site showed very high Myotis calls. The majority of these are likely to be Daubenton's.

Several Pipistrelle calls were recorded with a peak frequency of around 40kHz. These calls are lower than expected for Common Pipistrelle but higher than typical for Nathusius's.

Table 3-1 below provides a summary of data with full data tables provided in Appendix A. Results show number of registrations and Bat passes per hour (Bp/Hr) and divides results per species and detector. An overall average of 92.3 Bp/Hr was recorded from the Spring period, reducing to 89.9 in Summer.

Figure 3-3 below shows the location of statics detectors with size of location point based on number of registrations recorded. Detector 3 recorded Lesser Horseshoe bats in spring and summer and Detector

4 recorded Lesser Horseshoe in spring. Highest activity for this species is at Detector 3 with 39 registrations recorded over spring and summer.

Activity across the site was very high, with the highest areas of bat activity being along the river at Detectors 3 and 4 which show Bp/Hr of 134.4 and 145.1 respectively. The most common species recorded was Soprano Pipistrelle with 53,676 registrations (66%) followed by Common Pipistrelle with 22,004 (27%). Leisler's bat and unidentified Myotis species comprised 3% of recordings each with other species recorded at low levels comparatively.

It should be noted that a single bat continuously circling a small stand of trees will produce numerous recordings, thus the number of registrations cannot quantify abundance, rather activity.

Table 3-1: Summary of results from static detector surveys

Detector	Leisler's Bat	Common Pipistrelle	Soprano Pipistrelle	Pipistrelle 40 kHz	Brown Long-eared	Lesser Horseshoe Bat	Natterer's Bat	Daubenton's Bat	Unidentified Myotis	Total	Minutes recorded	Bat passes per hour
1 - County Council	425	1,590	6,785	1	0	0	25	0	96	8,922	10,908	49.1
2 - Canon-Quinn	349	541	830	0	0	0	0	0	2	1722	10,908	9.5
3 - Barracks Street by river	583	2,189	21,119	0	1	38	244	5	1519	25,698	11,471	134.4
4 – South of Bridge	558	9,706	15,821	1	2	1	2	0	281	26,372	10,908	145.1
5 - Near Tracks	706	7,978	9,121	1	0	0	29	0	354	18,189	9,188	118.8
Total	**2621**	**22,004**	**53,676**	**3**	**3**	**39**	**300**	**0**	**2,257**	**80,903**	**53,383**	**90.9**
Bat passes per hour	2.9	24.7	60.3	0.003	0.003	0.04	0.3	0.01	2.5			

Figure 3-3: Combined Bat Activity. Size of circle represents activity level (Bp/Hr)

3.1.5 Preliminary lighting survey

A preliminary examination of light sources affecting the river through the town was also conducted to establish what affect urban lighting has on the river, which may provide an important ecological corridor for bats.

3.1.5.1.1 Bridge.

Results reveal a light barrier occurring primarily on the north-east side of the river. Galway county council street lights alongside private & commercial lighting have created a barrier preventing bats from using the river as a corridor. Lights attached to the Medical Centre and Aldi (6 flood lights on the building as well as several 6m lamp posts were identified). The thermal surveys revealed a stark contrast either side of the river as mentioned above.

3.1.5.1.2 Canon Quinn Park

While some trees can be found within the park that have some potential to host a bat roost a flood light affixed to a lamp post on Church Road produces lighting at too high levels for bats.

3.1.5.1.3 Barracks street

Two lights are impacting activity in this area; a garda light and street light.

3.1.5.1.4 Car park by County Council building.

This area currently has low light levels and bats have been noted feeding in the area. While a lack of connectivity excludes the usefulness of this location for Lesser Horseshoe bats, it is utilised by local bats, particularly Pipistrelles.

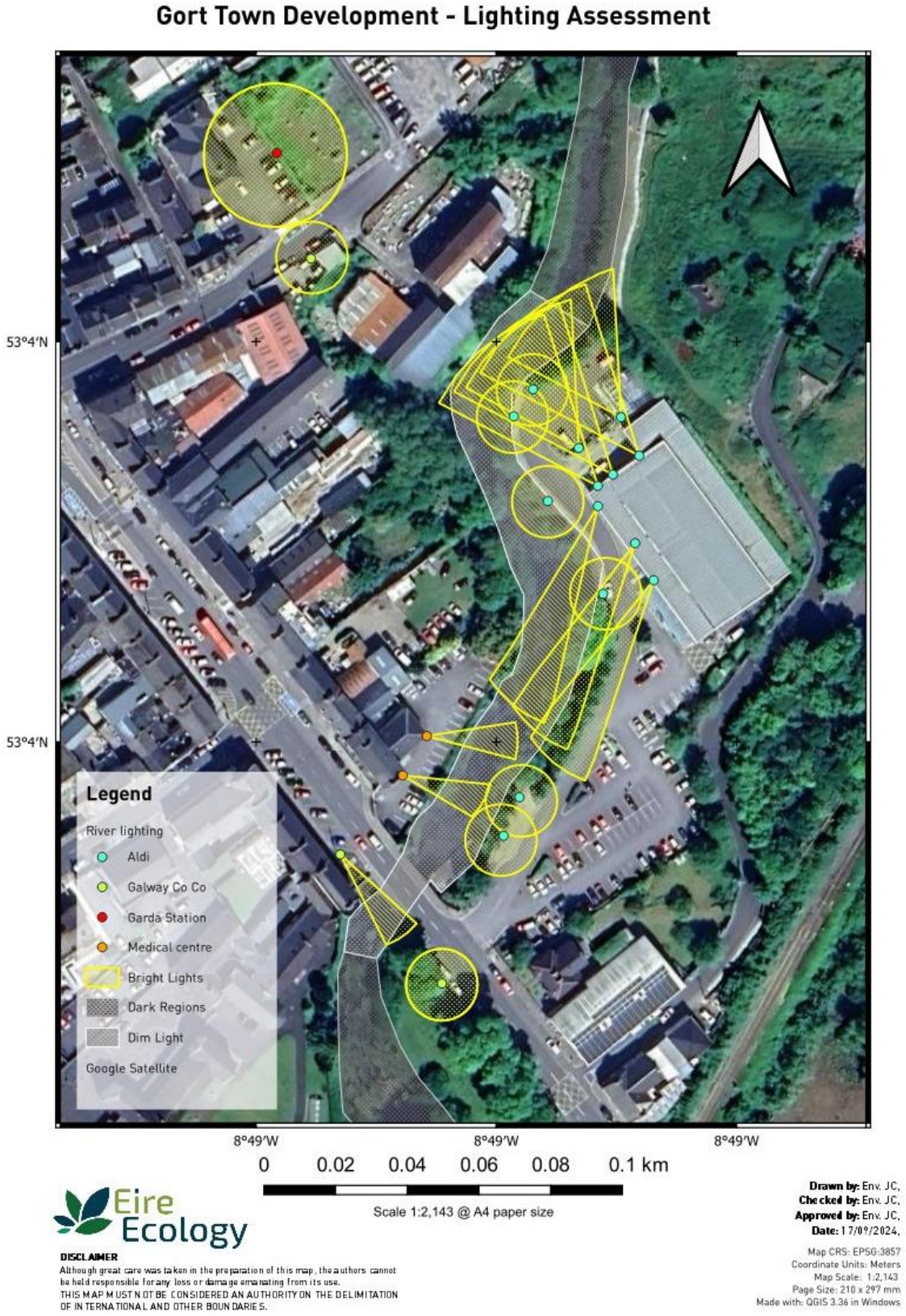


Figure 3-4: Light sources impacting on the Gort River commuting route.

4 Discussion

Seven of the nine resident Irish bat species were found within the site; Leisler's Bat, Common Pipistrelle, Soprano Pipistrelle, Brown Long-eared, Lesser Horseshoe, Natterer's Bat and Daubenton's bat.

80,903 registrations were recorded over the course of 21 nights from 5 static bat detectors placed in key locations throughout the town. Locations along the Gort River (south of the bridge and the northern end close to Barrack Street) were of highest value to bats alongside the adjoining railway. Lesser Horseshoe recordings were confined to the river. The literature review above shows the presence of Lesser Horseshoe bat roosts along a potential commuting corridor following the course of the river. These are likely satellite roosts for the larger SAC protected roosts found further to south-east and north-west of Gort (see figure 4-1 below). Night time surveys show that the existing light regime along the Gort River, particularly to the north-east of the Gort bridge is creating a barrier for low flying bats such and Daubenton's and Lesser Horseshoe, potentially severing an important commuting route.

Lowest activity was recorded in Canon-Quinn park. This is not surprising given the level of light pollution occurring here. The proposed County Council car park showed decent activity given its location within the center of a town, with activity dominated by Pipistrelle and Leisler's bats. These bats are the frequently found within urban areas and can fly high over impeding lights. One detector was placed attached to a tree close to the railway bridge. This section of land has not yet been developed and showed very high activity levels of 118Bp/Hr. Highest activity was noted along the river both to the NE and SW.

An analysis of earliest Lesser Horseshoe bats recordings was conducted (Appendix A) taking into consideration the typical emergence time of 31 minutes after sunset (Jones & Rydell, 1994). Results show the closest summer roost for this species is to the north-east (downstream along the Gort River) where several first recordings occurred approx. 20 minutes after typical emergence. In comparison, Lesser Horseshoe were recorded much less frequently and towards the middle of the night to the south-west (upstream).

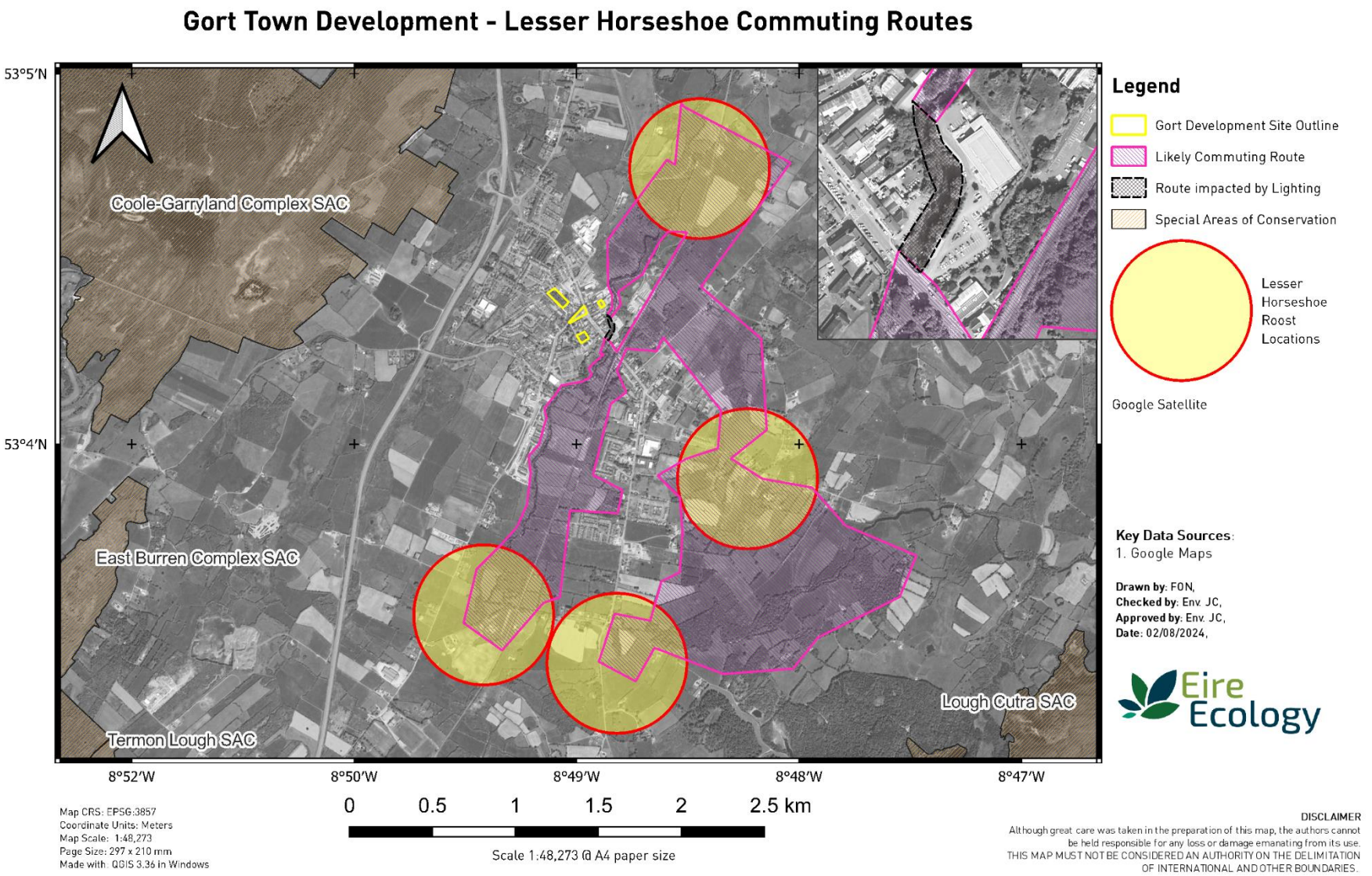


Figure 4-1: Lesser Horseshoe roosts surrounding the site alongside possible commuting corridors with SAC's designated for this species.

5 IMPACT ASSESSMENT PRIOR TO MITIGATION

Determination of impacts is derived with guidance from EPA 2022 Guidelines on the information to be contained in Environmental Impact Assessment Reports. Table 5-1 provides definitions of effect while table 5-2 provides an assessment of impacts prior to mitigation for bats recorded within the site.

5.1 LOSS OF ROOSTING HABITAT

Assessment of Potential Impacts on Roosting Bats	All structures, trees and hedge species which could be impacted by the development were assessed from ground level examining the potential to host a bat roost. No bat roosts were found.
Characterisation of unmitigated effect	The development will not have an impact on roosting bats
Assessment of Importance prior to mitigation	This has the potential to not have a significant effect on a receptor of Local Importance (Low Value).
Mitigation	Tree-felling should ideally be undertaken in the period **September to late October/early November** however can also be conducted from **late January until the end of February**. Outside of these times an EcOW will need to first verify if impacts will occur.
Residual Effect following Mitigation	With the implementation of the prescribed mitigation measures, no significant residual effects are predicted as a result of the construction works.

5.2 LOSS OF FORAGING AND COMMUTING HABITAT

Describing the Significance of Effects	**Proposed car park adjacent to County Council buildings** The proposed car park by the county council building is currently a disused section of ground with some tree cover. This area has low connectivity as it's surrounded by estates and buildings. No Lesser Horseshoe bats were recorded here however recorded, Leisler's bat, Soprano and Common Pipistrelle were observed hunting here. While trees here had low potential to host bat roosts the loss of this dark area has the potential to impact the local bat population. **Cannon Quinn Park** It is proposed to remove a line of non-native Laylands. While treelines can provide valuable roosting and landscape features usable by bats, these trees have very limited value. Static

	and emergence surveys revealed minimal bat activity within the park. The project will not result in a loss of commuting or feeding habitat along the river.
Characterisation of unmitigated effect	Without mitigation, there would be a loss of some feeding habitat for bats local to the town, particularly by the County Council lands.
Assessment of Importance prior to mitigation	This is a Low effect on receptors of Local Importance (Higher Value), and negligible impact on a receptor of International Importance (river corridor). The loss of trees within the site is not significant at a county, national or international scale.
Mitigation	Cannon Quinn Park BNP design report proposes a planting regime within the park including the use of native trees such as Sweet cherry, Strawberry tree, crab apple and hawthorn. Numerous All Ireland Pollinator Plan species have been chosen for new flowerbeds here. These should substantially increase invertebrate diversity and abundance in the park resulting in an improvement in the biodiversity value of this section. Car park by the County Council building While several trees within the proposed car park will be felled, the proposed development will see additional tree planting and rain garden species thus overall impacts in this respect will be limited.
Residual Effect following Mitigation	With the implementation of the prescribed mitigation measures, no significant residual effects are predicted as a result of the construction works. Short term slight effects on foraging and commuting are anticipated due to the temporary loss of vegetation during the construction phases.

5.3 DISTURBANCE.

Describing the Significance of Effects	**Disturbance** - Works associated with development or building work are likely to lead to an increase in human presence at the site, extra noise and changes in the site layout and local environment. **Lighting effects on feeding and commuting bats with emphasis on Lesser Horseshoe bats.** Guidance on lighting has been based on Bats and artificial lighting in the UK, Guidance Note 08/18 (BCT, 2018), EUROBATS*; Guidelines for consideration of bats in lighting projects.* (Voigt, 2018) and BCI; Bats & Lighting document; (BCI, 2010). Lighting can alter the behaviour of bats and the insects they prey on. Night flying insects can be attracted to lights particularly sources that emit an ultraviolet component or have a high blue spectral content. Whilst some species of bat such as Leisler's and Pipistrelle species can take advantage of this occurrence, other species such as Daubenton's bat and brown long-eared avoid such areas. Lighting can create barriers for bat species both entering roosts and using commuting routes such as rivers, treelined roads and woodland edges. BCI's Bats & Lighting document (BCI, 2010) states 'Brown Long-eared bats (*Plecotus auritus*) and Myotis species, commute and forage along dark wildlife corridors such as treelines and consequently shies away from highly illuminated sections. Therefore,

illumination can impede their flight to suitable feeding areas. Consideration should be given to ensure that dark wildlife corridors remain in the landscape to allow bats and other wildlife to travel safely to and from feeding habitats.' The report also states 'each species of bat has an optimum level of light for emergence. For example, Daubenton's bats prefer a light level of less than 1 lux.' While the BCT guidelines do not give a recommended level of acceptable lux levels on commuting habitats it notes 'significant effects (on bat activity) have been recorded from as low as 3.6 lux'. Eurobats guidelines state *Myotis daubentonii* and *M. mystacinus/M. brandtii* consistently avoided their preferred habitats, i.e. lakes and forest gaps, in response to the brightness of the Nordic midsummer nights.

A mitigation guideline produced by (Bat Conservation Trust, 2018) recommends that for effective mitigation to be implemented, there needs to be a collaborative effort by an ecologist in conjunction with engineers, planners and when deemed necessary by the ecologist, there should also be input from a lighting specialist and landscape designer. The guideline was designed for the UK where more bat species are concerned however there are aspects of the guideline that apply to Irish bat species. The guidelines recommend a baseline bat survey is conducted and the following areas should have no ALAN

- Roosting and swarming sites for all species
- Foraging or commuting habitat for highly light-averse species (lesser horseshoe, brown long-eared and some Myotis)
- Foraging or commuting habitat used by large numbers of bats
- Foraging or commuting habitat for rare species (Lesser horseshoe) (Bat Conservation Trust, 2018)

Gort River

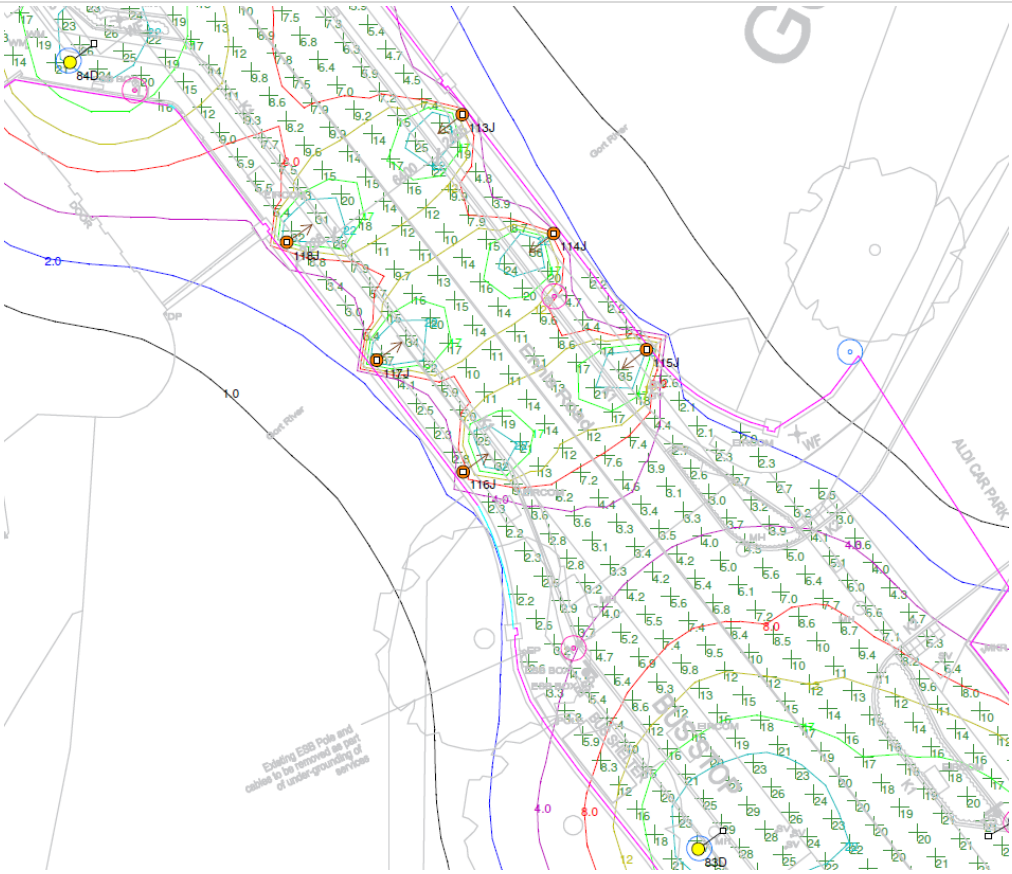
Results show bat activity during the surveys was highest along the Gort river which acts as an ecological hotspot for bats in the town. Detectors placed either side of the river were the only places where Lesser Horseshoe bats were recorded. A night time thermal survey on the river however shows several lights have created a barrier preventing low flying species such as Daubenton's and Lesser Horseshoe bats from passing. Of these lights; two are Galway County Council operated street lights.

The proposed development, without consideration could reinforce this barrier by the placement of lights that shine on the water and contain a colour content known to impact invertebrate activity (bats food source).

Other areas

Figure 3-3 above also highlights excessive lighting close to the Garda station in Barracks street. This area lies close to the northern portion of the Gort River where highest Lesser Horseshoe bat activity was recorded. Canon Quinn Park has very low levels of bat activity and is not currently of value to bats while the proposed carpark by the County Council offices lacks connectivity. It is used by local bats; mainly Common, Soprano Pipistrelle and Leisler's.

Characterisation of unmitigated effect	The proposed development will have limited impact on the local bat population with low effects on lesser horseshoe bats, which are already impacted by the current lighting regime (close to the river). However, with sufficient mitigation there is an opportunity to restore connectivity along the river. The creation of a carpark by the County Council lands will have some impact on the local bat population however activity here is limited (second lowest activity) and not of value to Lesser Horseshoe bats.
Assessment of Importance prior to mitigation	This is assessed as a long-term Significant effect on both a receptor of Local Importance (Higher Value), and on a receptor of International Importance.
Mitigation	Construction Where lighting is unavoidable during construction, low-intensity lighting and motion sensors will be used to limit illumination. Exterior lighting, during construction, will be designed to minimize light spillage, thus reducing the effect on areas outside the proposed development, and consequently on bats i.e. Lighting will be directed away from mature trees/treelines around the periphery of the site boundary and woodland areas to minimize disturbance to bats. Directional accessories will be used to direct light away from these features, e.g. through the use of light shields (Stone, 2013). The luminaries will be of the type that prevent upward spillage of light and minimize horizontal spillage away from the intended lands. Operation *Dark zone* It is essential that the Gort River ecological corridor is restored by a change of lighting along the bridge. *Lighting* A lighting plan including a lux diagram has been produced by BDP. An extract from the diagram showing the proposed lights by the bridge is shown below.



Extract from lux diagram

Lighting proposal

- Three pairs of lights will be installed on the bridge fitted at a height of 0.35m to prevent any lights shining on the river. While these lightbars have a temperature of 3000k they will sit below the top of the existing wall which will ensure they do not saturate the natural environment below. The streetlight (84D) alongside its southern neighbour (83D), identified as having some impact on the river will be replaced with a 6m pole with a directional light with a colour temp of 2200K.
- At the proposed Barracks street carpark (62G to 65G), bat friendly lighting will be installed using a colour variant lacking the blue light component particularly attractive to invertebrates. Lights here will have a 2200K colour and a reduced height of 6m. No bat roosts were found within the ruins so the main purpose is to reduce light saturation of closeby important dark zones.
- Currently, the Canon Quinn park has low bat favourability. In order to make the park more usable by bats 6m poles are proposed here with a colour component of 2200K (66A to 77A). This should allow Pipistrelle bats and Leisler's bats easier access. The spotlight shining on the park will be removed. It is expected these measures will result in a marked increase in bat activity here.
- The proposed car park by the County Council building is not a viable habitat for Lesser Horseshoe bats given a lack of connectivity to SAC habitats. Mitigation measures proposed for this section include installing reduced height lamp posts (6m); (96G to 108G) using a light without a blue component (2200k). The most frequently occurring bats found here; Soprano and Common Pipistrelle and Leisler's bat are all capable of flying above this

	height. Lights along Lowry's Lane will be positioned at a height of 3m and have a colour temp of 2200k thus allowing Pipistrelles and Leisler's to continue to use this area.
Residual Effect following Mitigation	The proposed mitigation are primarily designed to reduce the impacts of the development on Lesser Horseshoe bats given their status of being of International Importance. While the site is not a viable feeding ground, it is important that a commuting route remains open along the river. The proposed measures will help reopen the river as a commuting route although several privately owned lights will still impede the viability of the route. No significant residual effects on Lesser Horseshoe bats are expected at a county, national or international level.

6 CONCLUSION

Seven of the nine resident Irish bat species were found within the site. While no bat roosts were found, the site is utilised for feeding and commuting purposes. The site is situated in Gort, Co. Galway.

While the site is not situated within a Core Zone of Influence for SAC designated Lesser Horseshoe bat roosts the site does sit between the Coole-Garryland Complex SAC (site code: 000252), 1.2km to the north-west and the Lough Cutra SAC (site code: 000299), 2.9km to the south-east. In addition, several smaller, Lesser Horseshoe bat roosts can be found surrounding the site.

Mitigation measures have been proposed to protect commuting routes by the creation of dark corridors. Lighting has been designed so as to prevent lightning impacting on key bat features.

After mitigation, no significant long term residual impacts will occur to roosting and commuting bats. It is possible that there will be a long term slight impact on feeding bats specifically relating to bats utilising the proposed car park by the County Council offices however effects here will not impact Lesser Horseshoe bats and bats should still be able to utilise this section of the site. Conversely, bats should be able to better utilise the Canon Quinn Park due to a change of lighting and the planting of pollinator friendly species.

6.1 FURTHER RECOMMENDATIONS

- The Gort River is an important ecological corridor providing a commuting route between SAC designated Lesser Horseshoe roosts. The current lighting regime to the NE of the Gort Bridge has created a barrier for this species. It would be possible to re-open this route by making some minor changes to several privately owned lights. Approximately 14 lights (two of which are operated by Galway County Council) require alterations such as cowls or replacements to restore the functioning of the river.
- Further planting of native hedge and tree species along the river would also help provide landscape features suitable for commuting bats.
- Previous surveys along the Ennis Road identified a Lesser Horseshoe bat commuting corridor along the railway line and river to the south of Gort. Land found along the eastern side of the river and south of Georges Street (where static no 5 was placed) currently consists of pasture and treelines and provides a buffer for the river while also acting as an important area for bats. The conservation of these lands as parkland would have ecological as well as anthropogenic benefits.

APPENDIX A – TABLES, FIGURES & PHOTOS

POTENTIAL ROOST FEATURE (PRF) RESULTS

Lat	Lon	Location	Description	Potential to host a bat roost	Description
53.06765	-8.81786	Barracks Street	Ruin	Low	Invasive Old man beard present does not form mats suitable for roosting bats.
53.06555	-8.81966	Canon Qunin Park	Line	None	3 semi-mature limes
53.0658	-8.81988	Canon Qunin Park	Line	None	Lime tree
53.0659	-8.8198	Canon Qunin Park	Sycamore	None	One rot section but no cavity
53.06587	-8.81977	Canon Qunin Park	Strawberry tree	None	
53.06606	-8.81928	Canon Qunin Park	Beech	None	tear outs sealed
53.06599	-8.81914	Canon Qunin Park	Layland	None	downward facing tear off
53.06585	-8.81904	Canon Qunin Park	Layland	None	6 mature layland trees. No obvious cavities
53.06567	-8.81909	Canon Qunin Park	Oak	PRF-I	Double leader. Large tree.
53.06553	-8.81939	Canon Qunin Park	Horse chestnut	PRF-I	Canker feature likely suitable for single bat
53.06551	-8.81944	Canon Qunin Park	Holy	None	
53.06774	-8.82091	Co Co car park	Ash	None	Immature ash trees
53.0677	-8.82096	Co Co car park	Layland	None	Double leader without cavity
53.06775	-8.8212	Co Co car park	Ash	None	jackdaws present in March
53.06789	-8.82164	Co Co car park	Ash	None	Immature and young ash.
53.06813	-8.82189	Co Co car park	Ash	None	Two ash with ivy but not mat forming
53.06764	-8.82082	Co Co car park	Layland	None	

STATIC DETECTOR RESULTS

Spring / Summer breakdown

	Spring											
Detector	**Leisler's Bat**	**Common Pipistrelle**	**Soprano Pipistrelle**	**Pipistrelle 40 kHz**	**Brown Long-eared**	**Lesser Horseshoe**	**Natterer's Bat**	**Daubenton's**	**Unidentified Myotis**	**Total**	**Minutes recorded**	**Bat passes per hour**
1	109	431	1344	1	0	0	0	0	13	1898	4958	23.0
2	155	324	628	0	0	0	0	0	0	1107	4958	13.4
3	63	903	8126	0	1	12	63	0	182	9350	4958	113.2
4	449	2099	10266	0	1	1	2	0	133	12951	4958	156.7
5	87	6955	2994	1	0	0	1	0	150	10188	3238	188.8
Total	**863**	**10712**	**23358**	**2**	**2**	**13**	**66**	**0**	**478**			
Bat passes per hour	2.2	27.9	60.7	0.005	0.005	0.034	0.2	0	1.2	**35494**	**23070**	92.3
	Summer											
Detector	**Leisler's Bat**	**Common Pipistrelle**	**Soprano Pipistrelle**	**Pipistrelle 40 kHz**	**Brown Long-eared**	**Lesser Horseshoe**	**Natterer's Bat**	**Daubenton's**	**Unidentified Myotis**	**Total**	**Minutes recorded**	**Bat passes per hour**
1	316	1159	5441	0	0	0	25	0	83	7024	5950	70.8
2	194	217	202	0	0	0	0	0	2	615	5950	6.2
3	520	1286	12993	0	0	26	181	5	1337	16348	6513	150.6
4	109	7607	5555	1	1	0	0	0	148	13421	5950	135.3
5	619	1023	6127	0	0	0	28	0	204	8001	5950	80.7
Total	**1758**	**11292**	**30318**	**1**	**1**	**26**	**234**	**5**	**1779**			
Bat passes per hour	3.5	22.4	60.0	0.002	0.002	0.1	0.5	0.01	3.5	**45409**	**30313**	89.9

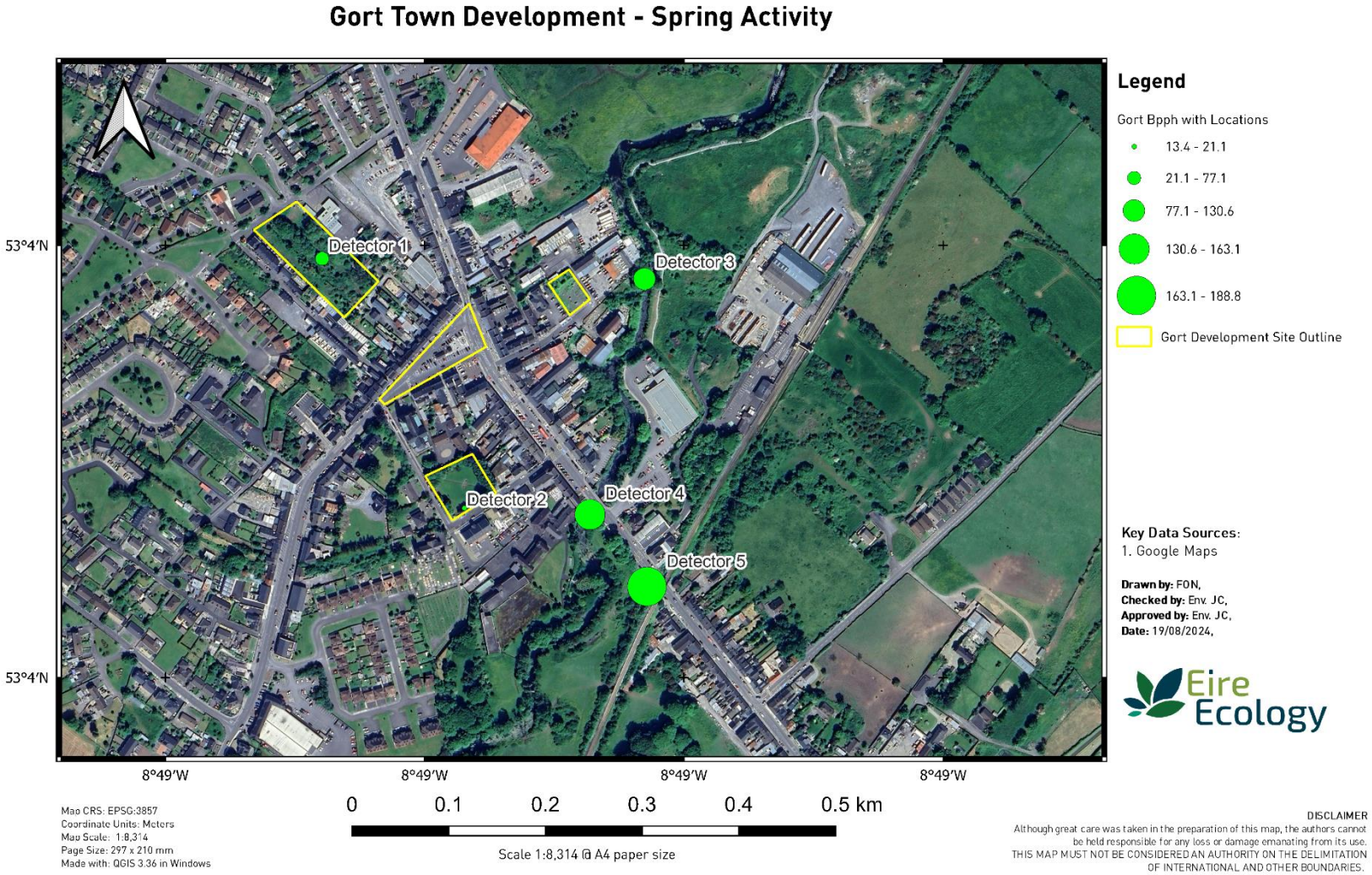
Per night results

Detector	Date	Leisler's Bat	Common Pipistrelle	Soprano Pipistrelle	Pipistrelle 40 kHz	Brown Long-eared	Lesser Horseshoe	Natterer's Bat	Unidentified Myotis	Total
1	31st May	1	23	32	0	0	0	0	0	56
1	1st June	4	19	118	0	0	0	0	0	141
1	2nd June	30	54	141	1	0	0	0	0	226
1	3rd June	11	26	72	0	0	0	0	1	110
1	4th June	5	29	160	0	0	0	0	0	194
1	5th June	15	32	170	0	0	0	0	0	217
1	6th June	19	43	112	0	0	0	0	0	174
1	7th June	10	86	132	0	0	0	0	0	228
1	8th June	8	44	247	0	0	0	0	0	299
1	9th June	6	75	160	0	0	0	0	12	253
1	19th July	12	103	159	0	0	0	2	21	297
1	20th July	12	134	710	0	0	0	2	11	869
1	21st July	29	63	671	0	0	0	1	4	768
1	22nd July	29	96	509	0	0	0	3	4	641
1	23rd July	31	50	804	0	0	0	2	6	893
1	24th July	10	24	468	0	0	0	3	19	524
1	25th July	18	37	442	0	0	0	1	1	499
1	26th July	4	44	137	0	0	0	4	7	196
1	27th July	59	196	777	0	0	0	1	2	1035
1	28th July	85	126	238	0	0	0	4	0	453
1	29th July	27	286	526	0	0	0	2	8	849
2	31st May	9	23	40	0	0	0	0	0	72
2	1st June	16	57	70	0	0	0	0	0	143
2	2nd June	30	38	80	0	0	0	0	0	148
2	3rd June	15	17	60	0	0	0	0	0	92

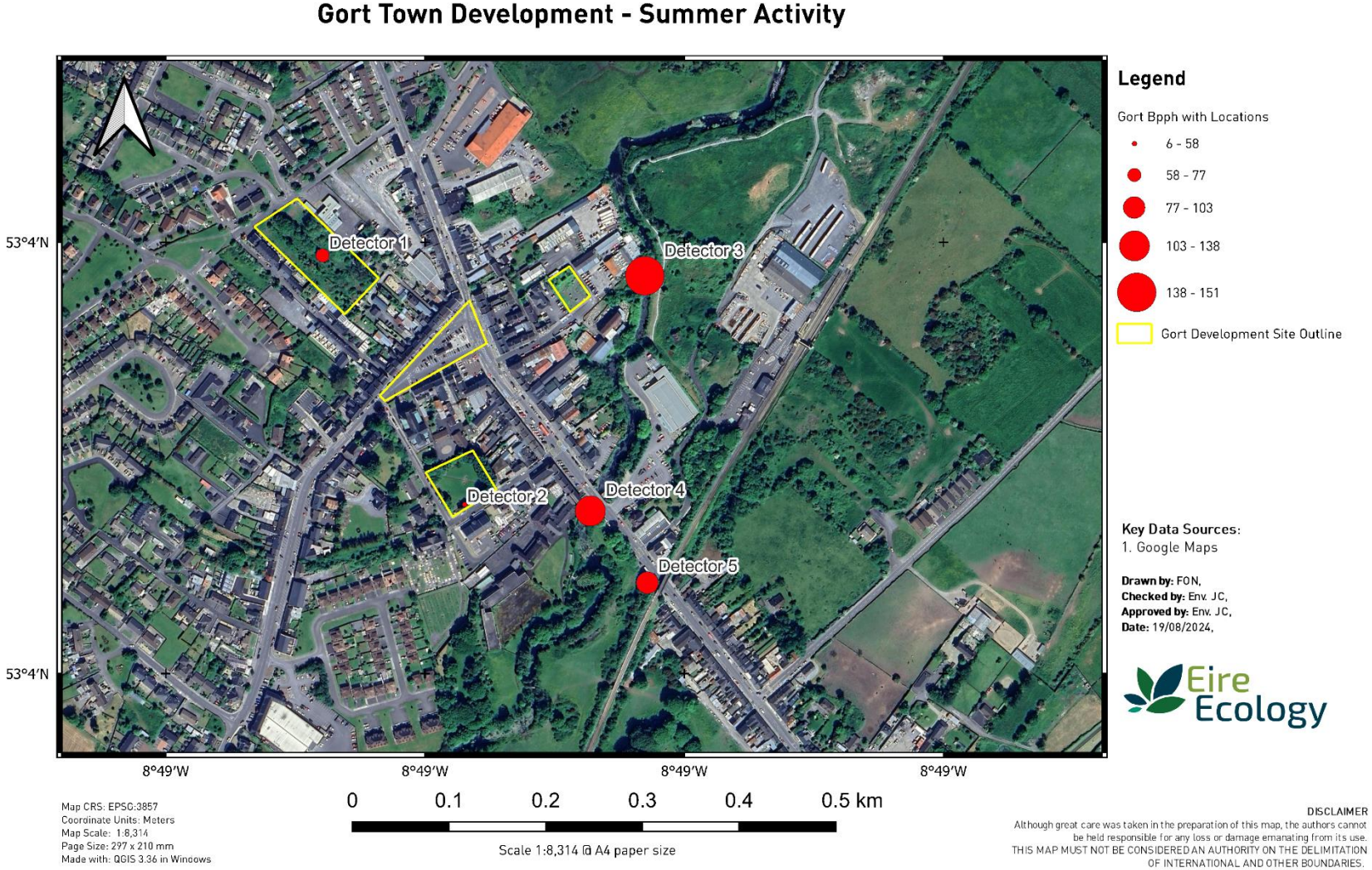
Detector	Date	Leisler's Bat	Common Pipistrelle	Soprano Pipistrelle	Pipistrelle 40 kHz	Brown Long-eared	Lesser Horseshoe	Natterer's Bat	Unidentified Myotis	Total
2	4th June	9	20	61	0	0	0	0	0	90
2	5th June	9	44	113	0	0	0	0	0	166
2	6th June	13	53	53	0	0	0	0	0	119
2	7th June	16	18	72	0	0	0	0	0	106
2	8th June	20	39	63	0	0	0	0	0	122
2	9th June	18	15	16	0	0	0	0	0	49
2	19th July	3	11	7	0	0	0	0	0	21
2	20th July	18	13	2	0	0	0	0	0	33
2	21st July	15	9	7	0	0	0	0	0	31
2	22nd July	5	0	0	0	0	0	0	0	5
2	23rd July	19	12	10	0	0	0	0	0	41
2	24th July	4	13	21	0	0	0	0	0	38
2	25th July	11	19	14	0	0	0	0	0	44
2	26th July	7	16	38	0	0	0	0	0	61
2	**27th July**	**49**	**27**	**41**	**0**	**0**	**0**	**0**	**1**	118
2	**28th July**	**49**	**64**	**34**	**0**	**0**	**0**	**0**	**1**	148
2	**29th July**	**14**	**33**	**28**	**0**	**0**	**0**	**0**	**0**	75
3	31st May	3	34	438	0	0	2	10	22	509
3	1st June	8	62	545	0	0	0	18	20	653
3	2nd June	10	96	734	0	0	0	2	26	868
3	3rd June	8	82	567	0	0	0	7	20	684
3	4th June	4	81	635	0	1	0	3	15	739
3	5th June	2	124	1444	0	0	0	3	13	1586
3	6th June	14	95	866	0	0	4	6	21	1006
3	7th June	8	105	792	0	0	0	13	17	935
3	8th June	2	160	1317	0	0	6	1	19	1505
3	9th June	4	64	788	0	0	0	0	9	865

Detector	Date	Leisler's Bat	Common Pipistrelle	Soprano Pipistrelle	Pipistrelle 40 kHz	Brown Long-eared	Lesser Horseshoe	Natterer's Bat	Unidentified Myotis	Total
3	19th July	1	317	1570	0	0	0	5	16	1909
3	20th July	39	82	1056	0	0	3	11	38	1229
3	21st July	36	82	1111	0	0	1	9	58	1297
3	22nd July	41	64	1289	0	0	0	11	88	1493
3	23rd July	84	102	995	0	0	7	19	81	1288
3	24th July	23	112	1495	0	0	1	9	165	1805
3	25th July	22	144	824	0	0	7	34	118	1149
3	26th July	9	120	2105	0	0	2	18	98	2352
3	27th July	57	61	873	0	0	2	29	250	1272
3	28th July	148	121	898	0	0	0	11	131	1309
3	29th July	57	61	734	0	0	3	25	299	1179
3	30th July	3	20	43	0	0	0	0	0	66
4	31st May	42	193	497	0	0	0	0	4	736
4	1st June	64	228	802	0	1	0	0	9	1104
4	2nd June	61	326	1229	0	0	0	0	7	1623
4	3rd June	43	225	1849	0	0	0	0	1	2118
4	4th June	35	171	364	0	0	0	0	2	572
4	5th June	27	184	1138	0	0	0	0	57	1406
4	6th June	55	170	523	0	0	1	2	6	757
4	7th June	38	162	1562	0	0	0	0	22	1784
4	8th June	48	245	1297	0	0	0	0	22	1612
4	9th June	36	195	1005	0	0	0	0	3	1239
4	19th July	1	346	258	0	0	0	0	15	620
4	20th July	8	845	290	0	0	0	0	12	1155
4	21st July	4	402	247	0	0	0	0	8	661
4	22nd July	5	512	237	0	0	0	0	8	762
4	23rd July	13	341	298	0	0	0	0	10	662

Detector	Date	Leisler's Bat	Common Pipistrelle	Soprano Pipistrelle	Pipistrelle 40 kHz	Brown Long-eared	Lesser Horseshoe	Natterer's Bat	Unidentified Myotis	Total
4	24th July	6	782	573	0	0	0	0	10	1371
4	25th July	6	921	561	0	0	0	0	8	1496
4	26th July	3	1297	820	0	0	0	0	23	2143
4	27th July	24	688	868	0	1	0	0	21	1602
4	28th July	28	582	437	0	0	0	0	19	1066
4	29th July	11	891	966	1	0	0	0	14	1883
5	31st May	10	793	318	0	0	0	0	6	1127
5	1st June	20	1201	379	0	0	0	0	5	1605
5	2nd June	23	931	391	0	0	0	1	20	1366
5	3rd June	11	1171	347	0	0	0	0	7	1536
5	4th June	3	1033	550	0	0	0	0	10	1596
5	5th June	12	1167	678	1	0	0	0	42	1900
5	6th June	8	659	331	0	0	0	0	60	1058
5	7th June	0	0	0	0	0	0	0	0	0
5	8th June	0	0	0	0	0	0	0	0	0
5	9th June	0	0	0	0	0	0	0	0	0
5	19th July	20	11	280	0	0	0	0	21	332
5	20th July	41	95	1099	0	0	0	2	11	1248
5	21st July	35	112	536	0	0	0	9	21	713
5	22nd July	82	143	703	0	0	0	0	11	939
5	23rd July	94	90	587	0	0	0	0	9	780
5	24th July	19	95	409	0	0	0	2	10	535
5	25th July	24	92	418	0	0	0	2	18	554
5	26th July	19	49	522	0	0	0	0	8	598
5	27th July	128	118	452	0	0	0	2	27	727
5	28th July	111	130	648	0	0	0	2	22	913
5	29th July	46	88	473	0	0	0	9	46	662



Location of statics with size of point based on total bat activity across all species.



Summer location of statics with size of point based on total bat activity across all species.

LESSER HORSESHOE BAT EMERGENCE ANALYSIS

Lesser Horseshoe bat first recordings per night from static surveys									
Detector 3	Species & emergence times (Mins. after Sunset)				Detector 4	Species & emergence times (Mins. after Sunset)			
Date	Sunset Time	Typical Emergence	First Recording	Difference	Date	Sunset Time	Typical Emergence	First Recording	Difference
31st May	21:40	22:10	22:39	00:29	31st May	21:40	22:10	-	-
1st June	21:42	22:12	-	-	1st June	21:42	22:12	-	-
2nd June	21:43	22:13	-	-	2nd June	21:43	22:13	-	-
3rd June	21:44	22:14	-	-	3rd June	21:44	22:14	-	-
4th June	21:45	22:15	-	-	4th June	21:45	22:15	-	-
5th June	21:46	22:16	-	-	5th June	21:46	22:16	-	-
6th June	21:47	22:17	22:37	00:20	6th June	21:47	22:17	-	-
7th June	21:48	22:18	-	-	7th June	21:48	22:18	00:56	02:38
8th June	21:49	22:19	22:42	00:23	8th June	21:49	22:19	-	-
9th June	21:49	22:19	-	-	9th June	21:49	22:19	-	-
19th July	21:38	22:08	-	-					
20th July	21:37	22:07	23:11	01:04					
21st July	21:35	22:05	01:13	03:08					
22nd July	21:34	22:04	-	-					
23rd July	21:33	22:03	23:16	01:13					
24th July	21:31	22:01	03:17	05:16					
25th July	21:30	22:00	00:55	02:55					
26th July	21:28	21:58	03:38	05:40					
27th July	21:26	21:56	22:33	00:37					
28th July	21:25	21:55	-	-					
29th July	21:23	21:53	22:43	00:50					
30th July	21:21	21:51	-	-					
Detector 3 was positioned to the northeast of Gort while detector 4 was placed to the south west (see figure 3-3). Results indicate Lesser Horseshoe bats appear to be roosting closer to the northeast side.									

PHOTOS

Plate 1: Soprano Pipistrelle hunting by shed to south of proposed car park

Plate 2: 5 Soprano Pipistrelle hunting along the SW end of the Gort bride. Bats would fly under the bridge but not past excessive lights.

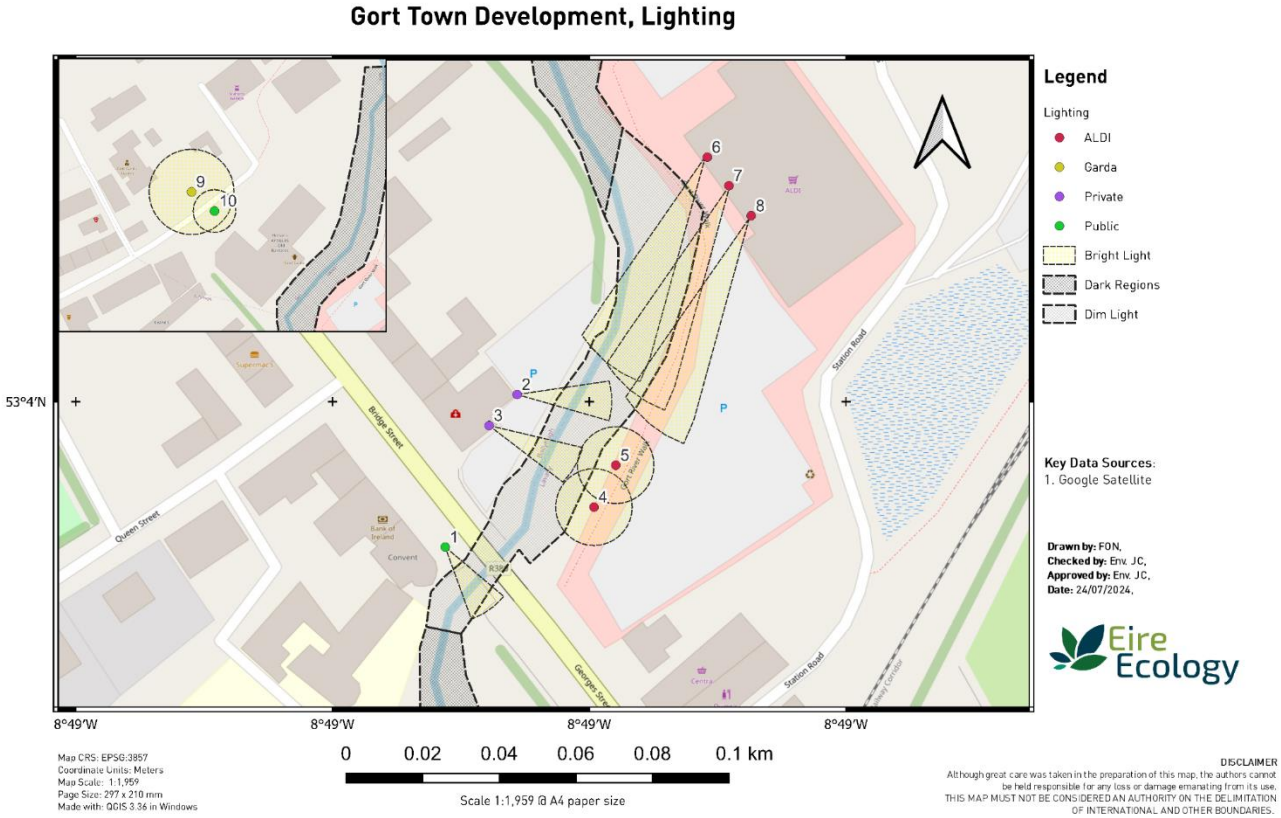


Figure 1: Map showing location of below photos

Plate 3: Obs.1 Public streetlight in front of Bank of Ireland.

Plate 0-4; Obs. 2 & 3 - Private rear lights on roof and above rear door.

Plate 0-5: Obs. 4 - Aldi Streetlamps

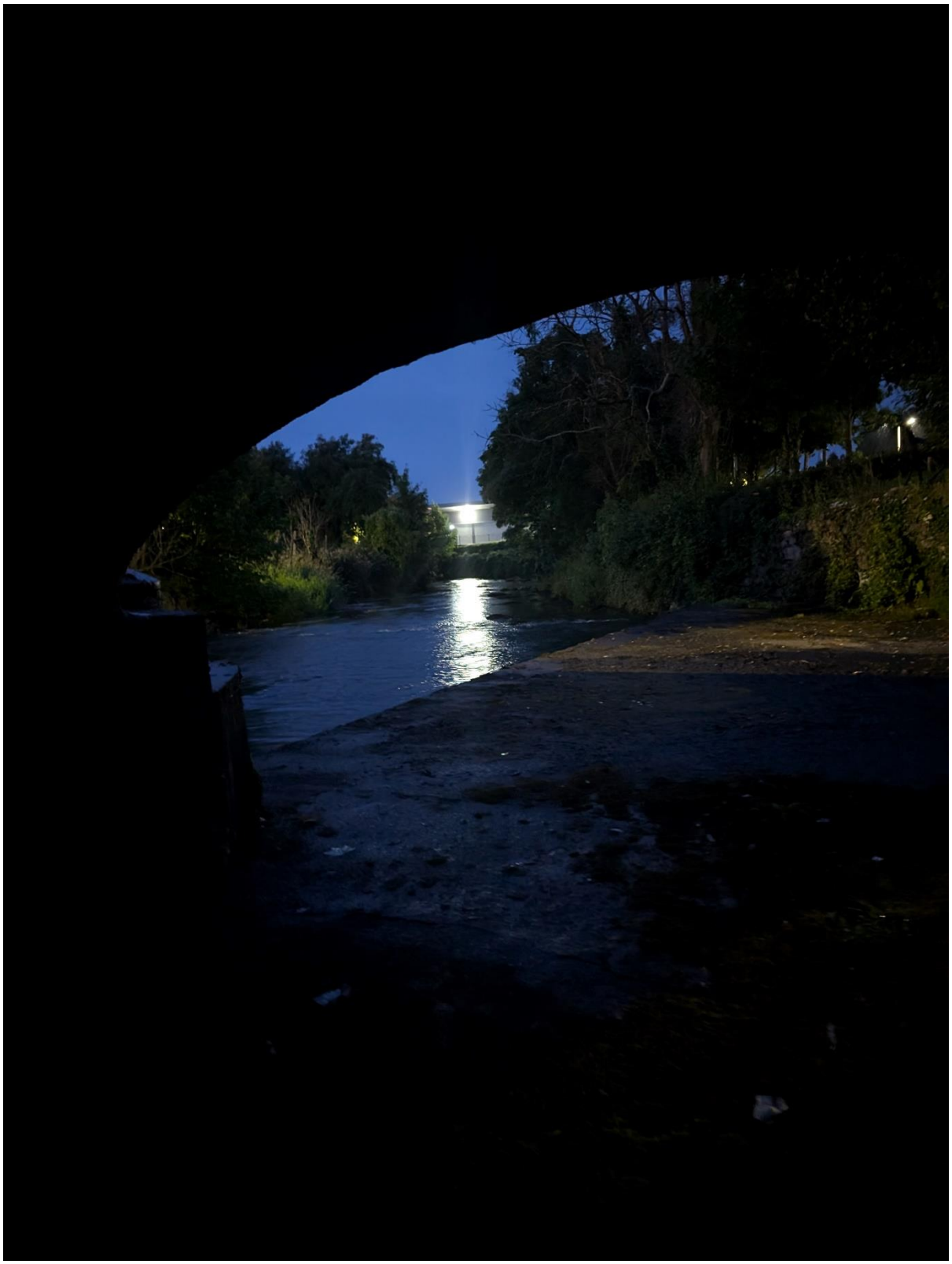


Plate 0-6: Obs. 6 - Bright Aldi Light shines directly down river.

Plate 0-7: Obs. 6,7 & 8 – White Lights on ALDI building.

Plate 0-8: Obs. 9 & 10: Orange Streetlight and White light in Garda station.