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Office of Public Works

Graiguenamanagh/Tinnahinch Flood Relief Scheme

Bat Survey Report

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1 Introduction

1.1 Overview

ByrneLooby has been appointed by The Office of Public Works (OPW) for the development and implementation of a flood relief scheme (FRS) for a section of the River Barrow that flows through Graiguenamanagh-Tinnahinch. Periods of high rainfall have resulted in parts of the town being flooded frequently in recent years. Graiguenamanagh (Co. Kilkenny) is situated on the northern side of the Barrow, while Tinnahinch (Co. Carlow) is situated on the southern side. For the purpose of this report, and in line with the nomenclature used for the FRS as a whole, the locality is referred to as Graiguenamanagh-Tinnahinch. The overall scheme study area is shown in Figure 1.1.

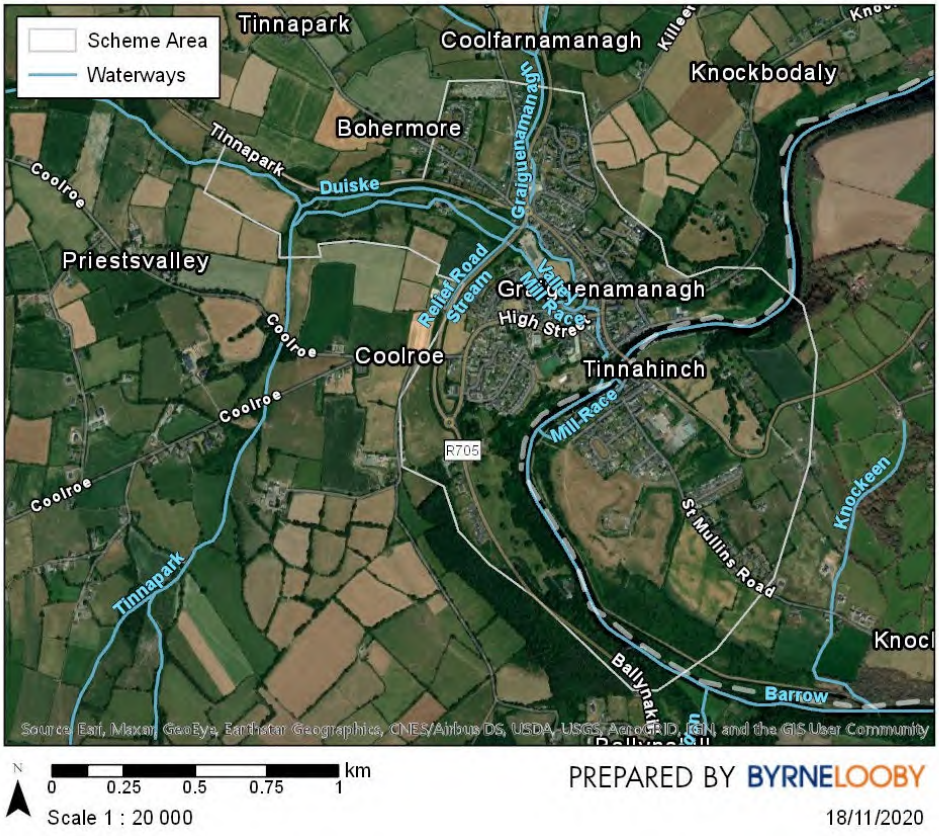

Figure 1.1. Overall Scheme Study Area

All Irish bats are protected under national and EU legislation. Both the animals themselves and their roosts are protected and it is an offence to disturb or interfere with them without a licence. Such a derogation (which must be given by the Minister for the Environment, Heritage and Local Government) can only be sanctioned where there is no satisfactory alternative and where it will not be detrimental to the favourable conservation status of the species concerned.

With due cognisance of the protection of all bat species, ByrneLooby were requested to carry out a survey of the development area to ascertain if the proposed development area was being used, or had the potential to be used, by bats. See Figure 1.2 for an overview of the survey area. The results of this survey will form part of a constraints study for the proposed project.

This report details the findings of a bat survey of the development area carried out in September 2020 by Steven Tooher MSc.

1.2 Statement of Authority

Steven Tooher has been working as a professional ecologist since July 2015. He has experience in a wide variety of aquatic and terrestrial surveys. He has a BSc. (Hons.) in Zoology from University College Cork, and a MSc. In Environmental Resource Management from University College Dublin.

He has considerable experience undertaking protected species surveys in Ireland, including plants, bats and bird surveys for a variety of public and private entities.

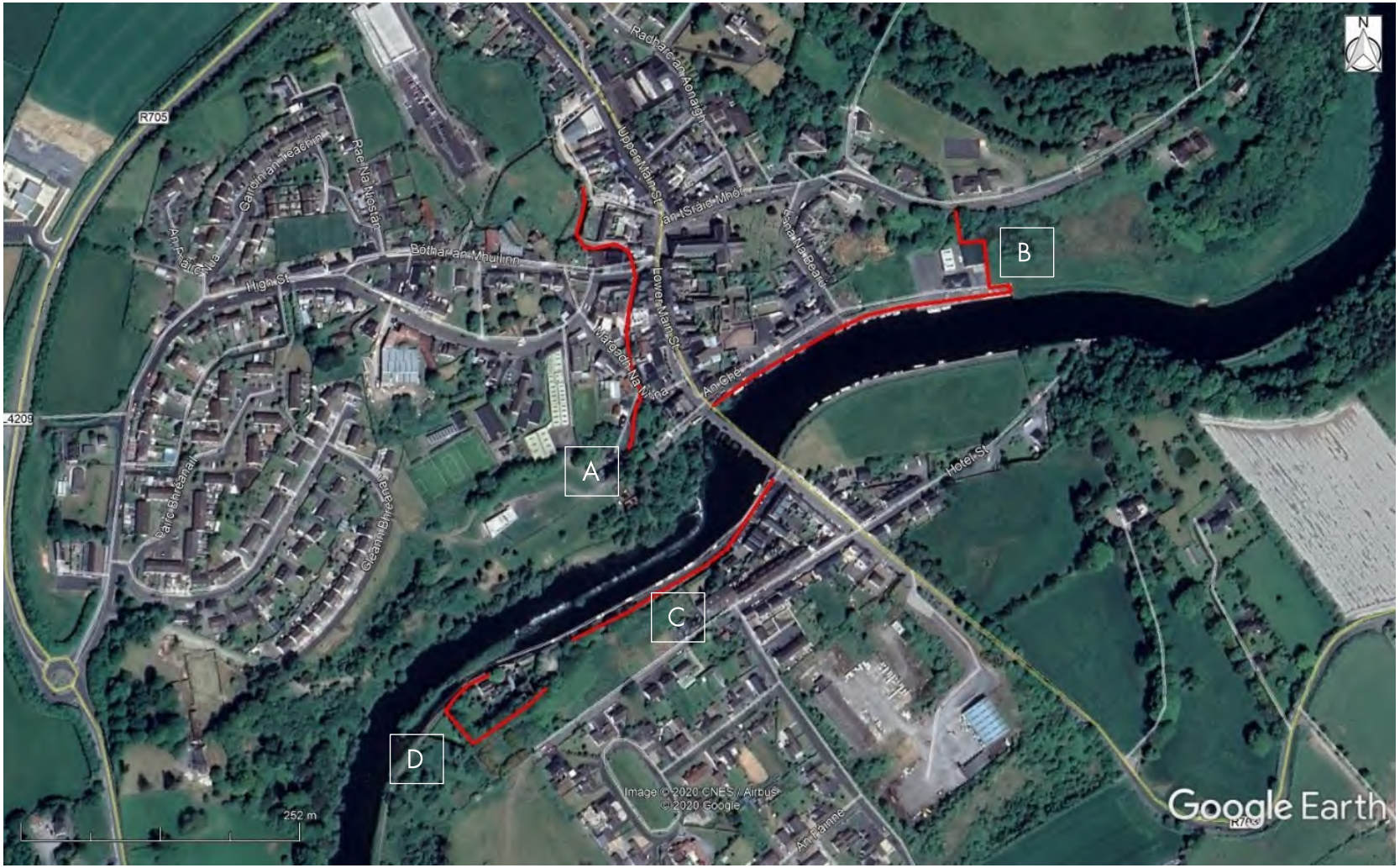

Figure 1.2. Graiguenamanagh-Tinnahinch Bat Survey Routes (shown as red lines)

2 Methodology

2.1 Guidance and background information

This report has been prepared with reference to the following European Directives, national legislation and guidance on bat mitigation.

- Bat Conservation Trust (2015). Bat Surveys for Professional Ecologists – Good Practice Guidelines (3rd edition).
- Council Directive (92/43/EEC) of 21 May 1992 on the conservation of natural habitats and of wild flora and fauna.
- Kelleher, C. & Marnell, F. (2006) Bat Mitigation Guidelines for Ireland. Irish Wildlife Manuals, No. 25. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.
- National Roads Authority (2005). Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes. National Roads Authority, Dublin.
- Wildlife Acts 1976 to 2018.

2.2 Study Area

The survey area focused on the areas shown in Figure 1.2 where works are proposed to be implemented (as per correspondence from the OPW).

2.3 Survey Methodology

A desk assessment of potential bat habitats in the wider geographical area was conducted. Existing records of historical bat sightings were obtained from the National Bat Database of Ireland, which is maintained by Bat Conservation Ireland (BCI) and available from the National Biodiversity Data Centre (NBDC).

An initial survey of the site was carried out during daylight hours on 14th of September 2020 to gain an overview of the site with regard to its potential use by bats. Sites deemed to be suitable for roosting bats were noted and recorded on a handheld GPS device (Garmin GPSMAP 64S). Notes were taken on the habitats and general appearance of the environment along the entire survey route. The information gathered during the daytime survey is presented in Section 4.

Potential roost sites were revisited at dawn and dusk on the following two nights/mornings to establish whether they were being used as roosts by bats. Bat activity was monitored using a heterodyne bat detector (Magenta Bat5), with which it was possible to identify species based on their echolocation frequency. The results of this survey are presented in Section 5.

3 Description of the Study Area and Survey Routes

Graiguenamanagh-Tinnahinch is located on the border between counties Kilkenny and Carlow, where the River Barrow and the River Duiske converge. The town is known for its attractive examples of 18th and 19th-Century civil engineering structures and architecture. The survey routes A, B, C and D (as shown in Figure 1.2) are described below. All potential roost locations are shown in Figure 3.1 at the end of this section.

3.1 Survey Route A

This route starts at the southern end of a lane known as Turf Market. Further south is a recreational area that is frequently occupied by caravans. At the bottom of Turf Market there is a pair of old stonework buildings that were erected c. 1800. They are separated by a narrow passageway known as Peg Washington's Lane, which connects Turf Market to a narrow footpath alongside the River Duiske. Both buildings were considered to have potential as bat roosts, due to their old stonework and abandoned appearance. There were potential entry/exit points on both buildings. These potential roosts were labelled PR1 and PR2 respectively.

The River Duiske at this location is approximately 2 metres wide and flows over cobbles and boulders. Flow at the time of surveying was considered to be moderate. Immediately upstream there is some mixed broadleaved woodland, which has foraging potential. No obvious potential bat roosting sites were observed in this area.

Further upstream, Route A passes by some modern bridges and a weir before encountering another old stone building with an abandoned appearance. From examining the 25-inch OSI maps available online, it appears that this building may have been a smithy. It is partially-overgrown with *Hedera helix* (ivy) and *Parthenocissus quinquefolia* (Virginia creeper). This was also considered a potential roost site (PR3).

Further north, domestic dwellings are crowded along both sides of the River Duiske. One of the buildings appeared to be in disuse - window panes were absent and the interior appeared to have been undisturbed for some time. A stockpile of refuse bags and other miscellaneous items were being stored inside, and there appeared to be sufficient shelter so as to be another potential roost site (PR4). Some bramble and willow scrub was noted along the opposite side of the river.

It is possible to access the Duiske further upstream via a historic feature known as the Bianconi Archway. This leads to a small patio, flowerbed and a small assembly of chairs and tables. It has the appearance of belonging to the adjacent pub (Mick Doyle's). This area looks out onto the Duiske, and to its rear is another old building with similarly old stonework. It is unclear what the present use of the building is, but it is suggested that stables existed here when Mick Doyle's pub used to be a hotel and stopping point for horse-drawn 'Bianconi Cars' in the 19th and early

20th Century. Some slit openings exist along the riverside wall, which along with its disused appearance, contributes to the building's potential as another roost site (PR5).

3.2 Survey Route B

Starting at the northern end of the bridge, travelling east.

The majority of this route consists of a tarmacked road, with buildings on one side and a quay on the other. The quay was populated with pleasure craft (barges etc.) at the time of the site visit. The quay wall dates from c. 1900[1] and is constructed with stone blocks. Concrete bollards line the edge of the quay. There is very little vegetation along this stretch, with the exception of a small marshy/grassy area by the bridge. This area is fringed by *Typha latifolia*, but grades into grasses towards the roadside. Several specimens of *Impatiens glandulifera* (Himalayan balsam) were noted. A couple of *Salix cinerea* (grey willow) shrubs were also noted.

At the eastern end of Route B, the survey route winds its way up a hill behind a scout hall and rowing club. The low-lying parts of this section are occupied by semi-natural grassland and bramble scrub, but a mixed broadleaved woodland sits at the top of the hill. The woodland was easiest accessed from Chapel Street to the north. It is home to several large specimens of *Fraxinus excelsior* (ash) and *Acer pseudoplatanus* (sycamore), and had a notable coverage by *Clematis vitalba*.

The riverside portion of Survey Route B is considered generally unsuitable for roosting bats. Whilst there may be crevices etc. in old stonework along the quay walls, the frequent boat activity in this area is sufficient to deter bats from roosting. The willow shrubs are too young to have any of the characteristics that make an attractive vegetative roost (cracks, hollows etc.). The woodland up the hill behind the scout centre and rowing club contains some large trees that may have these physical properties (cracks, hollows etc.). This site was therefore noted as a potential roost (PR6).

3.3 Survey Route C

Starting at the southern end of the bridge, moving west.

Much like Route B above, the southern embankment of the river along Route C is tarmacked and built up as a quayside. Pleasure craft lined much of Route C at the time of the survey. It is the site of a former towpath; a canal exists further west. The height of the quay wall has been recently increased in this area to provide some degree of flood protection to the adjacent residential properties. The landward side of Route C is at first residential, comprising mostly modern buildings. After ~150 metres a small stream is apparent – this may have been a mill race for an old starch works that operated on the quayside between 1842-1919. The landward

[1] https://www.buildingsofireland.ie/buildings-search/building/12318002/graiguenamanagh-county-kilkenny

habitat from this point on along Route C is dominated by a hedgerow, which can be called a treeline in some areas where trees are >5m in height. Species noted were:

Acer pseudoplatanus (Sycamore)
Salix cinerea (Grey willow)
Crataegus monogyna (Hawthorn)
Impatiens glandulifera (Himalayan balsam)
Fraxinus excelsior (Ash)
Hedera helix (Ivy)
Lonicera periclymenum (Honeysuckle)
Sambuca nigra (Elder)

This area was noted as potential foraging habitat, but was not considered a likely roosting area for bats. There were no potential roost sites noted along Survey Route C.

3.4 Survey Route D

Continuing west from the end of Route C and looping around Tinnahinch Castle.

The former towpath approaches small group of buildings; one of these is Tinnahinch Castle, which was constructed in 1615 and has been in ruins since approximately 1700. It is possible to access the interior of the castle walls, which are all that remains of the structure. Several ash shrubs form a partial canopy 3-4 metres in height. The old stonework and abandoned nature of the building suggest that this is a potential roost (PR9).

A canal lock exists further west along the former towpath. The bankside wall was lined with 1m^2-sandbags in this area. A ~1m-wide strip of common reeds (*Phragmites australis*) extends into the watercourse along the bankside wall – this is no longer a mooring point for boats. A grey heron (*Ardea cinerea*) was observed standing in this area. A treeline begins opposite the lock on the landward side of the towpath. A large cypress tree (*Cupressus* sp.) was considered large enough to have features compatible with potential bat roosts (cracks, hollows etc. inside which bats can crawl) (PR7). Approximately 25 metres further west, a mature horse chestnut was observed (*Aesculus hippocastanum*), the top of which appears to have fallen or broken off (evidenced by a jagged break line, distinct from a clean chainsaw cut). This was also considered a potential bat roost (PR8). The proximity of PR7 and PR8 to each other meant that it would later be possible to survey this small stretch of treeline as one potential roost site (i.e. PR7/8).

The remainder of this treeline, which extends south and east around Tinnahinch castle, was not accessible on foot. This treeline does contain other examples of large mature trees, all of which have potential as foraging grounds or commuting routes for bats, and some of which may also have features attractive to roosting bats.

All potential roost locations identified during the daytime walkover are shown in Figure 3.1 overleaf.

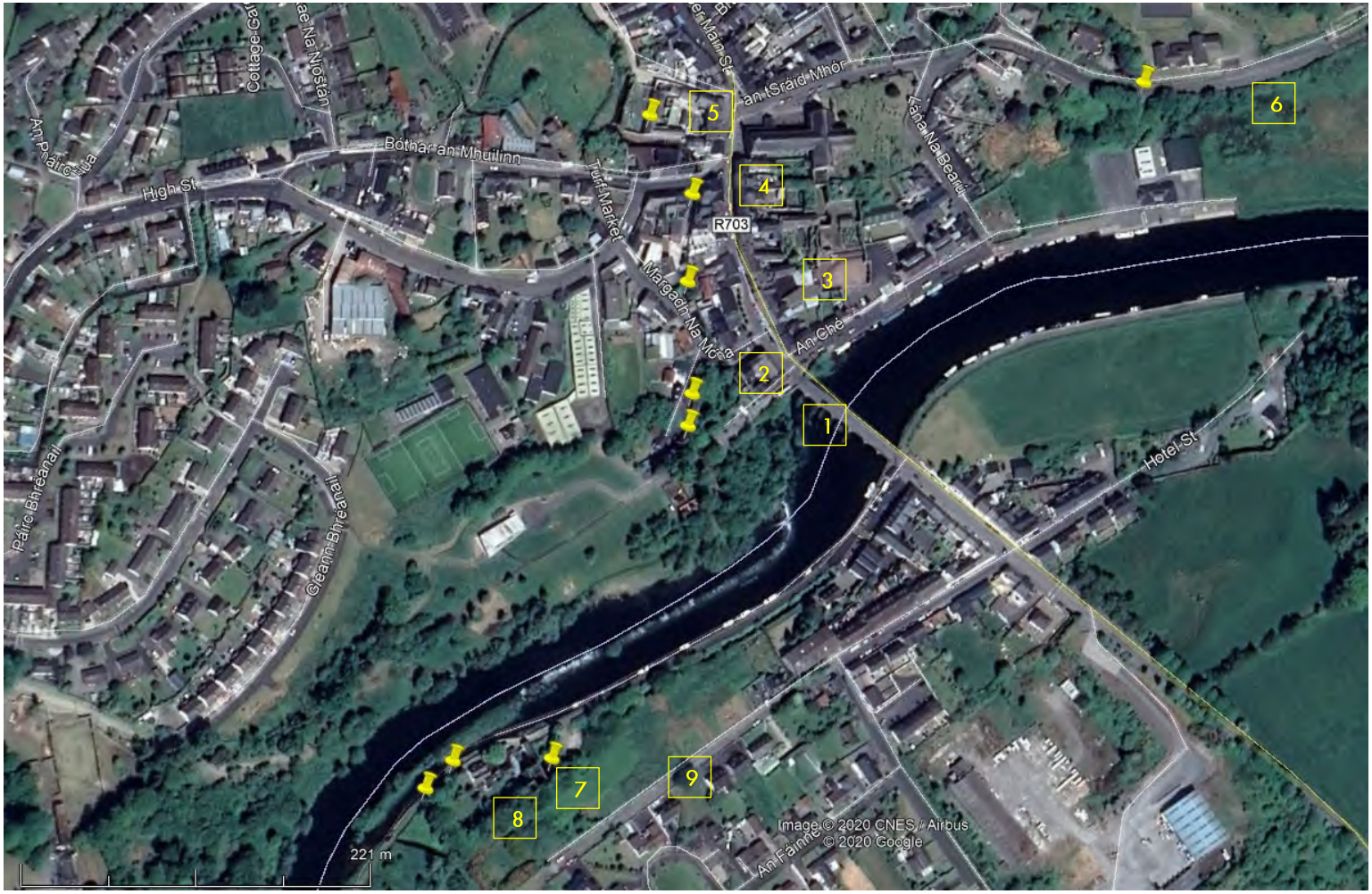

Figure 3.1. Potential Roost Sites

4 Results

This section provides the results of the desk-based study exercise and the site surveys.

4.1 Existing Data

4.1.1 Habitat Suitability

The National Biodiversity Data Centre (NBDC) has compiled data on the suitability of areas as habitats for bats. The table below provides a 'suitability index' for all bats, as well as each individual species known in Ireland. The suitability index is a number between 0 and 100, with 0 being least suitable and 100 being most suitable. The data in Table 4.1 pertains to a 6 x 6 km square, as shown in Figure 4.1.

Table 4.1. Suitability Indeces for bats in the 6km square in which the study area is located

Scientific Name	Common Name	Suitability Index
All bats		31.67
Pipistrellus pygmaeus	Soprano pipistrelle	38
Plecotus auritus	Brown long-eared bat	47
Pipistrellus pipistrellus	Common pipistrelle	48
Rhinolophus hipposideros	Lesser horseshoe bat	5
Nyctalus leisleri	Leisler's bat	38
Myotis mystacinus	Whiskered bat	33
Myotis daubentonii	Daubenton's bat	29
Pipistrellus nathusii	Nathusius' pipistrelle	1
Myotis nattereri	Natterer's bat	46

Figure 4.4.1. Location of the NBDC's 6-km square, to which the data in Table 4.1 relates

The above data suggests that the site and its surroundings generally have a moderate-to-high habitat suitability for bat usage. The area is deemed most suitable for brown long-eared bats and common pipistrelles. The surrounding landscape is reasonably diverse, comprising a mixture of agricultural grassland, silviculture and urban land-uses, which are punctuated by a network of criss-crossing treelines/hedgerows and a river system. The diverse landscape, as well as the presence of ecological corridors (in the form of hedgerows/treelines and rivers) are what drives the high habitat suitability index for bats in this area.

4.2 National Bat Database of Ireland

Nationwide records of bat observations are collected and maintained by Bat Conservation Ireland. The data come from a number of different surveys, some of which have been undertaken by BCI and their members. With regard to Graiguenamanagh-Tinnahinch, bats have been recorded in the locations shown in Figure 4.2. For the purpose of this report, the locations have been labelled A-D. The data are summarised in the table below.

Table 4.2. Existing records

Location	Species	Date(s) recorded
A	*Myotis daubentonii*	27 times between 2006-2014
B	*Myotis daubentonii*	07/03/2003
C	*Pipistrellus pygmaeus*	08/04/2000
		04/06/2012
	Pipistrellus pipistrellus	04/06/2012
	Nyctalus leisleri	04/06/2012
	Plecotus auritus	04/06/2012
D	*Nyctalus leisleri*	08/03/2000
	Pipistrellus pipistrellus	08/03/2000

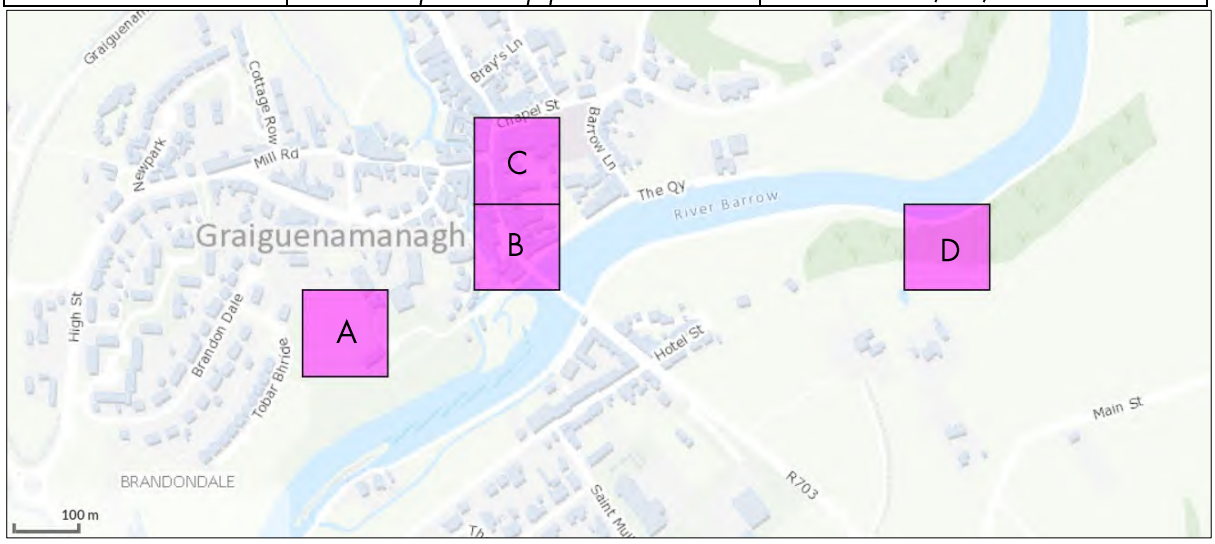

Figure 4.4.2. Locations of existing bat records (Source: NBDC, 2020)

4.3 Dawn/Dusk Surveys

Dawn and dusk surveys were carried out during September 2020 as summarised in Table 4.3.

Table 4.3 Survey dates and times

Survey and Date	Sunrise/Sunset	Start time	End time	Weather
Dusk (14/09/2020)	19:44 (Sunset)	19:25	21:29	Overcast, dry
Dawn (15/09/2020)	07:03 (Sunrise)	05:10	07:05	Overcast, dry
Dusk (15/09/2020)	19:43 (Sunset)	19:30	21:25	Clear, dry
Dawn (16/09/2020)	07:05 (Sunrise)	05:12	07:09	Clear, dry

The first two surveys focused on potential roost sites PR1-PR6. The ecologist moved between them continuously for the duration of the survey. Five minutes were spent at each site before moving onto the next one, where the process was repeated. The bat detector was used to detect evidence of bats emerging from or returning to a roost. Records of any foraging or commuting bats were also made. The last two surveys focused on potential roost sites PR7-PR9. The results are presented in Table 4.4 below.

Table 4.4 Dawn/Dusk Survey Results

Potential Roost ID	GPS		Surveys (Dawn/Dusk) – Positive or Negative for Emerging or Returning Bats				Comments – species etc.
	X	Y	Dusk 14/09/20	Dawn 15/09/20	Dusk 15/09/20	Dawn 16/09/20	
PR1	-6.955894	52.539381	-ve	-ve			No bats observed in, emerging from or returning to this structure. Fly-bys of foraging Soprano Piipstrelles and Daubenton's bat.
PR2	-6.955857	52.539562	+ve	+ve			See comments overleaf. Fly-bys of foraging Soprano Pipistrelles
PR3	-6.955904	52.540196	-ve	-ve			No bats observed in, emerging from or returning to this structure. Fly-by of foraging Common Pipistrelle
PR4	-6.955866	52.540692	-ve	-ve			No bats observed in, emerging from or returning to this structure. Fly-bys of foraging Soprano Pipistrelles
PR5	-6.956265	52.541137	-ve	-ve			No bats observed in, emerging from or returning to this structure. Fly-bys of foraging Soprano Pipistrelles and Daubenton's bat.
PR6	-6.951671	52.541341	-ve	-ve			No bats observed in, emerging from or returning to this structure. Fly-bys of foraging Soprano Pipistrelles
PR7	-6.958062	52.537479			-ve	-ve	7 and 8 are close enough so that they can be observed simultaneously from the same vantage point. No bats observed in, emerging from or returning to these structures.
PR8	-6.958316	52.537321			-ve	-ve	

							Almost constant foraging activity from Soprano Pipistrelle. Fly-bys of Daubenton's bats also observed.
PR9	-6.957142	52.537495			+ve	+ve	See comments overleaf.

4.4 Evidence of Roosting Bats

There was sufficient evidence to suggest that bat species (Soprano Pipistrelles) were roosting at PR 2 and PR 9 as follows:

PR2 – During the dusk survey, soprano pipistrelles appeared to be circling inside the building (frequent pulses were recorded on detector, suggesting bats were flying past the window). During the dawn survey the following morning, a number of Soprano Pipistrelles (clearest at ~55 kHz, erratic flight patterns) were observed circling before disappearing from view towards the northern end of the building. The exact point of exit/entry was not observed.

PR9 – During the dusk survey (observing from inside the castle walls), Soprano Pipistrelles were observed emerging over the top of the northern wall. Some descended into the castle and circled for a short time before leaving. The dawn survey yielded a similar pattern, with Soprano Pipistrelles circling before disappearing from view over the northern wall. The exact point of exit/entry was not observed.

5 Discussion

5.1 Overview of the Species Recorded

The **common pipistrelle** (*Pipistrellus pipistrellus*) is widespread throughout the country and commonly encountered during bat surveys. The most recent estimates suggest a population size in the order to 1-2 million animals, making it one of the most common mammals in Ireland. It is very general in its habitat preference, foraging in woodland, riparian habitats and parkland, along linear features in farmland, and in towns and cities. Maternity roosts of this species are often in buildings, typically in the attics of dwelling houses, although it is occasionally found roosting under bridges and in trees. Recent monitoring by NPWS has reported that there is no evidence of any decline in the range or habitat for this species in Ireland and that the population is increasing. The available NPWS reporting notes that there is no indication of any major pressures currently impacting populations of this species. Overall, the species is assessed as "Favourable" and the overall trend is demonstrating an on-going increase (NPWS, 2019).

The **soprano pipistrelle** (*Pipistrellus pygmaeus*) is the most widespread bat species on the island of Ireland, occurring in all counties including the extreme north, west and south. It is the second most commonly encountered species in the national bat monitoring programme, although its abundance is variable across the island with no particular north-south or east-west pattern apparent. Summer roosts are usually in buildings, including modern suburban houses, old abandoned mansions, churches, amenity buildings and farm sheds. Soprano pipistrelles normally roost in very confined spaces, such as behind window sashes, under tiles and weather-boards, behind fascia and soffits, and within the cavities of flat roofs. Roosts of >1,500 individuals are known. The species is thought to hibernate in buildings and trees, but has seldom been recorded in winter. Although this bat is known to forage in a broad range of habitats, it shows some preference for aquatic habitats – riparian woodland, rivers and lakes. The population of this species has been increasing significantly and steadily in recent years. Given the widespread distribution and very large population present in the country, no threats or pressures are considered significant (NPWS, 2019).

The **Daubenton's bat** (*Myotis daubentonii*) is found throughout Ireland. It forages over water and is particularly associated with slow-moving rivers and with lakes. It favours waterways with riparian vegetation, particularly broadleaf woodlands, and is positively associated with good water quality and invertebrate diversity. It is less likely to be present where there are street lights. This species forages over the surface of water bodies, gaffing aquatic insects such as non-biting midges, caddis-flies and mayflies. The majority of roosts known for this species are in masonry bridges and stone buildings such as castles and ruins. The Daubenton's bat is widespread across Ireland and its population is showing signs of increase. The species exploits a habitat niche which is widely available in Ireland and despite some local reductions in quality (e.g. due to light pollution) there appears to be sufficient suitable habitat going forward. The NPWS reporting notes that Light pollution is a particular concern for Myotis bats such as Daubenton's

bat. Removal of riparian vegetation, bridge repairs and drainage works may also provide some cause for concern for this species and these issues merit further study.

However, there is no current evidence to date of an impact on Daubenton's bat distribution due to these issues (NPWS, 2019).

5.2 Overview of Bat Use of the Survey Site

Graiguenamanagh-Tinnahinch is an old town that has retained much of its centuries-old stonework. The presence of the Rivers Barrow and Duiske, as well as numerous patches of scrub, hedgerows, treelines and woodland, cumulatively offer attractive foraging and commuting habitats for several species of bats. These observations are supported by the existing data available online from the National Biodiversity Data Centre and Bat Conservation Ireland.

Two of the potential roost sites identified during the daytime survey showed evidence of roosting soprano pipistrelles. Bat activity (in the form of fly-bys) was recorded at all potential roost sites, which indicates that the area as a whole is an important resource for foraging and/or commuting bats. Light pollution is more notable on the northern side of the River Barrow (i.e. PR1-6), which is where the bulk of the town centre is located.

It is noted that the project is in early stages of planning, and specific structural details of the proposed flood defence measures are not yet available. The significance of these potential roost sites in relation to the proposed works is therefore currently unclear.

5.2.1 Recommendations for Further Study

Once more detail becomes available pertaining to the proposed structural alterations to the site (including the proposed methods of construction), the site should be re-visited for the purpose of:

- Surveying key locations (e.g. where it is known that potential roosting habitat will be removed or disturbed)
- Obtaining more detailed information about any potential bat roosts (i.e. whether it is a maternity roost, hibernaculum etc.)

This information will inform any considerations of mitigation measures that may need to be implemented.

As all Irish bats and their roosts are protected under national and EU legislation it is an offence to disturb or interfere with them without a licence. Such a derogation (which must be given by the Minister for the Environment, Heritage and Local Government) can only be sanctioned where there is no satisfactory alternative and where it will not be detrimental to the favourable conservation status of the species concerned. Therefore, any falling of trees or work on bridges

which provide suitable roost habitat for bats should be sought in advance of any development that may interfere with such roost sites.

6 References

Bat Conservation Trust (2015). *Bat Surveys for Professional Ecologists – Good Practice Guidelines* (3rd edition). London.

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