

10. BIODIVERSITY

10.1 Introduction

This report has been prepared by Padraic Fogarty of OPENFIELD Ecological Services. Pádraic Fogarty has worked for over 20 years in the environmental field and in 2007 was awarded an MSc from Sligo Institute of Technology for research into Ecological Impact Assessment (EcIA) in Ireland. OPENFIELD is a full member of the Institute of Environmental Management and Assessment (IEMA).

This report provides for an assessment of the potential impacts to biodiversity of the proposed development.

Article 3 of the EIA Directive requires that *"The environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors:... (b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;"*

And

Annex IV point 4 of the EIA Directive requires *"A description of the factors specified in Article 3(1) likely to be significantly affected by the project: ... biodiversity (for example fauna and flora) ..."*

Under Article 6(3) of the Habitats Directive (Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora), a screening for 'appropriate assessment' of projects must be carried by the competent authority to assess, in view of best scientific knowledge, if that proposed development, individually or in combination with another plan or project is likely to have a significant effect on the European site. A full AA is required if it cannot be excluded, on the basis of objective information, that the proposed development, individually or in combination with other plans or projects, will have a significant effect on a European site. The Habitats Directive has been transposed into Irish law by European Communities (Birds and Natural Habitats) Regulations 2011 – 2015. This assessment is carried out by the competent authority, in this case An Bord Pleanála. The AA Screening report is presented separately.

10.2 Site Visit

The assessment was carried out in accordance with the following best practice methodology: Draft 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports (Environmental Protection Agency, 2017) and 'Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland' by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018).

A site visit was carried out on the 5th of February 2018, the 1st of June 2018 and the 2nd of February 2019. The site was surveyed in accordance with the Heritage Council's Best Practice Guidance for Habitat Survey and Mapping (Smith et al., 2011). Habitats were identified in accordance with Fossitt's Guide to Habitats in Ireland (Fossitt, 2000). A species list for each habitat was compiled and these are presented in Appendix 1 of this report. Species abundance was determined using the DAFOR scale (D = Dominant; A = Abundant; F = Frequent; O = Occasional; R = Rare), a subjective estimation but nevertheless a useful mode of habitat description. Sample digital photos were also taken. Data were then uploaded to the ArcView 9.2 GIS software suite.

The nomenclature for vascular plants is taken from *The New Flora of the British Isles* (Stace, 2010) and for mosses and liverworts *A Checklist and Census Catalogue of British and Irish Bryophytes* (Hill et al., 2008).

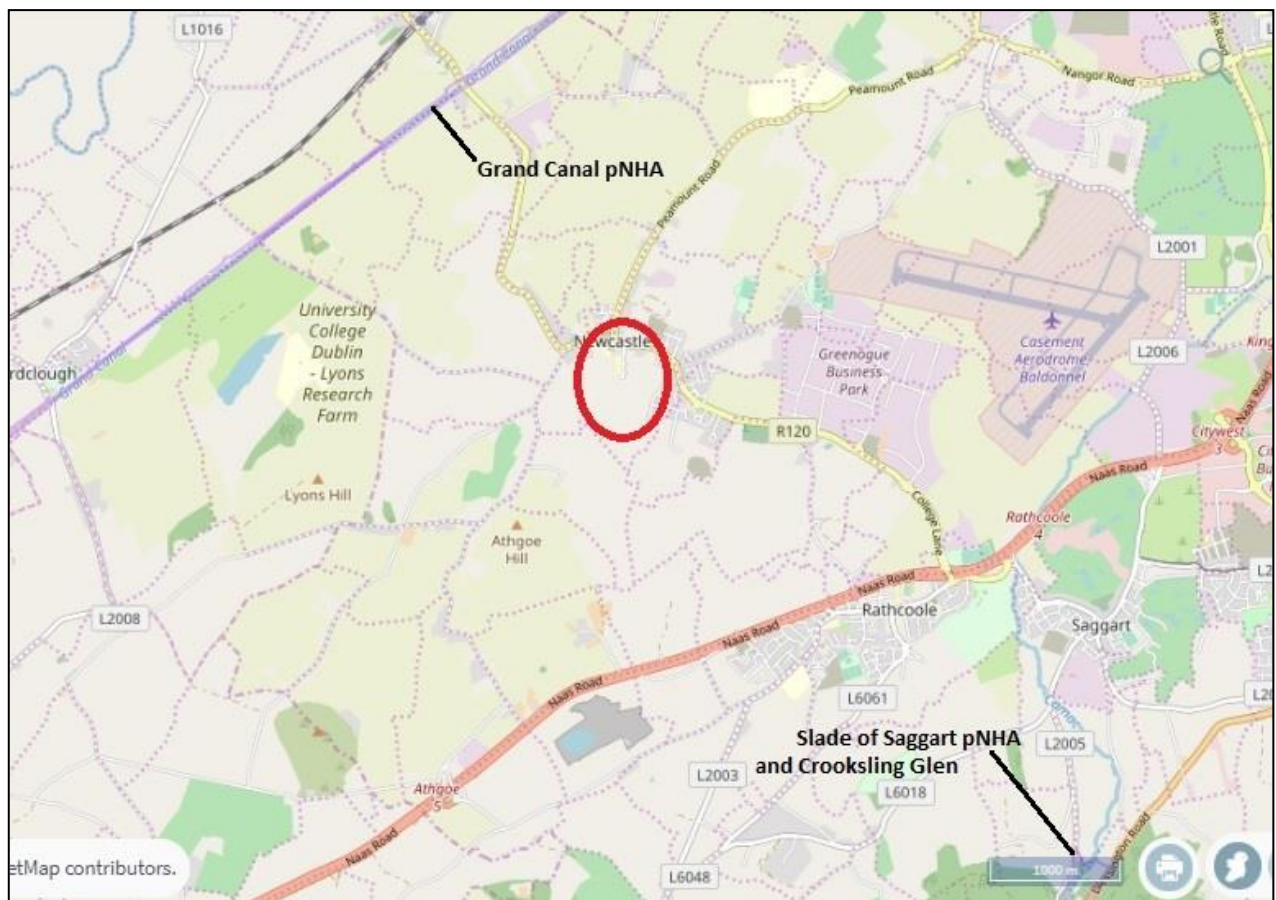
June lies within the optimal survey period for general habitat surveys (Smith et al., 2010) and so a full description of habitats has been made. February is within the optimal period for mammal surveying (with the exception of bats) as tracks and other field signs can easily be read. A separate series of bat surveys was undertaken during the optimal survey period. June is within the season for surveying breeding bird activity. It was possible to classify all habitats on the appropriate level

10.3 The Existing Receiving Environment

10.3.1 Zone of Impact

Best practice guidance suggests that an initial zone of influence be set at a radius of 2km for non-linear projects (IEA, 1995). However, some impacts are not limited to this distance and so sensitive receptors further from the project footprint may need to be considered as this assessment progresses. This is shown in Figure 10.1.

Figure 10.1 Approximate 2km radius of proposed site showing areas designated for nature conservation



There are a number of designations for nature conservation in Ireland including National Park, National Nature Reserve, RAMSAR site, UNESCO Biosphere reserves, Special Protection Areas (SPA – Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (Birds Directive), Special Areas of Conservation (SAC – Habitats Directive); and Natural Heritage Areas. The mechanism for these designations is through national or international legislation. The Birds Directive has been transposed into Irish law by the European Communities (Birds and Natural Habitats) Regulations 2011 – 2015 Proposed NHAs (pNHA) are areas that have yet to gain legislative protection. They are generally protected through the relevant County Development Plan. There is no system in Ireland for the designation of sites at a local or county level. The following area was found to be located within an approximate 2km radius of the application site:

Grand Canal pNHA (site code: 2104): This water course was constructed in the late 18th Century to provide a transport link between Dublin and the River Shannon. It fell into disuse following the opening of railway lines however has undergone a renaissance since the 1960s as an amenity area. It has significant wildlife value. The short 'site synopsis' is given by the National Parks and Wildlife Service (NPWS) and is reproduced here in its entirety:

"The Grand Canal is a man-made waterway linking the River Liffey at Dublin with the Shannon at Shannon Harbour and the Barrow at Athy. The Grand Canal Natural Heritage Area (NHA) comprises the canal channel and the banks on either side of it. The canal system is made up of a number of branches - the Main Line from Dublin to the Shannon, the Barrow Line from Lowtown to Athy, the Edenderry Branch, the Naas and Corbally Branch and the Milltown Feeder. The Kilbeggan Branch is dry at present, but it is hoped to restore it in the near future. Water is fed into the summit level of the canal at Lowtown from Pollardstown Fen, itself an NHA.

A number of different habitats are found within the canal boundaries - hedgerow, tall herbs, calcareous grassland, reed fringe, open water, scrub and woodland.

The hedgerow, although diverse, is dominated by Hawthorn (*Crataegus monogyna*). On the limestone soils of the midlands Spindle (*Euonymus europaeus*) and Guelder-rose (*Viburnum opulus*) are present.

The vegetation of the towpath is usually dominated by grass species. Where the canal was built through a bog, soil (usually calcareous) was brought in to make the banks. The contrast between the calcicolous species of the towpath and the calcifuge species of the bog is very striking. The diversity of the water channel is particularly high in the eastern section of the Main Line - between the Summit level at Lowtown and Inchicore. Arrowhead (*Sagittaria sagittifolia*) and Watercress (*Nasturtium officinale*) are more common in this stretch than on the rest of the system. All sites for Hemlock Water-dropwort (*Oenanthe crocata*) on the Grand Canal system are within this stretch.

The aquatic flora of the Corbally Extension of the Naas Branch of the canal is also very diverse, with a similar range of species to the eastern Main Line.

Otter spraints are found along the towpath, particularly where the canal passes over a river or stream.

The Common Newt breeds in the ponds on the bank at Gollierstown in Co. Dublin.

The Rare and legally protected Opposite-leaved Pondweed (*Groenlandia densa*) (Flora Protection Order 1987) is present at a number of sites in the eastern section of the Main Line, between Lowtown and Ringsend Basin in Dublin.

The ecological value of the canal lies more in the diversity of species it supports along its linear habitats than in the presence of rare species. It crosses through agricultural land and therefore provides a refuge for species threatened by modern farming methods." (NPWS, 1995)

Slade of Saggard and Crooksling Glen pNHA (site codes: 0211): The following description of the site is taken from the most recent site synopsis report from the NPWS (1997):

"This site is located in the south-west of the county and stretches from Brittas northwards to approximately 2 km south of Saggart. The northern half of the site comprises a river valley with steep tree-covered sides, while the southern side is flatter and contains two small lakes, the Brittas Ponds.

The trees are mostly of planted origin with fine specimens of Beech (*Fagus sylvatica*), Ash (*Fraxinus excelsior*), Oak (*Quercus spp.*) and Birch (*Betula spp.*) occurring. The ground flora is well developed with Common Dog-violet (*Viola riviniana*), Wood Sanicle (*Sanicula europaea*), Wood Sorrel (*Oxalis acetosella*), Bluebell (*Hyacinthoides non-scripta*) and Three-nerved Sandwort (*Moehringia trinervia*). The marshy edges of the stream have Brooklime (*Veronica beccabunga*) and Marsh Speedwell (*Veronica scutellata*). Marsh Orchid (*Dactylorhiza incarnata*) occurs in one place.

Higher up the valley, in Crooksling Glen the vegetation becomes more natural and shrubs and trees such as Guelder Rose (*Viburnum opulus*), Whitebeam (*Sorbus hibernica*) and Goat Willow (*Salix caprea*) appear. The herbaceous layer includes Red Campion (*Silene dioica*), Wood Speedwell (*Veronica montana*) and Lady's Mantle (*Alchemilla glabra* and *A. filicaulis subsp. vestita*). Yellow Archangel (*Lamium galeobdolon*), a Red Data Book species, has been recorded from this site.

The chalcid Halticoptera patellana (Hymenoptera) was recorded from the site in 1981, the only Irish record for this species up to at least 1989.

South of Crooksling Glen are Brittas Ponds, a Wildfowl Sanctuary, that supports a variety of wildfowl, including Teal, Mallard, Pochard and Tufted Duck. The ponds themselves are of interest for the aquatic plants they support (including Shoreweed (*Littorella uniflora*), a rare plant in Dublin) and the marginal areas of freshwater marsh and wet grassland vegetation found.

The site includes a good example of a wooded river valley and a small wetland system. The presence of a Rare plant, a Rare invertebrate and a variety of wildfowl species adds to the interest of the site."

The NPWS web site (www.npws.ie) contains a mapping tool that indicates historic records of legally protected species within a selected Ordnance Survey (OS) 10km grid square. The Newcastle site is located across two OS squares: N92 and O02 and three species of protected mammal and flowering plant are highlighted. These species are detailed in Table 10.1. It must be noted that this list cannot be seen as exhaustive as suitable habitat may be available for other important and protected species.

In summary it can be seen that of the protected plants only the Opposite-leaved Pondweed is current. This aquatic plant is confined to the Grand Canal.

Additional records of protected species are available from the database of the National Biodiversity Data Centre. Table 10.2 lists mammal species that are protected under the Wildlife Acts 1976 to 2018 and highlights those for which there are current records in these 10km squares. As can be seen there are a number of species of bat as well as larger mammal species for which there are current records in this area.

Table 10.1 Known records for protected species within the N92 and O02 10km square

Species	Status and habitat ^{1 2}
Red hemp nettle <i>Galeopsis angustifolia</i>	Tilled fields and waste places. Records pre-1970
Opposite-leaved pondweed <i>Groenlandia densa</i>	Ditches streams and canals. Records current
Hammarbya paludosa Bog Orchid	Wet spongy bogs, usually in tufts of Sphagnum moss. Currently found around the Glenasmole reservoir. Record from 1894.
Misopates orontium Lesser Snapdragon	Arable fields. Record pre-1930.
Pseudorchis albida Small-white Orchid	Upland pastures and heaths. Records pre-1930
Sanguisorba officinalis Great burnet	Lakes shores and dry banks. Record pre-1930.
Cervus nippon Sika Deer	Coniferous woodland and adjacent heath. Current.
Otter <i>Lutra lutra</i>	Rivers, coasts and wetlands. Recent records are from the Grand Canal (i.e. since 2010) ³

Table 10.2 Protected mammals in Ireland and their known status within the zone of influence (Harris & Yalden, 2008)⁴ Those cells that are greyed out indicate no records for this species in the N92 or O02 squares.

Species	Level of Protection	Habitat	Red List Status ⁵
Otter <i>Lutra lutra</i>	Annex II & IV Habitats Directive;	Rivers and wetlands	Near Threatened
Lesser horseshoe bat <i>Rhinolophus hipposideros</i>	Wildlife (Amendment) Act, 2000	Disused, undisturbed old buildings, caves and mines	Least Concern
Grey seal <i>Halichoerus grypus</i>	Annex II & V Habitats Directive;	Coastal habitats	Not assessed
Common seal	Wildlife (Amendment) Act, 2000		Not assessed

¹ Preston et al., 2002² Parnell et al., 2012³ Bailey & Rochford, 2006⁴ Excludes marine mammals⁵ Marnell et al., 2009

<i>Phocaena phocaena</i>			
Whiskered bat <i>Myotis mystacinus</i>	Annex IV Habitats Directive; Wildlife (Amendment) Act, 2000	Gardens, parks and riparian habitats	Least Concern
Natterer's bat <i>Myotis nattereri</i>		Woodland	Least Concern
Brown long-eared bat <i>Plecotus auritus</i>		Woodland	Near Threatened
Leisler's bat <i>Nyctalus leisleri</i>		Woodlands and buildings	Least Concern
Common pipistrelle <i>Pipistrellus pipistrellus</i>		Farmland, woodland and urban areas	Least Concern
Soprano pipistrelle <i>Pipistrellus pygmaeus</i>		Rivers, lakes & riparian woodland	Least Concern
Daubenton's bat <i>Myotis daubentonii</i>		Woodlands and bridges associated with open water	Least Concern
Nathusius' pipistrelle <i>Pipistrellus nathusii</i>		Parkland, mixed and pine forests, riparian habitats	Least Concern
Irish hare <i>Lepus timidus hibernicus</i>	Annex V Habitats Directive;	Wide range of habitats	Least Concern
Pine Marten <i>Martes martes</i>	Wildlife (Amendment) Act, 2000	Broad-leaved and coniferous forest	Least Concern
Hedgehog <i>Erinaceus europaeus</i>	Wildlife (Amendment) Act, 2000	Woodlands and hedgerows	Least Concern
Pygmy shrew <i>Sorex minutus</i>		Woodlands, heathland, and wetlands	Least Concern
Red squirrel <i>Sciurus vulgaris</i>		Woodlands	Near Threatened

Irish stoat <i>Mustela erminea hibernica</i>		Wide range of habitats	Least Concern
Badger <i>Meles meles</i>		Farmland, woodland and urban areas	Least Concern
Red deer <i>Cervus elaphus</i>		Woodland and open moorland	Least Concern
Fallow deer <i>Dama dama</i>		Mixed woodland but feeding in open habitat	Least Concern
Sika deer <i>Cervus nippon</i>		Coniferous woodland and adjacent heaths	Not assessed

Water quality in rivers is monitored on an on-going basis by the Environmental Protection Agency (EPA). It assesses the pollution status of a stretch of water by analysing the invertebrates living in the substrate as different species show varying sensitivities to pollution. They arrive at a 'Q-Value' where Q1 = pristine quality and Q5 = grossly polluted (Toner et al., 2005). OS and EPA mapping show that no significant water courses flow through, or close to, the site boundary. The www.wfdireland.ie website shows that the site is located across a watershed of two catchments: the Liffey Lower (the bulk of the open lands to the west) and the Griffeen Lower (lands to the east). The Cornerpark Stream flows through the built-up portion of the lands to the east and is largely culverted along this stretch. No water courses are found to the west until the channel of the River Liffey. Both catchments therefore drain to the River Liffey and on into the Irish Sea at Dublin Bay. Along the Griffeen there is an EPA monitoring station at the bridge east of Miltown, and which was last sampled in 1991, when a value of Q3 (moderate pollution) was recorded. Along the Liffey meanwhile, there is a monitoring station at Celbridge. Water quality here was assessed in 2016 at Q4 (unpolluted).

The Griffeen and the Liffey are a part of the Liffey Water Management Unit (management area) and the majority of this river length was assessed as satisfactory (good or high) in 2010 according to the Programme of Measures in the ERBD Management Plan. This report suggests that main pressures on water quality are from abstractions, physical modifications and wastewater discharges. The Griffeen has been classified as 'moderate' under the Water Framework Directive (WFD) reporting period 2010-15 (from www.epa.ie). The Liffey meanwhile is 'moderate' or 'poor' downstream of Celbridge. These assessments are 'unsatisfactory' and so remedial measures will be required to restore 'good ecological status', something that was due by 2015.

10.3.2 Stakeholder Consultation

The Development Applications Unit (DAU) of the Department of the Arts, Heritage and the Gaeltacht was contacted for nature conservation observations but a response to this was not received at the time of issuing this report.

10.4 Site Survey

Aerial photography from the OSI shows that land use in this area has been predominantly agricultural with amenity uses. In recent years it has been subject to disturbance in preparation for building, which subsequently did not proceed (detailed elsewhere in this EIAR)

10.4.1 Flora

The site survey showed that eight broad habitat types are present in the development boundary. Habitats are described here in accordance with Ireland's standard classification system (Fossitt, 2000). These are shown as a habitat map in Figure 10.2. The lands are largely disturbed in nature while small areas are infill sites. The habitats present are therefore reflective of this land use history. Roughly the land can be divided into two.

The half to the east is **buildings and artificial surfaces – BL3** and is composed of apartment buildings with roads etc. and which is already constructed and occupied (and which is largely outside the development site boundary).

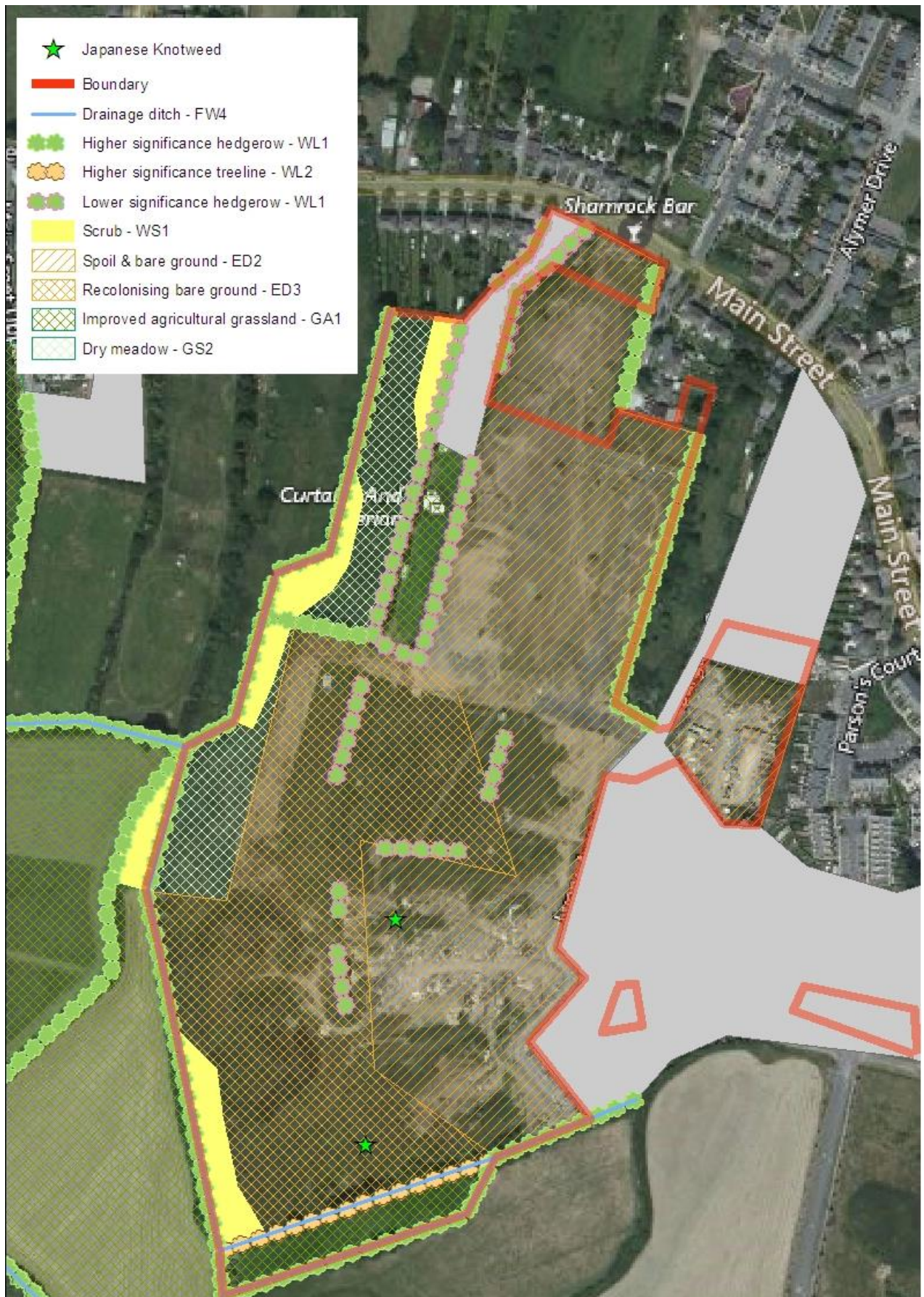
To the west of this there are large areas of disturbed ground, which are either **spoil and bare ground – ED2** or **recolonising bare ground – ED3**, depending on the degree of disturbance. The latter is approximately 50% bare earth. Elsewhere vegetation is diverse and dominated by annual or ruderal species (as would be expected), e.g. Canadian Fleabane *Conyza canadensis*, Thistles *Cirsium sp.*, Willowherbs *Epilobium sp.*, and grasses such as Creeping Bent *Agrostis capillaris*. This area includes at least two stands of the alien invasive Japanese Knotweed *Fallopia japonica*.

Small fields to the north and south of the area described above can be described as **improved agricultural grassland – GA1**. They are grazed by horses or cattle and are habitats of negligible or low local biodiversity value due to the very low species diversity. One field has not been grazed and has reverted to a **dry meadow – GS2** with tall tussocks of Cock's-foot *Dactylis glomerata* as well as Nettle *Urtica dioica* and Brambles.

The development area contains some remnant field boundaries, either **hedgerows – WL1** or **treelines – WL2**. These habitats can have a similar species composition however the latter is characterised by tall trees with an average height of 5m. These boundaries can be further classified into 'higher significance' or 'lower significance' in accordance with guidelines from the Heritage Council (Foulkes et al., 2013). This is based on a scoring system depending upon their age, structure and species diversity. Most of these boundaries are shown on 19th maps from the OSI and so are of significant age. Other boundaries which are of 'lower significance' include hedgerows which are predominantly composed of Brambles *Rubus fruticosus agg.* with few trees or large gaps. Higher significance boundaries, in addition to their age, tend to have a high number of trees, especially Ash *Fraxinus excelsior*, Hawthorn *Crataegus monogyna*, Elder *Sambucus nigra*, Grey Willow *Salix cinerea*, Blackthorn *Prunus spinosa*, Elm *Ulmus*, Hazel *Corylus avellana*, or Sycamore *Acer pseudoplatanus*. Ground flora can include Ground Ivy *Glechoma hederacea*, Soft-shield Fern *Polystichum setiferum*, Hart's-tongue Asplenium scolopendrium, Dog Violet *Viola riviniana*, Lords-and-Ladies *Arum maculatum*, Wood Avens *Geum urbanum*, Cow Parsley *Anthriscus sylvestris* or Lesser Celandine *Ficaria verna*. A number of these boundaries are accompanied by **drainage ditches – FW4** which adds to their wildlife interest. Higher significance hedgerows and treelines can be considered to be of high local biodiversity value.

Other habitats include an asphalt yard to the north-west and an old farm building to the far west.

Figure 10.2 Habitat map of the Newcastle site



10.4.2 Fauna

The site survey included incidental sightings or proxy signs (prints, scats etc.) of faunal activity, while the presence of certain species can be concluded where there is suitable habitat within the known range of that species. Table 10.2 details those mammals that are protected under national or international legislation in Ireland. Cells are greyed out where suitable habitat is not present, or species are outside the range of the zone of impact. Rabbits *Oryctolagus cuniculus* were seen and evidence for Fox *Vulpes vulpes* was also found. There were no signs of Badger activity and no set was found within the hedgerows or treelines. There are nevertheless records of Badgers from this vicinity from the database of the National Biodiversity Data Centre, specifically a record from 2005 from the N9928 2km square (which encompasses the western half of the site), and from 1992 from the O02 10km square (a much larger area which includes the eastern half of the site).

Features on the site are considered to be of moderate suitability for bat roosting (i.e. with suitable buildings – the old farm building to the west – and some old/veteran trees with cavities) (Hundt, 2013). Individual bats can roost temporarily in very small crevices that may be present in mature trees. Hedgerows and treelines, particularly those of 'higher significance' are suitable for foraging bats and a variety of species are likely to be present. A dedicated bat survey was carried out by Dr Tina Aughney in May 2018 and June 2019. This identified a shed on the site as a roost for Common Pipistrelle which was described by the bat ecologist as being of 'local importance'. Four bat species were recorded from the lands while a high level of activity was associated with certain hedgerows, particularly to the south of the current development lands. A further survey was undertaken in June 2019 which highlighted the presence of a roost for Common Pipistrelle in a shed on the lands along with foraging/commuting of four other species. The report described the level of bat activity on the site as 'medium'. This report is presented in full in Appendix 10.B

Suitable habitat for Otter is not present on the site. No evidence of Irish Hare was found although they are recorded from the Dublin area and avail of a variety of habitats (Reid et al., 2007). Small mammals such as Irish Stoat *Mustela erminea hibernica*, Hedgehog *Erinaceus europaeus* and Pygmy Shrew *Sorex minutus* are considered widespread and can be assumed to be present (Lysaght & Marnell, 2016).

Rabbit and Fox are confirmed to be present while other non-protected species such as House Mouse *Mus domesticus*, Wood Mouse *Apodemus sylvaticus* and Brown Rat *Rattus norvegicus* may also be found.

February is outside the bird breeding season and so species noted during this survey are indicative only. Blackbird *Turdus merula*, Wood Pigeon *Columba palumbus*, Magpie *Pica pica*, Bullfinch *Pyrrhula pyrrhula*, Dunnock *Prunella modularis*, Robin *Erithacus rubecula*, Blue Tit *Parus caeruleus*, Buzzard *Buteo buteo*, and Wren *Troglodytes troglodytes* were recorded during the site survey and these are listed as 'low conservation concern' by BirdWatch Ireland (Colhoun & Cummins, 2013). Hedgerows and treelines in particular provide breeding habitat for common garden and woodland species. A single Snipe *Gallinago Gallinago* was flushed from the meadow and this bird is of 'medium conservation concern' (the Snipe population is boosted in winter with birds which would habitually breed in countries to the north). Breeding birds from the site which were recorded in June 2018, are listed in Table 10.3.

Table 10.3 Breeding birds of the Newcastle site

Species	BirdWatch Ireland Status	Birds Directive
<i>Carduelis carduelis</i> Goldfinch	Green	n/a
<i>Columba palumbus</i> Wood pigeon	Green	n/a
<i>Corvus corone</i> Hooded crow	Green	n/a
<i>Erithacus rubecula</i> Robin	Green	n/a
<i>Parus caeruleus</i> Blue tit	Green	n/a
<i>Parus major</i> Great tit	Green	n/a
<i>Passer domesticus</i> House sparrow	Amber	n/a
<i>Phasianus colchicus</i> Pheasant	Green	n/a
<i>Phylloscopus collybita</i> Chiffchaff	Green	n/a
<i>Pica pica</i> Magpie	Green	n/a
<i>Prunella modularis</i> Dunnock	Green	n/a
<i>Streptopelia decaocto</i> Collared dove	Green	n/a
<i>Sturnus vulgaris</i> Starling	Amber	n/a
<i>Sylvia atricapilla</i> Blackcap	Green	n/a
<i>Troglodytes troglodytes</i> Wren	Green	n/a
<i>Turdus merula</i> Blackbird	Green	n/a

Of those species listed as being of high conservation importance in Ireland, Yellowhammer *Emberiza citronella*, Meadow Pipit *Anthus pratensis* and Grey Wagtail *Motacilla cinerea* are recorded from this part of Dublin (Colhoun & Cummins, 2013; Balmer et al., 2013). None of these birds was noted during the surveys while the Grey Wagtail is only found close to open water courses. This site is not likely to harbour resources for other species of high conservation concern.

Common Frog *Rana temporaria* and Common Lizard *Lacerta vivipara* are protected under the Wildlife Act 1976 and may be present on this site. February is within the spawning season however no spawn was noted. Smooth Newts *Lissotriton vulgaris* are to be found in Dublin but there are no permanent ponds on this site in which they are likely to be breeding.

Water courses on the site are not of fisheries significance. They are not suitable for salmonids (Atlantic Salmon *Salmo salar* or Trout *S. trutta*) or Eels *Anguilla anguilla*, or Lamprey *Lampetra* sp. as they are too shallow and are likely prone to drying out. Drainage ditches are led to the River Liffey (either directly or via the River Griffeen). The Liffey is of significant fisheries value with runs of Salmon and Trout as well as other fish of conservation value (Lampreys, Eel).

10.5 Overall Evaluation of the Context, Character, Significance and Sensitivity of the Proposed Development Site

In summary it has been seen that the development site is not within, or adjacent to, any area that has been designated for nature conservation at a national or international level. There are no examples of habitats listed on Annex I of the Habitats Directive or records of rare or protected plants. Japanese Knotweed is growing on the site and this is listed as an alien invasive species under SI No. 477 of 2011 (European Communities (Birds and Natural Habitats) Regulations 2011 – 2015). There are no significant water courses on the site although drainage ditches lead to the River Liffey.

Significance criteria are available from guidance published by the National Roads Authority (NRA, 2009). These are reproduced in Table 10.4. From this an evaluation of the various habitats and ecological features on the site has been made and this is shown in Table 10.5.

Table 10.4 Site evaluation scheme taken from NRA guidance 2009

Site Rating	Qualifying criteria
A - International importance	<p>SAC, SPA or site qualifying as such.</p> <p>Sites containing 'best examples' of Annex I priority habitats (Habitats Directive).</p> <p>Resident or regularly occurring populations of species listed under Annex II (Habitats Directive); Annex I (Birds Directive); the Bonn or Berne Conventions.</p> <p>RAMSAR site; UNESCO biosphere reserve;</p> <p>Designated Salmonid water</p>
B - National importance	<p>NHA. Statutory Nature Reserves. Refuge for Flora and Fauna. National Park.</p> <p>Resident or regularly occurring populations of species listed in the Wildlife Act or Red Data List</p> <p>'Viable' examples of habitats listed in Annex I of the Habitats Directive</p>

C - County importance	<p>Area of Special Amenity, Tree Protection Orders, high amenity (designated under a County Development Plan)</p> <p>Resident or regularly occurring populations (important at a county level, defined as >1% of the county population) of European, Wildlife Act or Red Data Book species</p> <p>Sites containing semi-natural habitat types with high biodiversity in a county context, and a high degree of naturalness, or populations of species that are uncommon in the county</p>
D - Local importance, higher value	<p>Sites containing semi-natural habitat types with high biodiversity in a county context, and a high degree of naturalness, or populations of species that are uncommon in the locality</p> <p>Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.</p>
E - Local importance, lower value	<p>Sites containing small areas of semi-natural habitat that are of some local importance for wildlife;</p> <p>Sites or features containing non-native species that are of some importance in maintaining habitat links.</p>

Table 10.5 Evaluation of the importance of habitats and species on the Newcastle site

Higher significance Hedgerows – WL1 and Treelines – WL1 with or without Drainage Ditches – FW4	Local Importance (higher value - D)
<p>Dry meadow – GS2</p> <p>Recolonising bare ground – ED3</p> <p>Scrub – WS1</p> <p>Lower significance Hedgerow – WL1</p>	Local importance (lower level - E)
<p>Improved agricultural grassland – GA1</p> <p>Buildings and artificial surfaces – BL3</p> <p>Spoil and bare ground – ED2</p>	Negligible value

10.6 Characteristics of the Proposed Development

This proposed project will involve the construction of a residential development of 406 houses along a commercial unit (67sqm), a childcare facility (518sqm), with access roads, open space and connections to infrastructure.

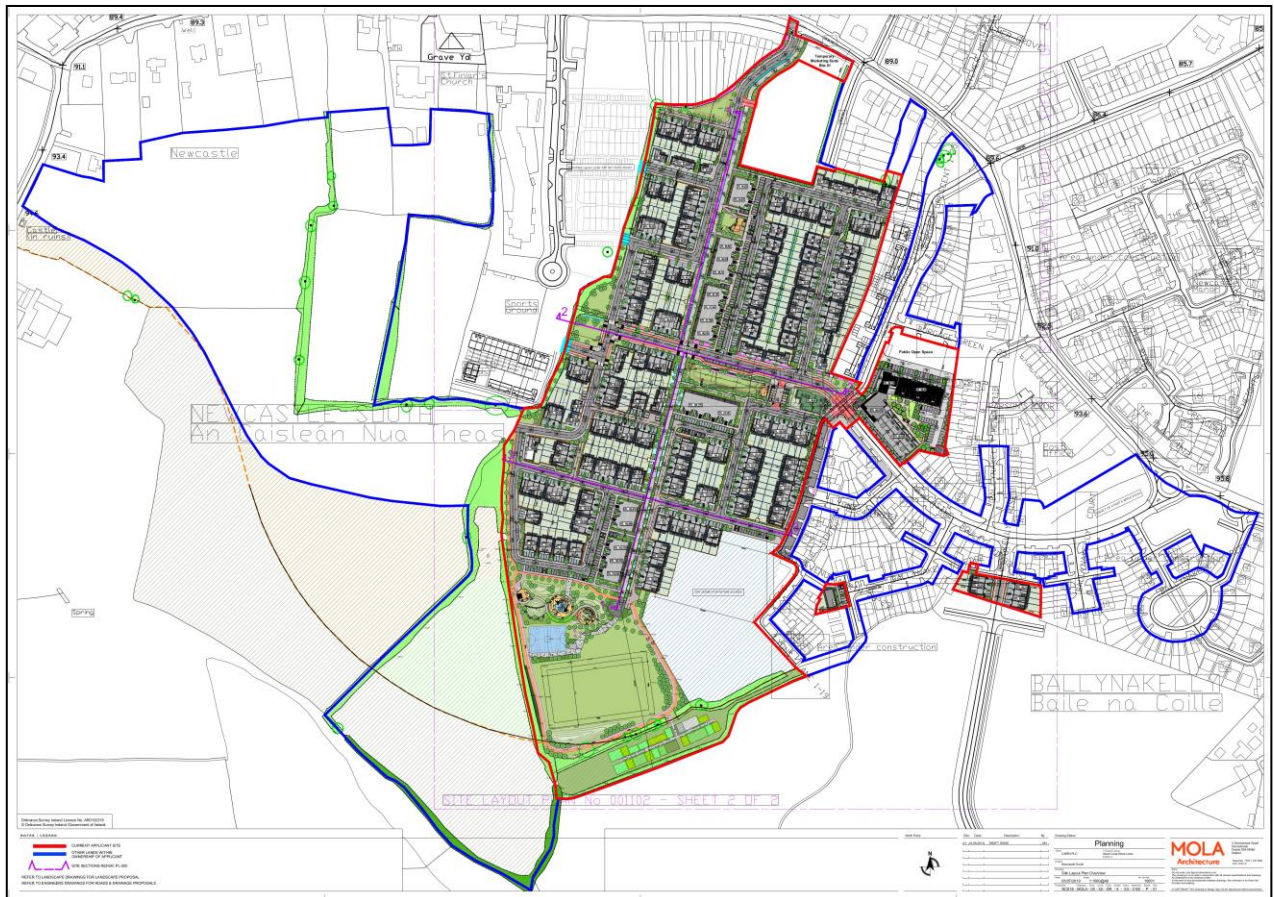
The construction phase will see the clearance of grassland and 500m of hedgerow/treeline habitats.

A new surface water drainage system will be installed and will be fully compliant with sustainable drainage principles. Wastewater will be delivered via the mains sewer network to the municipal treatment plant at

Osberstown. Freshwater is supplied from the mains network, which originates from reservoirs at Ballymore Eustace. Post-construction, the site will be landscaped.

The proposed site layout is given in Figure 10.3.

Figure 10.3 Proposed Site Layout and Landscaping Plan



10.7 Potential Effects of the Proposed Development in the Absence of Mitigation

This section provides a description of the potential impacts that the proposed development may have on flora & fauna in the absence of mitigation. Methodology for determining the significance of an impact has been published by the NRA (NRA, 2009).

10.7.1 Construction Phase

The following potential impacts are likely to occur during the construction phase in the absence of mitigation:

1. Habitat loss: agricultural grassland and disturbed ground habitats are to be lost along with approximately 250m of 'higher significance' hedgerow and treeline. Figure 10.4 shows the trees and hedges to be retained and those to be removed.

stems. Inappropriate treatment, or inadvertent disturbance are therefore the prime drivers for the spread of this plant throughout Ireland.

The stands of Japanese Knotweed have been treated since 2017 and a management plan has been prepared which includes deep burial of any remnant plant fragments. This management plan is presented as part of the Construction Management Plan.

10.7.2 Operation Phase

The following potential impacts are likely to occur during the operation phase in the absence of mitigation:

5. Disturbance to species from increased human activity (lighting, etc.). The species/habitats present on this site are not considered sensitive to disturbance from noise or general human activity given that this is already present from nearby residential uses. No lighting is to be directed at trees or hedges while LED bulbs will be used throughout. These have been shown to have a lower impact on bats than older metal halide bulbs. A derogation licence from the NPWS has been acquired from the Department of Culture, Heritage and the Gaeltacht to disturb the shed, as outlined in the bat survey report.
6. Pollution from surface water. Surface water attenuation measures will comply with Local Authority standards. The development will be divided into drainage catchments with each provided with attenuation storage and an oil/grit interceptor prior to discharge to the municipal surface water sewer. This ultimately discharges to the Cornerpark Stream, a tributary of the River Grifeen. The system will be fully compliant with the Greater Dublin Strategic Drainage Study and will utilise Sustainable Drainage Systems (SUDS) to minimise the volume of surface water entering the sewer. This will include permeable paving, surface swales. In this way the run-off will be maintained at a 'greenfield' rate.
7. Pollution of water from foul wastewater arising from the development. Wastewater will be sent to the municipal treatment plant at Ringsend. Upgrade works are needed as the plant is not currently meeting its requirements under the Council Directive 91/271/EEC concerning urban waste-water treatment (Urban Wastewater Treatment Directive). Pollution effects are most acute in freshwater systems where the capacity for dilution is low and the consequent risk of eutrophication is high. The Ringsend WWTP discharges into Dublin Bay which is currently classified as 'unpolluted' by the EPA despite long-running compliance issues at the plant. A separate screening report for Appropriate Assessment specifically examines the impacts of this project on Natura 2000 areas in Dublin Bay however there is currently no evidence that non-compliance issues at the WWTP are having negative effects to features of high ecological value (e.g. wading birds or intertidal habitats). It is understood that Irish Water is to undertake upgrading works on a phased basis and that compliance issues will be comprehensively addressed by 2023.
8. Impacts to protected areas:

The nearest area designated for nature conservation is the Grand Canal pNHA. At its closest point the canal is approximately 2.2km from the site. Due to this separation distance, and the fact that there is no hydrological connection between the two areas, there is no pathway for effects to occur to the Grand Canal pNHA. There is no pathway for effects to occur to the Slade of Saggart and Crooksling Glen pNHA.

Due to these reasons no impact can arise to these pNHAs from this project.

A separate screening report for Appropriate Assessment has been presented and this concludes that negative effects to Natura 2000 areas are not likely to arise. No significant effects to areas designated for nature conservation are likely to arise from this project.

Table 10.6 Significance Level of Likely Effects in The Absence Of Mitigation

Impact		Significance	Duration
Construction phase			
1	Habitat loss of features of local value (hedgerows/treelines)	Moderate effect	Permanent effect
2	Mortality to animals during construction	Moderate effect	Permanent effect
3	Pollution of water during construction phase	Moderate effect	Short-term effect
Operation phase			
4	Disturbance from noise and lighting	Moderate effect	Permanent effect
5	Spread of alien invasive species	Moderate effect	Long-term effect
6	Surface water pollution	Neutral effects	n/a
7	Wastewater	Neutral effects	n/a
8	Protected areas	No likely significant effects	n/a

Overall it can be seen that five potential moderate negative impacts are predicted to occur as a result of this project in the absence of mitigation.

10.8 Cumulative Impacts

The additional demand from this project for wastewater treatment capacity at the Ringsend plant will add to existing pressures. However, while compliance issues exist, planning permission has recently been granted (April 2019) to install additional capacity for the wider Dublin area in order to meet the requirements of the Urban Wastewater Treatment Directive.

Change of land use from open or agricultural, or urban-style residential, can result in cumulative losses of habitats. In this case the loss of hedgerows/treeline can be seen to be impacted in a cumulative way. To compensate for this loss, it is necessary to include biodiversity-friendly landscape measures within new housing estates. The developer has committed to such measures as part of the project design. The development project can be seen in addition to future expansion of Newcastle as provided for under

development planning. This will include Phase 2 of the current development proposal which will consist of an additional 300 residential units on land to the west.

10.9 Interactions

The principle interactions between biodiversity and other chapters of the EIAR are with water and landscaping. Measures to ensure that effects to water quality are not significant also have benefits for aquatic life throughout the catchment while landscaping will provide new habitat for plants and animals.

10.10 Avoidance, Remedial and Mitigation Measures

This report has identified five impacts that were assessed as 'moderate negative'. Mitigation is suggested where minor negative effects can be avoided or reduced.

Construction Phase

1. Loss of high local value hedgerows/treeline
2. Mortality to animals during site clearance including birds and bats
3. Disturbance to bats from artificial lighting
4. Pollution to water courses during construction
5. Spread of invasive species

10.11 Mitigation Measures Proposed

The following mitigation measures are proposed for the development

Recommendation 1: The loss of mature trees or hedgerows has been avoided where possible. Where this cannot be avoided, the landscaping scheme has been designed to compensate for the loss of habitat. This entails biodiversity friendly planting of natural meadow areas and clusters of native trees. Biodiversity value will be enhanced by installing bird nesting boxes and artificial bat roosts. The felling of large trees with bat roost potential will be supervised by a bat specialist as per recommendations in the bat report.

Recommendation 2: The removal of vegetation will not take place between March and August as per section 40 of the Wildlife Act. Where this cannot be avoided, vegetation must first be inspected by a suitably qualified ecologist for signs of nesting. Where no nesting is observed, vegetation can be removed within 48 hours. Where nesting is underway, vegetation cannot be removed unless under licence from the NPWS.

Recommendation 3: Loss of bat roost. A derogation licence from the National Parks and Wildlife Service is a prerequisite to disturbance of the agricultural shed which is acting as a bat roost and this has been issued with

conditions (licence reference number: DER/BAT 2019-61). This will require the installation of new/alternative roosting locations and this is provided for within the bat report.

Recommendation 4: The following is taken from the Bat Report and these measures will be implemented:

Nocturnal mammals are impacted by lighting. Therefore, it is important that lighting installed within the proposed development site is completed with sensitivity for local wildlife while still providing the necessary lighting for human usage. The following principals should be followed: - Artificial lights shining on bat roosts, their access points and the flight paths away from the roost must always be avoided. This includes alternative roosting sites such as bat boxes.

- Lighting design should be flexible and be able to fully take into account the presence of protected species. Therefore, appropriate lighting should be used within a proposed development and adjacent areas with more sensitive lighting regimes deployed in wildlife sensitive areas.

- Dark buffer zones can be used as a good way to separate habitats or features from lighting by forming a dark perimeter around them. This could be used for habitat features noted as foraging areas for bats.

- Buffer zones can be used to protect Dark buffer zones and rely on ensuring light levels (levels of illuminance measured in lux) within a certain distance of a feature do not exceed certain defined limits. The buffer zone can be further subdivided in to zones of increasing illuminance limit radiating away from the feature or habitat that requires to be protected.

- Luminaire design is extremely important to achieve an appropriate lighting regime. Luminaires come in a myriad of different styles, applications and specifications which a lighting professional can help to select. The following should be considered when choosing luminaires. This is taken from the most recent BCT Lighting Guidelines (BCT, 2018).

All luminaires used should lack UV/IR elements to reduce impact.

o LED luminaires should be used due to the fact that they are highly directional, lower intensity, good colour rendition and dimming capability.

o A warm white spectrum (<2700 Kelvins is recommended to reduce the blue light component of the LED spectrum).

o Luminaires should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats.

o The use of specialist bollard or low-level downward directional luminaires should be considered in bat sensitive areas to retain darkness above.

o Column heights should be carefully considered to minimise light spill. The shortest column height allowed should be used where possible.

o Only luminaires with an upward light ratio of 0% and with good optical control should be used.

o Luminaires should always be mounted on the horizontal, i.e. no upward tilt.

o Any external security lighting should be set on motion-sensors and short (1min) timers.

o As a last resort, accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only to where it is needed.

Recommendation 5: A Construction Management Plan will be prepared as part of the planning application with regard to guidelines on the protection of fish habitat from Inland Fisheries Ireland. This recommendation is intended to tackle the pollution of water courses through the ingress of silt, oils and other toxic substances, as identified in section 10.7.1 of this chapter. Measures will include storage of dangerous substances in bunded areas. Only clean, silt-free surface water run-off will leave the site. Any discharge to local drains will only be permitted after suitably-sized attenuation/silt-removal measures have been installed.

Recommendation 6: A management plan for Japanese Knotweed will be included within the Construction Management Plan. This has been prepared by Cairn Homes and is presented at Appendix 10.D. It provides for deep burial of any remaining fragments of plant within the site boundary. No contaminated material is to be moved off-site. Further monitoring will be required to ensure that further spread of the plant does not occur. This will include annual inspections for signs of re-growth.

10.12 Predicted Impacts of the Proposed Development

With full implementation of the proposed mitigation measures no likely significant effects on biodiversity will occur arising from this development project.

10.13 'Do nothing' scenario

In the absence of the development project little change in the biodiversity character of the lands can be expected. Unmanaged areas would eventually revert to scrub and, ultimately, woodland. Managed areas, i.e. those areas in agricultural production, are not likely to change. The stands of Japanese Knotweed would persist in the absence of treatment/intervention, although as they do not set seed they are unlikely to spread beyond their current extent.

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Appendix 10.A Species list

The nomenclature for vascular plants is taken from the *New Flora of the British Isles* (Stace, 2010).

Scientific names for mosses comes from *A Checklist and Census Catalogue of British and Irish Bryophytes* (Hill et al., 2008) while common names are taken from *Mosses and Liverworts of Britain and Ireland* (Atherton et al. eds., 2010).

Species indicated with an asterisk '*' are known to have been introduced to Ireland by humans. Relative abundance of species is present in accordance with the DAFOR scale where D = Dominant, A = Abundant, F = Frequent, O = Occasional and R = Rare.

Higher significance Treeline - WL2/Hedgerow - WL1		DAFOR
<i>Acer pseudoplatanus</i> *	Sycamore	O
<i>Anthriscus sylvestris</i>	Cow Parsley	F
<i>Arum maculatum</i>	Lords-and-Ladies	F
<i>Asplenium scolopendrium</i>	Hart's-tongue	O
<i>Brachypodium sylvaticum</i>	False Brome	O
<i>Corylus avellana</i>	Hazel	O
<i>Crataegus monogyna</i>	Hawthorn	F
<i>Euonymus europaeus</i>	Spindle	O
<i>Ficaria verna</i>	Lesser Celandine	O
<i>Fraxinus excelsior</i>	Ash	F
<i>Galium aparine</i>	Cleavers	O
<i>Geum urbanum</i>	Wood Avens	O
<i>Glechoma hederacea</i>	Ground-ivy	O
<i>Hedera helix</i>	Common Ivy	A
<i>Heracleum sphondylium</i>	Hogweed	O
<i>Ilex aquifolium</i>	Holly	O
<i>Polystichum setiferum</i>	Soft Shield-fern	O
<i>Primula vulgaris</i>	Primrose	R
<i>Prunus avium</i>	Wild Cherry	R
<i>Prunus spinosa</i>	Blackthorn	O
<i>Quercus sp.</i>	Oak	R
<i>Rosa arvensis</i>	Field-rose	O
<i>Rubus fruticosus</i> agg.	Brambles	A
<i>Salix cinerea</i>	Grey Willow	F
<i>Sambucus nigra</i>	Elder	F
<i>Ulmus glabra</i>	Wych Elm	O

<i>Vicia sepium</i>	Bush Vetch	O
<i>Viola riviniana</i>	Common Dog-violet	R

Recolonising bare ground - ED3		DAFOR
<i>Agrostis capillaris</i>	Common Bent	A
<i>Buddleja davidii</i> *	Butterfly-bush	O
<i>Calliergonella cuspidata</i>	Pointed Spear-moss	A
<i>Carex nigra</i>	Common Sedge	O
<i>Centaurea nigra</i>	Common Knapweed	O
<i>Chamerion angustifolium</i>	Rosebay Willowherb	O
<i>Cirsium arvense</i>	Creeping Thistle	O
<i>Conyza canadensis</i> *	Canadian Fleabane	O
<i>Fallopia japonica</i> *	Japanese Knotweed	O
<i>Juncus inflexus</i>	Hard Rush	O
<i>Plantago lanceolata</i>	Ribwort Plantain	F
<i>Prunella vulgaris</i>	Selfheal	O
<i>Rumex sp.</i>	Dock	A
<i>Ulex europaeus</i>	Gorse	O

Dry meadow - GS2		DAFOR
<i>Agrostis capillaris</i>	Common Bent	A
<i>Chamerion angustifolium</i>	Rosebay Willowherb	O
<i>Cirsium arvense</i>	Creeping Thistle	F
<i>Dactylis glomerata</i>	Cock's-foot	A
<i>Heracleum sphondylium</i>	Hogweed	O
<i>Rubus fruticosus</i> agg.	Brambles	F
<i>Senecio jacobaea</i>	Common Ragwort	O
<i>Urtica dioica</i>	Common Nettle	F

Scrub - WS1		DAFOR
<i>Prunus spinosa</i>	<i>Blackthorn</i>	A
<i>Rubus fruticosus agg.</i>	<i>Brambles</i>	A

Appendix 10.B Bat Survey

2019

Bat Assessment



Dr Tina Aughney
Bat Eco Services
August 2019

Bat Eco Services, Ulex House, Drumheel, Lisduff, Virginia, Co. Cavan. A82 XW62.

Licensed Bat Specialist: Dr Tina Aughney (tina@batecoservices.com, 086 4049468)

NPWS licence C30/2017 (Licence to handle bats, expires 31st December 2019)

NPWS licence 33/2017 (Licence to photograph/film bats, expires 31st December 2019)

NPWS licence DER/BAT 2017-09 (Licence to disturb a roost, expires 29th March 2020)

Client: Cairn Homes Properties Ltd.

Project Name & Location: Newcastle, Co. Dublin

Report Revision History

Date of Issue	Draft Number	Issued To
1/7/2019	Draft 1	James Donlon, Cairn Homes Properties Ltd.
22/7/2019	Draft 2	James Donlon, Cairn Homes Properties Ltd.
22/7/2019	Draft 3	James Donlon, Cairn Homes Properties Ltd.
22/7/2019	Final	James Donlon, Cairn Homes Properties Ltd.
10/8/2019	Amendment to reflect NPWS Derogation Licence received.	James Donlon, Cairn Homes Properties Ltd.
20/8/2019	Correction to Project description	Declan Brassil & Co.

Purpose

This document has been prepared as a Draft Report for Cairn Homes Properties Ltd. Only the most up to-date report should be consulted. All previous drafts/reports are deemed redundant in relation to the named site.

Bat Eco Service accepts no responsibility or liability for any use that is made of this document other than by the client for the purposes for which it was originally commissioned and prepared.

Carbon Footprint Policy

It is the policy of Bat Eco Services to provide documentation digitally in order to reduce carbon footprint. Printing of reports etc. is avoided, where possible.

Bat Record Submission Policy

It is the policy of Bat Eco Services to submit all bat records to Bat Conservation Ireland database one year post-surveying. This is to ensure that a high level bat database is available for future desktop reviews. This action will be automatically undertaken unless otherwise requested, where there is genuine justification.

Executive Summary

Project Name & Location: Newcastle, Co. Dublin

Proposed work: Residential development

Bat Survey Results - Summary

Bat Species	Roosts	Foraging	Commuting
Common pipistrelle <i>Pipistrellus pipistrellus</i>	√	√	√
Soprano pipistrelle <i>Pipistrellus pygmaeus</i>		√	√
Nathusius' pipistrelle <i>Pipistrellus nathusii</i>			
Leisler's bat <i>Nyctalus leisleri</i>		√	√
Brown long-eared bat <i>Plecotus auritus</i>		√	
Daubenton's bat <i>Myotis daubentonii</i>		√	
Natterer's bat <i>Myotis nattereri</i>			
Whiskered bat <i>Myotis mystacinus</i>			
Lesser horseshoe bat <i>Rhinolophus hipposideros</i>			

Bat Survey Duties Completed

Tree PBR Survey	<input checked="" type="checkbox"/>	Daytime Building Inspection	<input checked="" type="checkbox"/>
Static Detector Survey	<input checked="" type="checkbox"/>	Daytime Bridge Inspection	<input type="checkbox"/>
Dusk Bat Survey	<input checked="" type="checkbox"/>	Dawn Bat Survey	<input checked="" type="checkbox"/>
Walking Transect	<input checked="" type="checkbox"/>	Driving Transect	<input type="checkbox"/>
Trapping / Mist Netting	<input type="checkbox"/>	IR Camcorder filming	<input checked="" type="checkbox"/>
Endoscope Inspection	<input type="checkbox"/>	Other	<input type="checkbox"/>

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1. Introduction

Bat Eco Services was commissioned Cairn Homes Properties Ltd. to survey lands proposed to be developed in Newcastle, Co. Dublin.

1.1 Relevant Legislation & Bat Species Status in Ireland

All Irish bat species are protected under the Wildlife Act (1976) and Wildlife Amendment Acts (2000 and 2010). Also, the EC Directive on The Conservation of Natural habitats and of Wild Fauna and Flora (Habitats Directive 1992), seeks to protect rare species, including bats, and their habitats and requires that appropriate monitoring of populations be undertaken. All Irish bats are listed in Annex IV of the Habitats Directive and the lesser horseshoe bat *Rhinolophus hipposideros* is further listed under Annex II. Across Europe, they are further protected under the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention 1982), which, in relation to bats, exists to conserve all species and their habitats. The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention 1979, enacted 1983) was instigated to protect migrant species across all European boundaries. The Irish government has ratified both these conventions.

Also, under existing legislation, the destruction, alteration or evacuation of a known bat roost is a notifiable action and a derogation licence has to be obtained from the *National Parks and Wildlife Service* before works can commence. Any works interfering with bats and especially their roosts, may only be carried out under a licence to derogate from Regulation 23 of the Habitats Regulations 1997 and Regulation 54 of the European Communities (Birds and Natural Habitats) Regulations 2011 (which transposed the EU Habitats Directive into Irish law), issued by NPWS. The details with regards to appropriate assessments, the strict parameters within which derogation licences may be issued and the procedures by which and the order in relation to the planning and development regulations such licences should be obtained, are set out in Circular Letter NPWS 2/07 "*Guidance on Compliance with Regulation 23 of the Habitats Regulations 1997 - strict protection of certain species/applications for derogation licences*" issued on behalf of the Minister of the Environment, Heritage and Local Government on the 16th of May 2007.

There are eleven recorded bat species in Ireland, nine of which are considered resident. Eight resident bat species and one of the vagrant bat species are vesper bats and all vespertilionid bats have a tragus (cartilaginous structure inside the pinna of the ear). Vesper bats are distributed throughout the island. Nathusius' pipistrelle *Pipistrellus nathusii* is a recent addition while the Brandt's bat has only been recorded once to-date (Only record confirmed by DNA testing, all other records has not been genetically confirmed). The ninth resident species is the lesser horseshoe bat *Rhinolophus hipposideros*, which belongs to the Rhinolophidea and has a complex nose leaf structure on the face, distinguishing it from the vesper bats. This species' current distribution is confined to the western seaboard counties of Mayo, Galway, Clare, Limerick, Kerry and Cork. The eleventh bat species, the greater horseshoe bat, was only recorded for the first time in February 2013 in County Wexford and is therefore considered to be a vagrant species.

Irish bat species list (please see Appendices for more information in individual bat species) is presented in Table 1. The current status of the known bat species occurring in Ireland is given in the Table 1 below.

Table 1: Status of the Irish bat fauna (Marnell *et al.*, 2009).

Species: Common Name			Irish Status	European Status	Global Status
Resident Bat Species ^					
Daubenton's bat <i>Myotis daubentonii</i>			Least Concern	Least Concern	Least Concern
Whiskered bat <i>Myotis mystacinus</i>			Least Concern	Least Concern	Least Concern
Natterer's bat <i>Myotis nattereri</i>			Least Concern	Least Concern	Least Concern
Leisler's bat <i>Nyctalus leisleri</i>			Near threatened	Least Concern	Least Concern
Nathusius'	pipistrelle	<i>Pipistrellus</i>	Least Concern	Least Concern	Least Concern
<i>nathusii</i>					
Common	pipistrelle	<i>Pipistrellus</i>	Least Concern	Least Concern	Least Concern
<i>pipistrellus</i>					
Soprano	pipistrelle	<i>Pipistrellus</i>	Least Concern	Least Concern	Least Concern
<i>pygmaeus</i>					
Brown long-eared bat <i>Plecotus auritus</i>			Least Concern	Least Concern	Least Concern
Lesser horseshoe bat		<i>Rhinolophus</i>	Least Concern	Near threatened	Least Concern
<i>hipposideros</i>					
Possible Vagrants ^					
Brandt's bat <i>Myotis brandtii</i>			Data deficient	Least Concern	Least Concern
Greater horseshoe bat		<i>Rhinolophus</i>	Data deficient	Near threatened	Near threatened
<i>ferrumequinum</i>					

^ Roche *et al.*, 2014

1.2 Relevant Guidance Documents

This report will draw on guidelines already available in Europe and will use the following documents:

- National Roads Authority (2006) Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes
- Collins, J. (Editor) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edition). Bat Conservation Trust, London
- McAney, K. (2006) A conservation plan for Irish vesper bats, Irish Wildlife Manual No. 20 National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.
- 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.
- The status of EU protected habitats and species in Ireland: Conservation status in Ireland of habitats and species listed in the European Council Directive on the Conservation of Habitats, Flora and Fauna 92/43/EEC. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government.

Based on the information collected during the desktop studies and bat surveys, the bat ecologist assigns an ecological value to each bat species recorded based on its conservation status at different geographical scales (Table 2). For example, a site may be of national ecological value for a given species if it supports a significant proportion (e.g. 5%) of the total national population of that species.

Table 2: The six-level ecological valuation scheme used in the CIEM Guidelines (2016) Ecological Value

Ecological Value	Geographical Scale of Importance
International	International or European scale
National	The Republic of Ireland or the island of Ireland scale (depending on the bat species)
Regional	Province scale: Leinster
County	County scale: Co. Dublin
Local	Newcastle town environs
Negligible	None, the feature is common and widespread

Impacts, in general, on bats can arise from activities that may result in:

- Physical disturbance of bat roosts e.g. destruction or renovation of buildings
- Noise disturbance e.g. increase human presence, use of machinery etc.
- Lighting disturbance
- Loss of roosts e.g. destruction or renovation of buildings
- Modifications of commuting or foraging habitats
- Severance or fragmentation of commuting routes
- Loss of foraging habitats.

It is recognised that any development will have an impact on the receiving environment, but the significance of the impact will depend on the value of the ecological features that would be affected. Such ecological features will be those that are considered to be important and potentially affected by the proposed road improvement scheme.

The guidelines consulted recommend that the potential impacts of a proposed development on bats are assessed as early as possible in the design stage to determine any areas of conflict along each of the proposed route options.

In addition, the proposed development provides a childcare facility (518sqm) with capacity for in the order of 110 no. children to serve the needs of the proposed development and the wider community. The proposals also include 1 no. retail units (total gross floor area 67.7sqm) at ground floor level within the Ballynakelly apartment block.

The proposed development also provides for the first phase of a new east-west link street and greenway, a continuation of Newcastle Boulevard, and a new north-south greenway linking the Main Street to the new public park. The proposed development facilitates a number of future potential pedestrian, cycle and vehicular links to existing and proposed adjoining developments. Access to the proposed development is via a new north-south link street, with a new entrance onto Main Street, and via the existing road network from Newcastle Boulevard to the east.

A primary school site (approximately 1.5ha) has been reserved at the south-east of the application site in accordance with the Newcastle LAP 2012. A new public park is proposed (approximately 2ha) together with a range of pocket parks and greenways to serve the proposed development and the wider Newcastle community.

The proposed development provides all associated and ancillary infrastructure, landscaping, boundary treatments and development works on a total site of approximately 16 hectares. The proposed development also provides for a temporary, single storey marketing suite and associated signage (including hoarding) during the construction phase of development only.

1.3.3 Bat Survey Aims

The aims of the bat survey at the proposed project site are as follows:

- Collect robust data following good practice guidelines to allow an assessment of the potential impacts of the proposed project on local bat populations, both on and off-site;
- Facilitate the design of mitigation, enhancement and monitoring strategies for local bat populations recorded;
- Provide baseline information with which the results of post-construction monitoring surveys can be compared to, where appropriate;
- Provide clear information to enable NPWS and planning authorities to reach robust decisions with definitive required outcomes;
- Assist clients in meeting their statutory obligations;
- Facilitate the conservation of local bat populations.

Survey are comprised of many different types may differ from site to site depending on the goals of the survey. The following is a brief description of main types of surveys completed.

- Emergence (dusk) surveys: surveying of buildings or structures to determine whether such building/structure is a bat roost. Undertaken from 10 minutes prior to sunset to 90 minutes after sunset.
- Walking transect: bat surveys completed on-foot where the surveyor(s) walk the survey site from 10 minutes prior to sunset to at least 110 minutes after sunset. Often this survey is completed post an emergence survey and therefore may be undertaken for a longer period of time after sunset.
- Driving transect: bat survey complete in a car and undertaken according to a strict survey protocol. Surveying is completed from 40 minutes after sunset till the end of the planned survey route. This is only undertaken for large survey area with a well-defined public road structure. Routes are planned and mapped prior to surveying.

- Dawn surveys: surveying of buildings or structures to determine whether such building/structure is a bat roost. Undertaken from 90 minutes prior to sunrise to 10 minutes after sunrise.
- Static surveys: placement of automated recording devices within the survey area. The units are set up during the daylight hours and left in place to record during the hours of darkness.
- Additional surveys required may include trapping / netting of bats. But this type of surveying is only undertaken where specific information is required (e.g. to determine if a roost is a maternity colony).

1.3.4 Bat Surveys - Historical

A bat survey was undertaken in May 2018 (various dates) and re-surveying was completed in June 2019 (various dates). Therefore this report presents the survey results from both survey years. Please note, that there may be differences in the bat survey methodologies between the two surveys as the 2019 surveys generally follows the recommendations from Collins, 2016. This report template was designed in 2019 to capture the detail of surveys completed in 2019 and going forward.

2. Bat Survey Methodology

2.1 Daytime Inspections

One purpose of daytime inspections is to determine the potential of bat roosts within the survey area. Due to the transient nature of bats and their seasonal life cycle, there are a number of different types of bat roosts. Where possible, one of the objectives of the surveys is to be able to identify the types of roosts present, if any. However, the determination of the type of roost present depends on the timing of the survey and the number of bat surveys completed. Consequently, the definition of roost types, in this report, will be based on the following:

Table 3: Bat Roost Types (Collins 2016).

Roost Type	Definition	Time of Survey
Day Roost	A place where individual bats or small groups of males, rest or shelter in the daytime but are rarely found by night in the summer.	Anytime of the year
Night Roost	A place where bats rest or shelter in the night but are rarely found in the day. May be used by a single bat on occasion or it could be used regularly by the whole colony.	Anytime of the year
Feeding Roost	A place where individual bats or a few bats rest or feed during the night but are rarely present by day.	Anytime of the year
Transitional Roost	A place used by a few individuals or occasionally small groups for generally short periods of time on waking from hibernation or in the period prior to hibernation.	Outside the main maternity and hibernation periods.
Swarming Site	Where large numbers of males and females gather. Appear to be important mating sites.	Late summer and autumn
Mating Site	Where mating takes place.	Late summer and autumn
Maternity Site	Where female bats give birth and raise their young to independence.	Summer months
Hibernation Site	Where bats are found, either individually or in groups in the winter months. They have a constant cool temperature and humidity.	Winter months in cold weather conditions
Satellite Roost	An alternative roost found in close proximity to the main nursery colony and is used by a few individuals throughout the breeding season.	Summer months

2.1.1 Building & Structure Inspection

Structures, buildings and other likely places that may provide a roosting space for bats are inspected during the daytime for evidence of bat usage. Evidence of bat usage is in the form of actual bats (visible or audible), bat droppings, urine staining, grease marks (oily secretions from glands present on stonework) and claw marks. In addition, the presence of bat fly pupae (bat parasite) also indicated that bat usage of a crevice, for example, has occurred in the past.

Inspections are undertaken visually with the aid of a strong torch beam (LED Lenser P14.2) and endoscope (General DC5660A Wet / Dry Scope).

2.1.2 Tree Potential Bat Roost (PBRs) Inspection

Trees that may provide a roosting space for bats are classified using the Bat Tree Habitat Key (BTHK, 2018) and the classification system used is from Collins (2016). The Potential Roost Features (PRFs) listed in this guide are used to determine the PBR value of trees.

Trees identified as PBRs are inspected during the daytime, where possible, for evidence of bat usage. Evidence of bat usage is in the form of actual bats (visible or audible), bat droppings, urine staining, grease marks (oily secretions from glands present on stonework) and claw marks. In addition, the presence of bat fly pupae (bat parasite) also indicated that bat usage of a crevice, for example, has occurred in the past.

A series of inspections are undertaken. Phase 1 inspections aims to make a list of trees within the proposed development site that may be suitable as roosting sites for bats. Inspections are undertaken visually with the aid of a strong torch beam (LED Lenser P14.2) during the daytime searching for PRFs, if visible. To aid this Phase 1 inspection, tree reports, if available, are consulted to supplement that data collected.

Phase 2 inspections are, generally, recommended once a complete list of trees that have been identified as PBRs, and are mark for felling in order for the proposed development to be undertaken. The Phase 2 inspection will generally involve a closer examination of individual trees using a strong torch beam (LED Lenser P14.2) and endoscope (General DC5660A Wet / Dry Scope) and where required (and/or possible), height surveys are completed using a ladder. If a tree is deemed to be a roost site then further surveying involving dusk and dawn surveys of the actual trees may be recommended to determine what bat species are present etc.

Table 4: Tree Bat Roost Category Classification System (Collins, 2016).

Tree Category	Description
1	Trees with multiple, highly suitable features (Potential Roosting Features = PRFs) capable of supporting larger roosts
2	Trees with definite bat potential but supporting features (PRFs) suitable for use by individual bats;
3	Trees have no obvious potential although the tree is of a size and age that elevated surveys may result in cracks or crevices being found or the tree supports some features (PRFs) which may have limited potential to support bats;
4	Trees have no potential.

2.1.3 Bat Habitat & Commuting Routes Mapping

The survey site is assessed during daytime walkabout surveys, in relation to potential bat foraging habitat and potential bat commuting routes. Such habitats are classified according to Fossit, 2000 (Appendix 1, Table 1.B) while hedgerows are classified according to BATLAS 2020 classification (Bat Conservation Ireland, 2015) (Appendix 1, Table 1.A). Bat habitats and commuting routes identified are considered in relation to the wider landscape to determine landscape connectivity for local bat populations through the examination of aerial photographs.

2.2 Night-time Bat Detector Surveys

2.2.1 Dusk & Dawn Bat Surveys

Dusk surveys are generally completed from 10 minutes before sunset to at least 120 minutes post sunset (extended survey period times occur if walking transects and driving transects are included). Dawn surveys are generally completed from 90 minutes before sunrise to 10 minutes after sunrise. Surveys are completed during mild and dry weather conditions with air temperature 8°C or greater, where possible. All bat encounters are noted during surveys.

The following equipment is used:

Surveyor 1 (Principal surveyor): Wildlife Acoustics Echo Meter Touch (Generation 1, Apple IOS) connected to iPad 2 (32 GB storage) and Petersson D200 Heterodyne Bat Detector.

Surveyor 2: Wildlife Acoustics Echo Meter Touch2 Pro (Android) connected to Samsung Galaxy Tab S3 and Petersson D200 Heterodyne Bat Detector.

Surveyor 3: Wildlife Acoustics Echo Meter Touch (Generation 1, Apple IOS) connected to iPad 2 (32 GB storage) and Petersson D100 Heterodyne Bat Detector.

If the focus of this survey is to determine whether a structure is a bat roost (i.e. An Emergence Survey is deemed necessary), the surveyors then position themselves adjacent to the building / structure to be surveyed to determine if bats are roosting within, location of roost, number of bats, bat species etc. Surveying is generally completed for 100 mins, starting 10 mins before sunset.

Walking transects involve the surveyor(s) walking the survey area, noting the time, location and bat species encountered. If the mapping facility is used on the Wildlife Acoustics Echo Meter Touch2 Pro (Android) connected to Samsung Galaxy Tab S3, this is mapped using Google Earth with a KLM file produced for mapping purposes. Validation of bat records is completed by the principal bat surveyor prior to mapping. Otherwise, Irish Grid references are recorded and an excel file of bat record locations is produced for mapping.

2.2.2 Passive Static Bat Detector Survey

A Passive Static Bat Surveys involves leaving a static bat detector unit (with ultrasonic microphone) in a specific location and set to record for a specified period of time (i.e. a bat detector is left in the field, there is no observer present and bats which pass near enough to the monitoring unit are recorded and their calls are stored for analysis post surveying). The bat detector is effectively used as a bat activity data logger. This results in a far greater sampling effort over a shorter period of time. Bat detectors with ultrasonic microphones are used as the ultrasonic calls produced by bats cannot be heard by human hearing.

The microphone of the unit was position horizontally to reduce potential damage from rain. Bat Logger A+ units and Wildlife Acoustics Song Meter SM2, SM2 BAT+ SM4 Bat FS and SM3 BAT Platform Units use Real Time recording as a technique to record bat echolocation calls and using specific software, the recorded calls are identified. It is these sonograms (2-d sound pictures) that are digitally stored on the SD card (or micro SD cards depending on the model) and downloaded for analysis. These results are depicted on a graph showing the number of bat passes per species per hour/night. 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

The recordings are analysed using various software. Recordings made by SongMeter SM2 (Unit 2) is analysed using SongScope, SongMeter SM2Bat+ (Unit 4, 5), Song Meter Bat FS (Units 1-5) and SongMeter 3 recordings are analysed using BatClassifyIreland and Wildlife Acoustics Kaleidoscope Pro. Elekon BatLogger A+ units are analysed using BatExplorer. Each sequence of bat pulses are noted as a bat pass to indicate level of bat activity for each species recorded. This is either expressed as the number of bat passes per hour or per survey night.

The following static units were deployed during this static bat detector survey:

Table 5: Static Bat Detectors deployed during Static Bat Detector Surveys.

Static Unit Code	Bat Detector Type	Recording Function	Microphone
SM2 Unit 2 – 2019 & 2018	Wildlife Acoustics SongMeter 2 Bat+	Passive Full Spectrum	SMX-US (connected directly to unit)
SM2 Unit 4 - 2018 SM2 Unit 5 – 2019			SMX-U1 (connected directly to unit)
SM4 Unit 1 - 2019 SM4 Unit 2 - 2019	Wildlife Acoustics SongMeter 4 Bat FS	Passive Full Spectrum	SMM-U2, 4m cable
BL Unit A - 2018 BL Unit B - 2018	Elekon BatLogger A+ bat detector	Passive Full Spectrum	FG Black microphone, 2m cable

2.3 Desktop Review

2.3.1 Bat Conservation Ireland Database

A 1km and 10km search is undertaken for the central Irish grid reference of the survey site.

2.4 Photographic Record

A photographic record was completed for the survey. Photographs are presented throughout the report, where relevant.

2.5 Survey Constraints

It is important to note that bat surveys are comprised of a number of surveys designed to provide as much information on the bat usage of a survey area. Each survey method has its pros and cons. Therefore, a combination of surveys is recommended to determine the importance of a survey area for local bat populations. Bat surveys are also a snap shot of the bat activity at the time of surveying. Bat activity varies greatly from season to season and in relation to weather conditions. A list of bat survey methods are ticked at the start of the report to provide an overview for the reader. Weather data is presented to provide context to the suitability of survey dates to recorded bat activity.

The following assessment has been completed in relation to Survey Constraints:

Table 6: Survey Constraint Assessment Results.

Category	Discussion
Timing of surveys	June 2019 supplemented with data from May 2018. This is during the recommended survey period to record bat activity and to record summer roosts.
Weather conditions	July / June 2019 – good weather conditions May 2018 – good weather conditions
Survey effort	July 2019 – emergence surveys (3 surveyors), 1 walking transect June 2019 – 4 nights statics; 1 emergence survey (3 surveyors), 1 dawn survey (1 surveyor), 2 walking transects (3 surveyors). May 2018 – 2 nights statics, 2 emergence surveys (1 surveyor), 2 walking transects (1 surveyor)
Equipment	All in good working order.

It is therefore deemed that the survey work completed is Appropriate in order to complete the aims of the bat survey.

3. Bat Survey Results

3.1 Daytime Inspections

3.1.1 Building & Structure Inspection

The following buildings / structures were inspected on 26/6/2019. Previous inspections were completed on the 3/5/2018 in relation to the agricultural building and 19/5/2018 in relation to the cottage on the main street. In relation to the dwellings and sheds located on Fitzgibbon lands and the community building, these were surveyed on the 20/7/19.

Table 7: Buildings / Structures inspection results.

Building Code	Description	Grid Reference	Roost Type / Suitability	Bat Species
Cottage, main street	Derelict cottage, no roof, concrete block walls, dense vegetation	00033128664 Red circle	Low	Internal inspection of walls completed during the daytime. Examination of externa walls. No evidence recorded.
Agricultural shed	Concrete cavity block walls, corrugated iron roof	00008528472 Yellow circle	Medium	Internal inspection of walls completed during the daytime. Examination of externa walls. Bat droppings – small scatter
Stone ruins	Derelict stone building	N9955628608 Blue circle	Medium	Internal inspection of walls completed during the daytime. No evidence recorded. However, suitable crevices within stone work for individual bats.
Vacant Community building	Unfished building	00024828207	Low	Internal inspection of walls completed during the daytime. Examination of externa walls. No evidence recorded. No attic space.
Fitzgibbons dwelling 1	Bungalow, tiled roof, insulated and roof felt.	00014728663	Medium	Internal inspection of attic space – no bat evidence record. Examination of external walls – no bat evidence recorded.
Fitzgibbons dwelling 2	Single storey residence, flat roof.	00024828207	Low to Medium	No attic space. Examination of external walls – no bat evidence recorded.
Fitzgibbons	Single storey sheds Shed 1 – concrete block	00024828207	Low	No attic space. Examination of external

Sheds / caravan	shed with corrugated roof. Shed 2 – modern corrugate shed. Caravan		walls – no bat evidence recorded.
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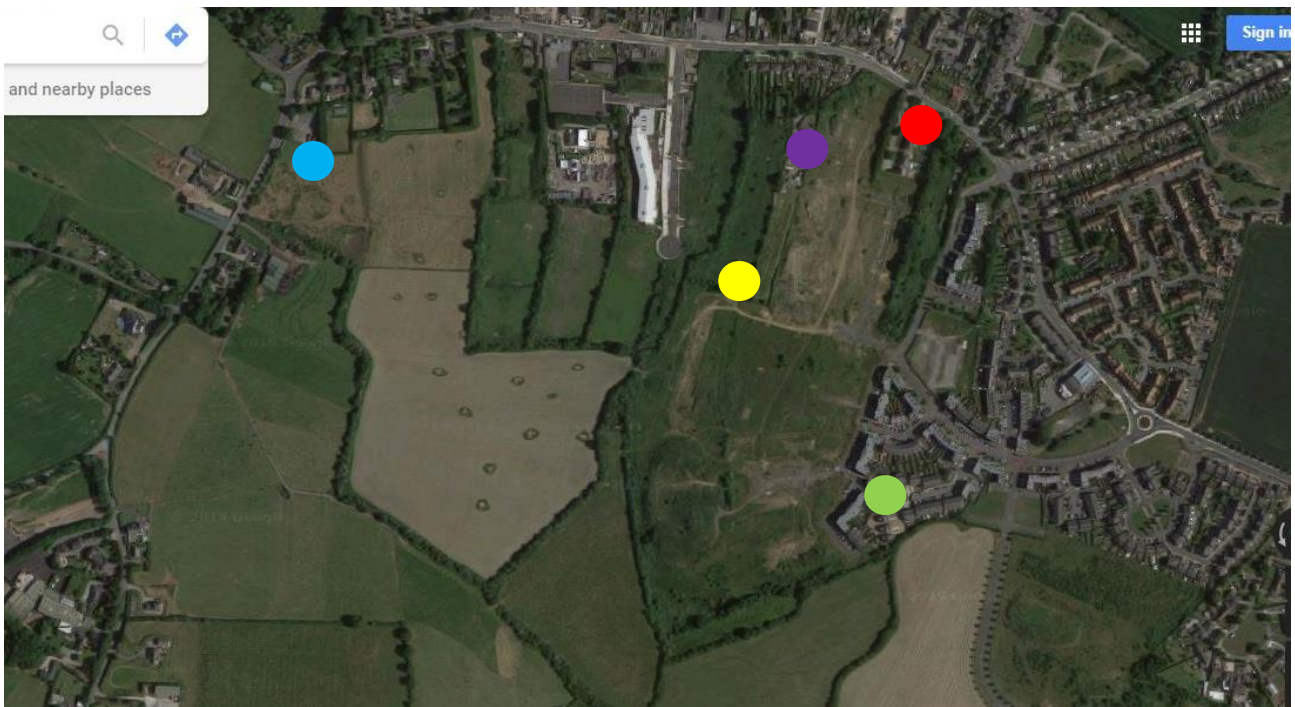


Figure 1: Location of buildings / structures surveyed.



Plate 1: Agricultural shed recorded as a satellite roost for common pipistrelles (Yellow Circle).



Plate 2: Derelict cottage surveyed (Red Circle).



Plate 3: Fitzgibbon's dwelling 1.



Plate 4: Fitzgibbon's land - additional structures surveyed.



Plate 5: Vacant community building.

3.1.2 Tree Potential Bat Roost (PBRs) Inspection

Sixteen trees located along treeline / hedgerows were recorded as Potential Bat Roosts (PBRs) (Figure 2 – Blue circles) from daytime ground inspection of the trees on-site. This is a first phase assessment of trees to document Potential Bat Roosts as a result of features potentially suitable for roosting bats. An additional two trees were identified on the Fitzgibbons lands (entrance drive way) as PBRs.

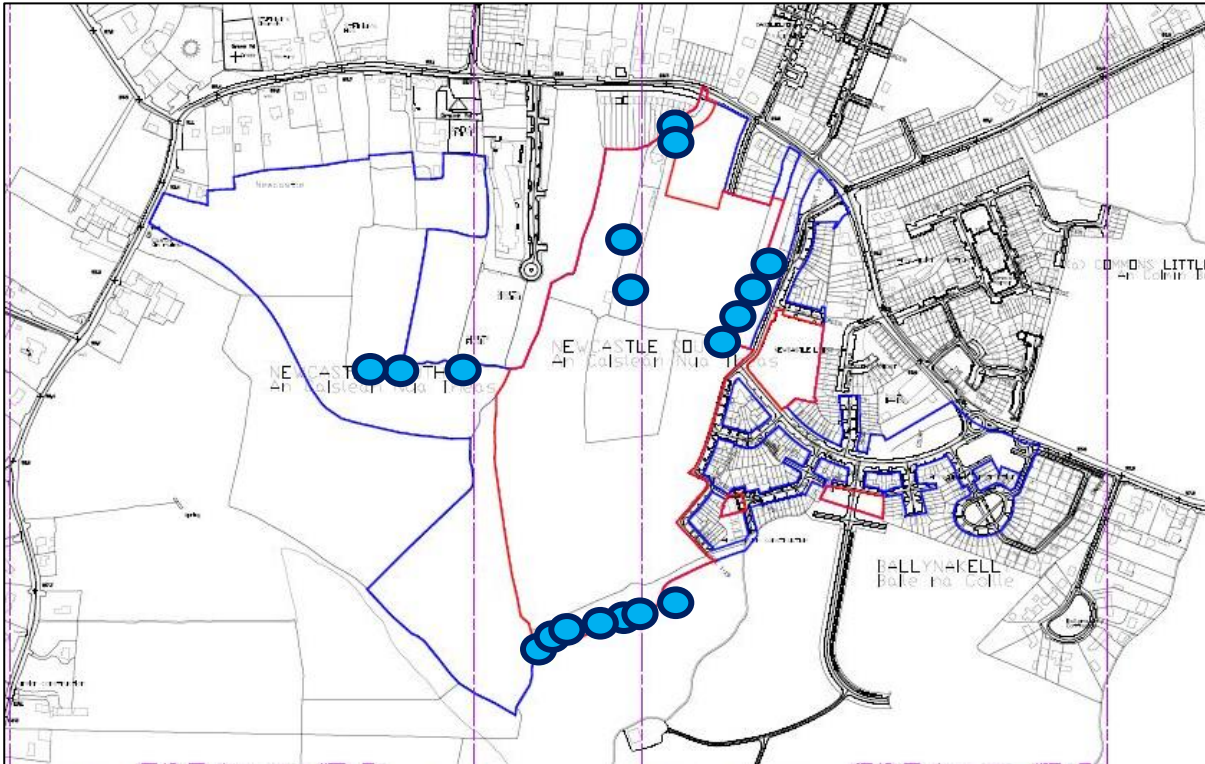


Figure 2: Map of daytime survey results of trees (Within Red Line, supplied by Cairn Home Properties Ltd.). Circles indicate the location of PBRs.

The Tree Survey report (dated: May 2018) was consulted in relation to trees marked for potential removal. Within the U category (trees recommended for removal) two mature trees have been identified as potential bat trees: 14E (mature ash – Hedge 19) and 68 (mature ash). Tree number 36 (mature ash) is within Hedgerow 26 and is marked for removal. This is considered to be a PBR. Hedge 29 is marked for removal and within this there are four mature ash trees: 37, 38, 41 and 48 considered to be PBRs. The two trees located along the driveway of Fitzgibbons land will also be removed. The remaining trees deemed as PBRs are not marked for removal. However, this should be assessed prior to any works and final tree/vegetation removal plans.

3.1.3 Bat Habitat & Commuting Routes Mapping

The survey area is characterised by extensive hedgerows (primarily Sparse Treeline hedgerow) with some sections of Mature Treelines. The survey area, as a consequence, offer good commuting linear habitat features for bats species such as common pipistrelles and soprano pipistrelles. There are a number of mature trees which also offer foraging habitat for Leisler's bats as well as open grassland with cattle grazing, which are also good foraging habitat for this bat species.

3.2 Night-time Bat Detector Surveys

3.2.1 Dusk & Dawn Bat Survey

An emergence survey was undertaken on 26/6/2019 of the cottage and agricultural shed while a static recording unit was placed within the stone ruins for 3 hours of recording (weather conditions: clear sky, light breeze, dry and 14°C). One surveyor was located on the main street in front of the cottage. The remaining two surveyors was located in vicinity of the agricultural shed – one to the rear of the shed noting bat activity along the principal hedgerows adjacent to the agricultural shed, while the third surveyor was located to the front of the shed operating a Sony Camcorder (night shot) with Infra-red lamps in order to film bat activity within the agricultural shed. This confirmed that the bats were roosting within the shed and emerged from the internal space rear of the shed. Two bats were recorded roosting in the shed and emerged during the dusk emergence survey. A number of common pipistrelles were also recorded commuting along the hedgerow towards the shed and further afield into the proposed development site. Leisler's bats were also recorded commuting from the north to south direction throughout the survey period. In relation to the cottage, no bats were recorded emerging from the building. Post emergence surveys, a walking transect were completed (results are detailed below).

A dawn survey was completed in relation to the cottage and general environs of the main street of the Newcastle town on 28/6/2019 (weather conditions: clear sky, light breeze, dry and 15°C). A previous emergence survey of the cottage was completed on the 19/5/2018 from 21:00 hrs to 22:30 hrs (weather conditions: cloudy, dry, calm and 17°C). No bats were detected roosting in the building during the dawn survey.

An emergence survey was completed on 20/7/2019 of buildings on Fitzgibbon lands and the community building (weather conditions: overcast, dry, calm and 14°C). One surveyor was located at the community building while two surveyors were located on Fitzgibbon's land. A dawn survey was also completed on the 21/7/2019 of the buildings on Fitzgibbon lands (weather conditions: clear sky, dry, light and 11°C). During the emergence dusk surveys, no bats were detected roosting in any of the buildings surveyed. In relation to the Fitzgibbons lands, the first bat was detected at 21:56 hrs and this was a Leisler's bat commuting from north to south through the survey area. Common pipistrelles were then recorded from 22:10 hrs with much of the foraging activity recorded around the mature trees at the entrance driveway and/or along the hedgerow commuting towards the survey area. Three species of bat was recorded commuting through the general environs of the community building: Leisler's bat, common pipistrelles and soprano pipistrelles. No bats were recorded exiting the buildings and overall the bat activity was at a low level. During the dawn survey at Fitzgibbons lands, not bats were recorded swarming and therefore roosting in any of the buildings. Only common pipistrelles were recorded from 04:07 hrs and these were individuals commuting in a south to north direction through the survey area.

The following figure summarises the results of the bat detector surveys completed in relation to buildings/structures:

Table 8: Buildings / Structures survey results.

Building Code	Roost Type & Location	Bat Species (No. of bats)	Access Points	Vegetation / Lighting arrangement
Cottage, main street	None 19/5/2018 - no	N/A	N/A	Yes - street lighting and dense vegetation growth within and

	bats emerging			adjacent to the cottage
	26/6/2019 - no bats emerging			
	28/6/2019 - no bats swarming / returning			
Agricultural shed	Satellite roost	2 common pipistrelles emerging on 26/6/2019 3+ common pipistrelles emerging on 3/5/2018	Open gable ends of building	No lighting Dense ivy growth on one gable end. Adjacent to hedgerow
Stone ruins	None	N/A	N/A	No lighting
Vacant Community building	None	N/A	N/A	Street lighting
Fitzgibbons dwelling	None	N/A	N/A	Associated residential lighting
Fitzgibbon dwelling 2, sheds and caravan	None	N/A	N/A	Associated residential lighting

A number of walking transect bat surveys were completed in both 2018 and 2019.

Previous bat survey work from 2018 within the survey area was undertaken on the following dates:

Weather Conditions	Cloudy, dry, light breeze, 12 ^o C.	2 nd May 2018
Dusk Survey	20:30 to 00:00 hrs	2 nd May 2018
Weather Conditions	Cloudy, dry, calm and 13 ^o C.	3 rd May 2018
Dusk Survey	20:30 to 00:00 hrs	3 rd May 2018

Dusk Survey Results 2nd May 2018

- The surveyor walked each of the treelines / hedgerows throughout the proposed development site from 20:30 hrs. The bat encounters are presented on Figure 3.
- The first bat encounter was at 21:38 hours and this was a common pipistrelle. This was the most common bat species encountered on-site during this survey.
- The first Leisler's bat was encountered at 21:44 hours. This species was only encountered on two occasions during this night of the bat survey.
- The first soprano pipistrelle was encountered at 22:52 hrs and this was the only location at which this species was recorded. However, the individual was foraging along this hedgerow.
- It was noted that there was a medium level of common pipistrelle bat activity at the location of the shed (Triangle, Figure 3).



Figure 3: Map of survey results – Dusk Survey 2nd May 2018 (Google Maps - aerial). Circles indicate the location of bat encounters and colours correspond to bat species: Blue = common pipistrelle; Green = soprano pipistrelle and Orange = Leisler's bat.

Dusk Survey Results 3rd May 2018

- An emergence survey was undertaken at the shed (Triangle, Figure 4). This was recorded as a common pipistrelle bat roost with 3+ individuals recorded emerging (deemed as a satellite bat roost). Individuals from this building commuted west along the hedgerow (blue arrow, Figure 4). Individuals from this roost was record continuously foraging in the area and along hedgerows to the east of the building.
- The first bat encounter was at 21:37 hours and this was a Leisler's bat. This was the 2nd most common bat species encountered on-site and was recorded at four locations.
- The first common pipistrelle was encountered at 21:39 hours. This species was the most encountered bat species during this night of the bat survey.
- The first soprano pipistrelle was encountered at 22:56 hrs and this species was only recorded at two locations.



Figure 4: Map of survey results – Dusk Survey 3rd May 2018 (Google Maps - aerial). Circles indicate the location of bat encounters and colours correspond to bat species: Blue = common pipistrelle; Green = soprano pipistrelle and Orange = Leisler’s bat.

The first walking transects for 2019 completed on the 26/6/2019 starting from 00:00hrs and was undertaken by one surveyor only and data is represented on the Google Earth map below. Four species of bat was encountered: common pipistrelle, soprano pipistrelle, Leisler’s bat and Daubenton’s bat. Common pipistrelles were the most encountered bat species. The most frequently recorded species was common pipistrelles followed by Leisler’s bats.

The walking transect was completed on the 27/6/2019 by 3 surveyors from 00:00 hrs. One surveyor walked the fields to the west of the agricultural shed while the 2 remaining surveyors walked the fields to the east of the agricultural shed. The Google Earth maps produced represent the bat encounters of surveyor walking the fields to the west with the bat encounters for the remaining surveyors marked on these maps post survey. Five species of bat was recorded during this survey: common pipistrelle, soprano pipistrelle, Leisler’s bat, brown long-eared bat and Daubenton’s bat. Again the most frequently recorded species was common pipistrelles followed by Leisler’s bats.

During the emergence survey of the agricultural shed, common pipistrelles (>20 individuals) were recorded commuting along the treelines / hedgerows from the town of Newcastle and past the agricultural shed. The first common pipistrelle was noted at 22:29 hrs with continuous activity thereafter noted during the emergence survey. Leisler’s bats were also recorded commuting from the town of Newcastle onto the survey site before continuing to commute in a south-west and south-east direction. The first Leisler’s bat was recorded at 22:33 hrs and activity was noted frequently thereafter. The surveyor at the cottage emergence survey also noted a high level of Leisler’s bat activity with commuting bats traveling from Newcastle town environs onto the survey site passing over the cottage. Common pipistrelles were also noted commuting over the cottage

and along the treeline / hedgerow within the survey area. These commuting routes are presented on the figures below.

Figure 5a-e: Walking transect results for 26/6/2019. The pink line represents the walking route.

a) All bat passes



b) Common pipistrelle encounters



c) Daubenton's bat encounters



d) Leisler's bat encounters

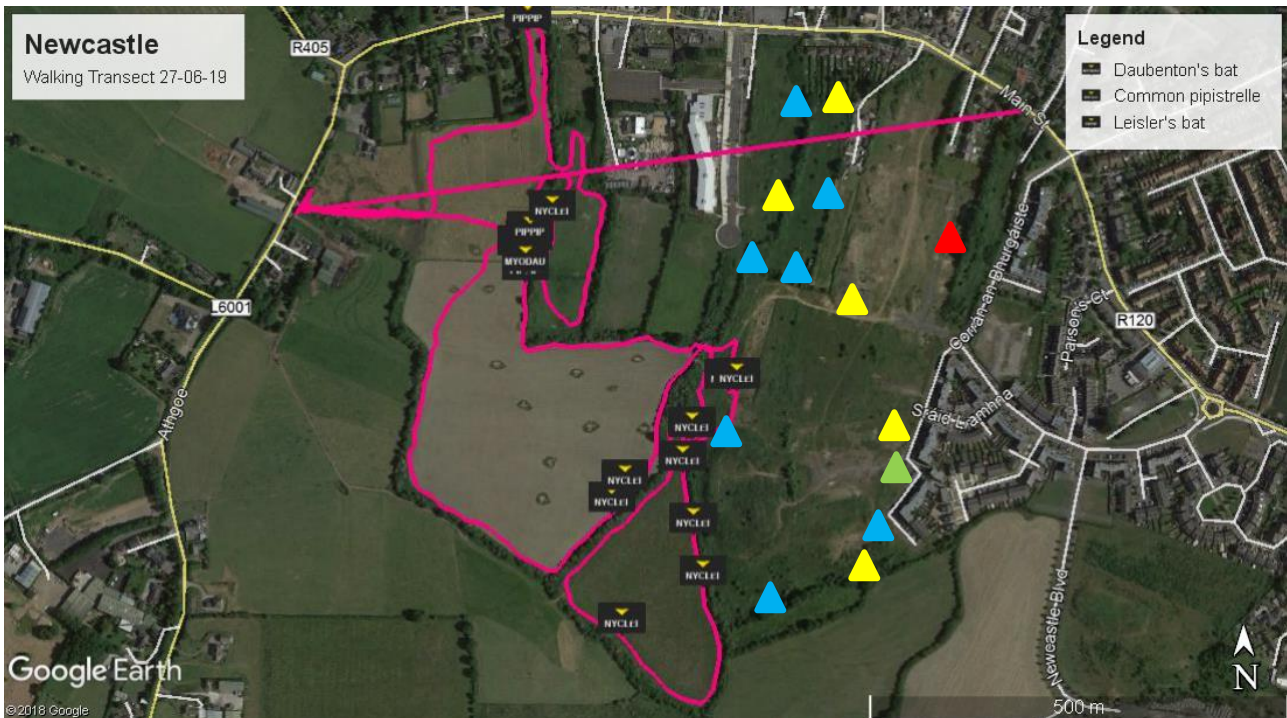


e) Soprano pipistrelle encounters



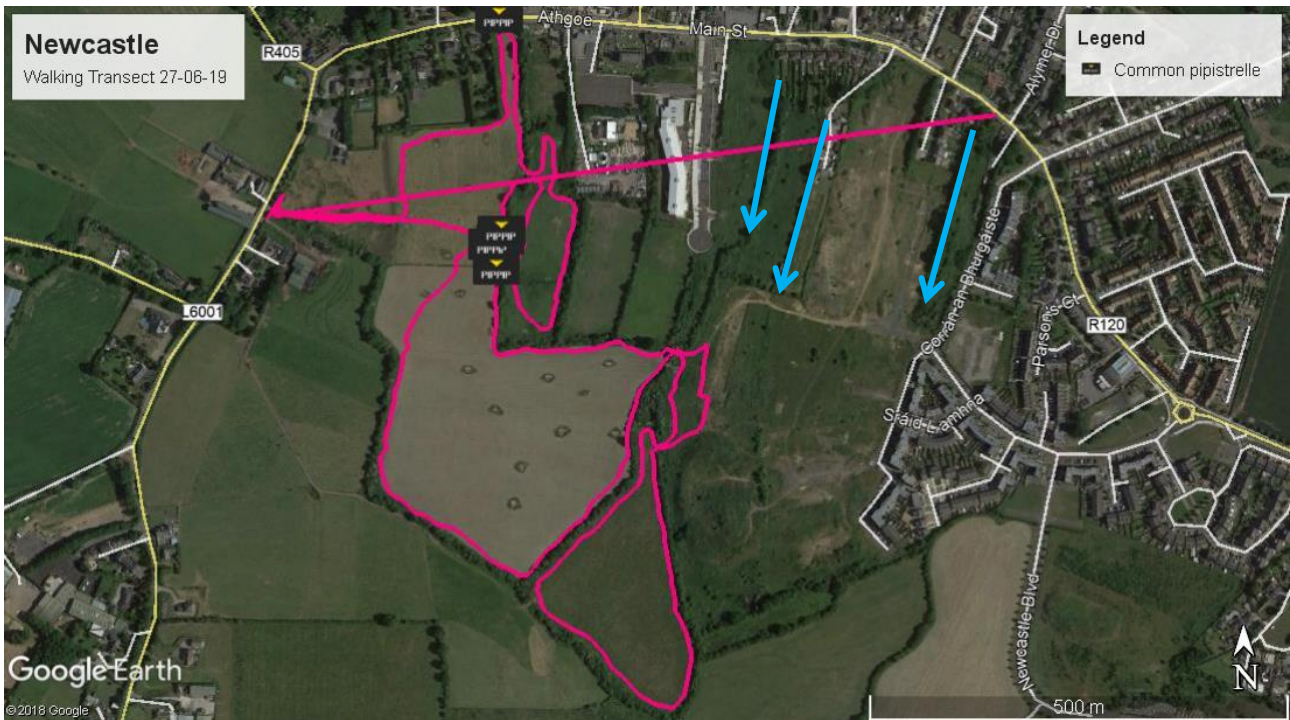
Figure 6a-d: Walking transect results for 27/6/2019. The pink line represents the walking route. Additional bat encounters are marked on the map: Yellow triangle = Leisler's bat; Blue triangle = common pipistrelle; Green triangle = brown long-eared bat and red triangle = soprano pipistrelle.

a) All bat passes



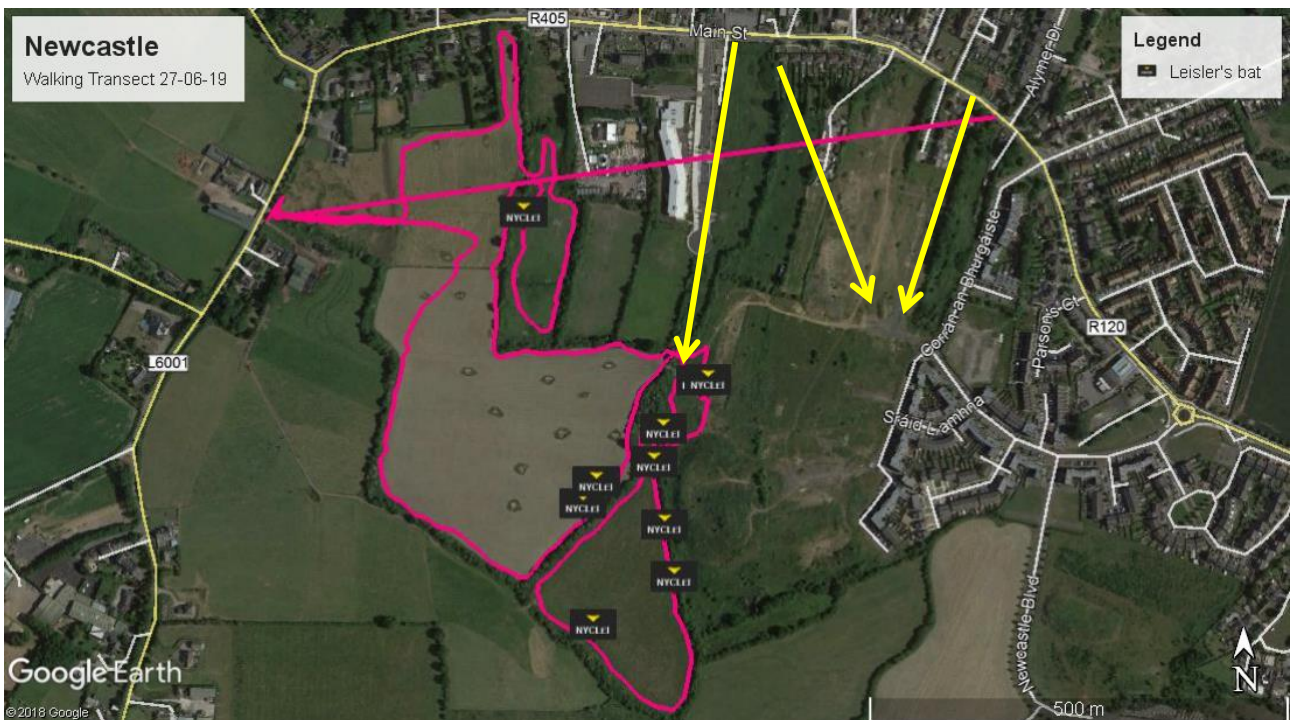
- b) Common pipistrelle encounters (please see All bat passes for the additional common pipistrelles encounters)

Commuting routes shown in blue arrows.



- c) Leisler's bat encounters (please see All bat passes for the additional common pipistrelles encounters)

Commuting routes shown in yellow arrows.



d) Daubenton's bat encounters

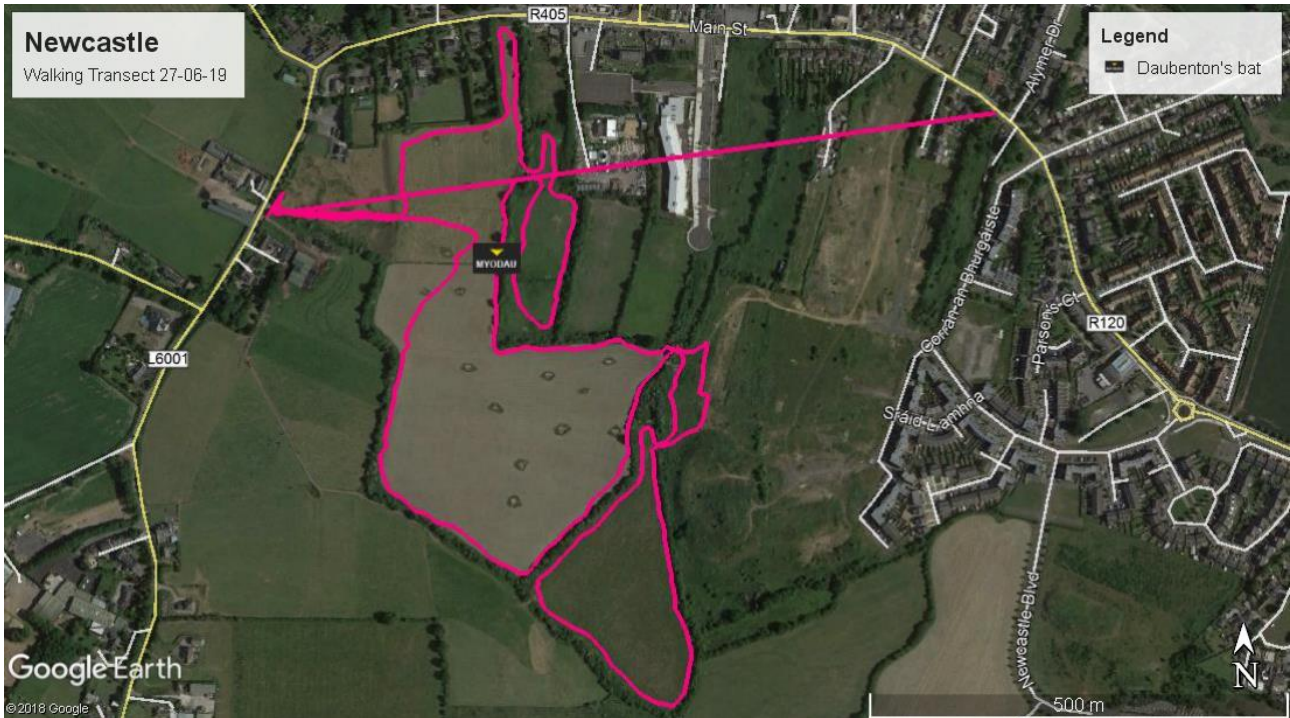


Plate 6: Landscape of proposed development site.

Additional walking transects were undertaken for the following locations on 20th July 2019 (Figure 7). Two species of bat were recorded commuting and foraging in the Red area (Fitzgibbon Lands): common pipistrelle and Leisler's bat. Common pipistrelle bat activity was primarily confined to the two mature trees at the front entrance of the driveway. Leisler's bats (2 passes) were commuting individuals through the survey area in a north to south direction.

Three species of bat was recorded in the general vicinity of the Blue areas: soprano pipistrelles, common pipistrelles and Leisler's bats. However only a small number of bat passes were recorded and these were of commuting bats through the areas. No foraging activity was recorded.

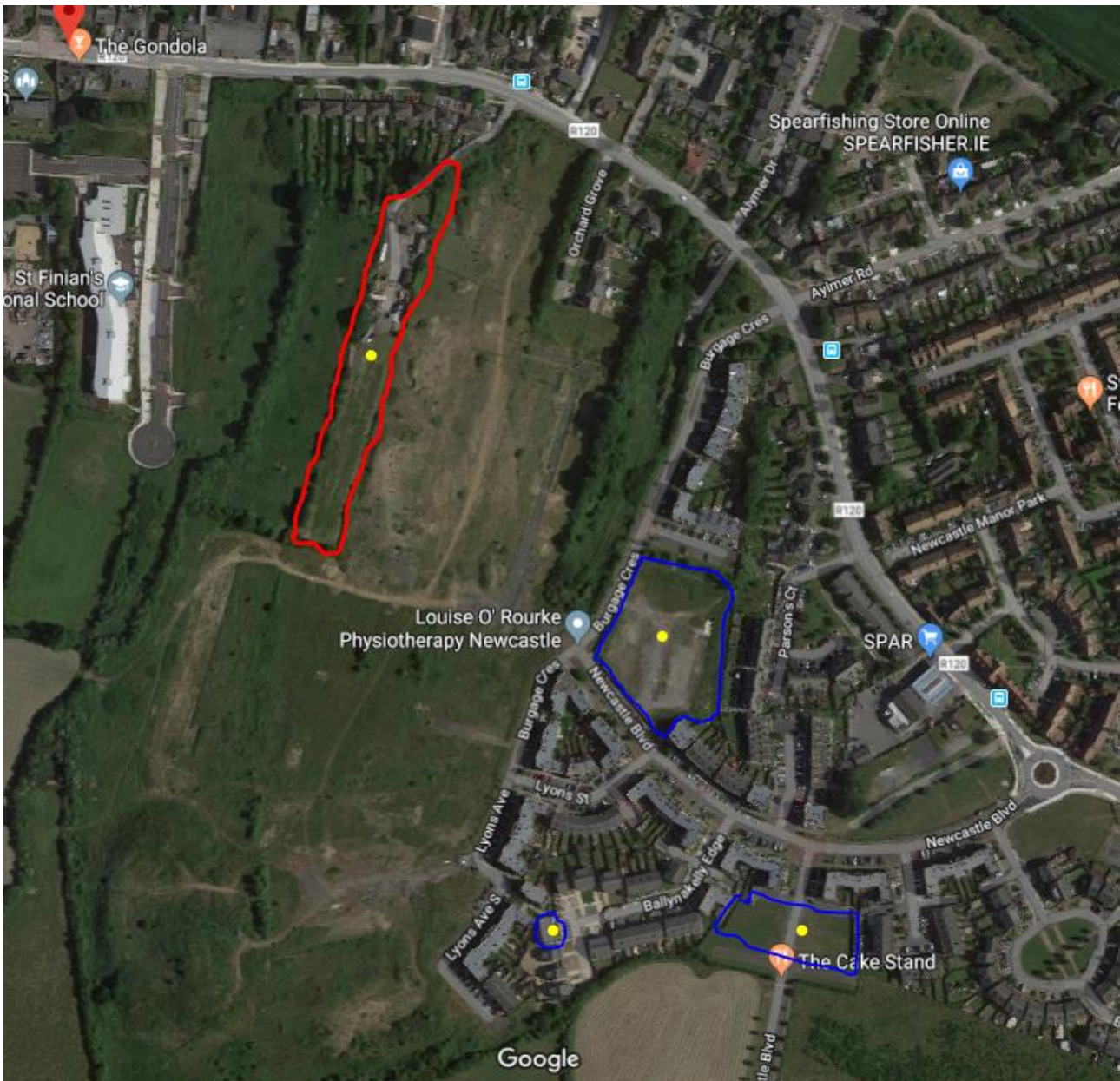


Figure 7: Additional lands surveyed on 20/7/2019.

3.2.2 Passive Static Bat Detector Survey

The following table summarises the results recorded on the static units deployed in both 2019 and 2018. The total number of bat passes recorded per night and divided by the number of hours of recording provides a figure for analysis. As a general guide activity level is determined as follows: Low = <10 bat passes/hr; Medium = >10 - <50 bat passes/hr; High = >50 bat passes/hr). Please see Appendices for more details.

NOTE: The behaviour of bats during commuting and foraging greatly influences the level of bat passes recorded on static units. The number of bat passes do not equate to the number of bats flying past the static unit. Pipistrellus species tended to foraging as they commute and therefore are regularly observed flying up and down a treeline or hedgerow before moving on in the landscape. Leisler's bats fly high in the sky and therefore can be observed flying fast through the landscape, occasionally foraging over treetops as they commute. As a consequence, Pipistrellus species bat activity tends to result in a higher number of bat passes recorded on static units compared to Leisler's bats. In relation to other bat species recorded, as they tend to be less common in the landscape compared to common pipistrelles, soprano pipistrelles and Leisler's bats, their recorded presence is notable. Exceptions to this would include Daubenton's bats on a waterway or a static located adjacent to a known bat roost.

Table 9: Result of Static Bat Detectors deployed during Static Bat Detector Surveys.

Static Code	Details	Leis	CP	SP	BLE	Myotis
2019 SM4 Unit 1	Location: treeline (red triangle) Survey Period - 24/6/2019 to 28/6/2019	Night 1 – Low Night 2 – Low Night 3 – Low Night 4 – Low	Night 1 – Low Night 2 – Med Night 3 – Med Night 4 – Low	Night 1 – Low Night 2 – Med Night 3 – Low Night 4 – Med	None	Night 1 – Low Night 2 – Low
2019 SM4 Unit 2	Location; adjacent to agricultural shed (orange triangle) Survey Period - 24/6/2019 to 28/6/2019	Night 1 – Med Night 2 – Med Night 3 – Low Night 4 – Low	Night 1 – Med Night 2 – High Night 3 – High Night 4 – High	Night 1 – Med Night 2 – Med Night 3 – Med Night 4 – Med	Night 1 – Low	None
2019 SM2	Location: treeline (blue triangle) Survey Period - 24/6/2019 to 28/6/2019	Night 1 – Low Night 2 – High Night 3 – High Night 4 – High	Night 1 – Low Night 2 – High Night 3 – High Night 4 – High	Night 1 – Low Night 2 – Med Night 3 – High Night 4 – Med	Night 2 – Low Night 4 – Low	Night 1 – Low Night 2 – Low
2019 SM5	Location: mature tree in ditch (green triangle) Survey Period - 24/6/2019 to 28/6/2019	Night 1 – Med Night 2 – Low Night 3 – Low Night 4 – Low	Night 1 – Low Night 2 – Low Night 3 – Low Night 4 – Low	Night 1 – Low Night 2 – Low Night 3 – Low Night 4 – Med	None	Night 4 – Low
2018 SM2 Unit 2	Location: Treeline / hedgerow (blue circle) Survey Period – 2/5/2018 to 4/5/2018	Night 1 – Low Night 2 – Low	Night 1 – Low Night 2 – High	Night 1 – Low Night 2 – Low	None	Night 1 – Low Night 2 – Low

2018 SM2 Unit 4	Location: Treeline / hedgerow (orange circle)	Night 1 – Low Night 2 – Low	Night 1 – Med Night 2 – Med	Night 1 – Low Night 2 – Med	None	None
2018 Unit A	Location: Treeline / hedgerow (purple circle)	Night 1 – Low Night 2 – Low	Night 1 – Med Night 2 – Med	Night 1 – Low Night 2 – Med	None	None
2018 Unit B	Location: Treeline / hedgerow (green circle)	Night 1 – Low Night 2 – Low	Night 1 – Med Night 2 – Low	Night 1 – Low Night 2 – Med	None	None



Figure 8: Aerial map of static unit locations in 2018 and 2019 surveys. Circles indicate the location of the static units in 2018 and triangles indicate the location of the static units in 2019.

3.3 Desktop Review

3.3.1 Bat Conservation Ireland Database

A 1km and 10km search was undertaken for the central Irish grid reference of the survey site: O0026328391.

1 km level: 2 Roosts (*Pipistrellus* spp. and soprano pipistrelle), 1 Transect (Leisler's bat and common pipistrelle) and 4 Ad Hoc record (Leisler's bat, soprano pipistrelle and common pipistrelle).

10km level: 35 Roosts (Natterer's bat, soprano pipistrelle, brown long-eared bat, common pipistrelle and Leisler's bats); 46 Transects (Daubenton's bat, Leisler's bat, common pipistrelle, Nathusius' pipistrelle and soprano pipistrelle) and 93 Ad Hoc records (whiskered bat, soprano pipistrelle, brown long-eared bat, common pipistrelle, Natterer's bat and Leisler's bats).

4. Bat Ecological Evaluation

4.1 Bat Species Recorded & Sensitivity

Three bat species were frequently recorded during these bat surveys: common pipistrelle, Leisler's bat and soprano pipistrelle. These three species are the three most common bat species recorded in Ireland. The additional two bat species recorded were Daubenton's bat and brown long-eared bat within the survey area, one of which was only recorded in the proposed development area (brown long-eared bat).

The medium-high level of bat activity of common pipistrelles and Leisler's bats was recorded, especially at the start of the night, commuting into the survey area and this may indicate that there are roosts, likely to be maternity roosts, located within the town of Newcastle. A low-medium level of soprano pipistrelle bat activity was recorded while a low level of bat activity was recorded for Daubenton's bat and brown long-eared bat. The Daubenton's bat encounter was recorded outside the proposed development area.

A medium-high level of bat activity was recorded in sections of the survey area and these are discussed further in the next section. Overall, the level of bat activity could be considered as Medium level.

A satellite roost of common pipistrelles was recorded both in 2018 and 2019 in an agricultural shed within the proposed development area.

In relation to the bat evidence collected by this report, it is deemed, according to Table 2, that the bat populations recorded within the survey area are of Local Importance.

Leisler's bat

This species was recorded primarily commuting through the survey area from the north to south direction during dusk surveys. Ireland's population is deemed of international importance and it is considered to be widespread across the island. The modelled Core Area for Leisler's bats is a relatively large area that covers much of the island of Ireland (52,820 km²). The Bat Conservation Ireland Irish Landscape Model indicated that the Leisler's bat habitat preference has been difficult to define in Ireland. Habitat modelling for Ireland shows an association with riparian habitats and woodlands (Roche *et al.*, 2014). The landscape model emphasised that this is a species that cannot be defined by habitats preference at a local scale compared to other Irish bat species but that it is a landscape species and has a habitat preference at a scale of 20.5km. In addition, of all Irish bat species, Leisler's bats have the most specific roosting requirements. It tends to select roosting habitat with areas of woodland and freshwater.

Irish Status	Near Threatened
European Status	Least Concern
Global Status	Least Concern
Estimated Irish Population Size	73,000 to 130,000 (2007-2013) Ireland is considered the world stronghold for this species
Irish Population Trend	2003-2013 ↑
Estimate Core Area (km²) (Lundy <i>et al.</i> 2011)	52,820

Taken from Roche *et al.*, 2014

The principal concerns for Leisler's bats are poorly known in Ireland but those that are relevant for this survey area are as follows:

- Tree felling
- Increasing urbanisation

Brown long-eared bat

This species was only encountered once during the walking transects (south-east of the survey area). This species is generally considered to be widespread across the island. The modelled Core Area for brown long-eared bats is a relatively large area that covers much of the island of Ireland (52,820 km²) with preference suitable areas in the southern half of the island. The Bat Conservation Ireland Irish Landscape Model indicated that the brown long-eared bat habitat preference is for areas with broadleaf woodland and riparian habitats on a small scale of 0.5 km emphasising the importance of local landscape features for this species (Roche *et al.*, 2014).

Irish Status	Least Concern
European Status	Least Concern
Global Status	Least Concern
Estimated Irish Population Size	64,000 to 115,000 (2007-2012)
Irish Population Trend	2008-2013 Stable
Estimate Core Area (km²) (Lundy <i>et al.</i> 2011)	49,929

Taken from Roche *et al.*, 2014

Principal concerns for brown long-eared bats are poorly known in Ireland, but those that are relevant for this survey area are as follows:

- Loss of woodland, scrub and hedgerows
- Tree surgery and felling
- Increasing urbanisation
- Light pollution

Daubenton's bat

This species was recorded along a treeline/hedgerow within the survey area but outside the proposed development site. The modelled Core Area for Daubenton's bats is a relatively large area that covers much of the island of Ireland (41,285 km²) reflecting the distribution of sizeable river catchments. The Irish Landscape Model indicated that the Daubenton's bat habitat preference is for areas with broadleaf woodland, riparian habitats and low density urbanisation (Roche *et al.*, 2014).

Irish Status	Least Concern
European Status	Least Concern
Global Status	Least Concern
Estimated Irish Population Size	81,000 to 103,000 (2007-2012)
Irish Population Trend	2008-2013 Stable
Estimate Core Area (km²) (Lundy <i>et al.</i> 2011)	41,285

Taken from Roche *et al.*, 2014

Principal concerns for Daubenton's bats are poorly known in Ireland but those that are relevant for this survey area are as follows:

- Loss of woodland, scrub and hedgerows
- Tree surgery and felling
- Increasing urbanisation
- Light pollution

Common pipistrelle

This species was the most recorded species within the survey area and it generally considered to be the most common bat species in Ireland. The species is widespread and is found in all provinces. The modelled Core Area for common pipistrelles is a large area that covers much of the island of Ireland (56,485 km²) which covers primarily the east and south east of the area (Roche *et al.*, 2014). The Bat Conservation Ireland Irish Landscape Model indicated that the common pipistrelle selects areas with broadleaf woodland, riparian habitats and low density urbanization (<30%) (Roche *et al.*, 2014).

Irish Status	Least Concern
European Status	Least Concern
Global Status	Least Concern
Estimated Irish Population Size	1.2 to 2.8 million (2007-2012)
Irish Population Trend	2003-2013 ↑
Estimate Core Area (km²) (Lundy <i>et al.</i> 2011)	56,485

Taken from Roche *et al.*, 2014

Principal concerns for common pipistrelles in Ireland that are relevant for this survey area are as follows:

- Renovation or demolition of derelict buildings.
- Tree felling
- Increasing urbanisation (e.g. increase in lighting)

Soprano pipistrelle

This species was the second most recorded species within the survey area and it generally considered to be the second most common bat species in Ireland. The species is widespread and is found in all provinces, with particular concentration along the western seaboard. The modelled Core Area for soprano pipistrelle is a large area that covers much of the island of Ireland (62,020 km²). The Bat Conservation Ireland Irish Landscape Model indicated that the soprano pipistrelle selects areas with broadleaf woodland, riparian habitats and low density urbanisation (Roche *et al.*, 2014).

Irish Status	Least Concern
European Status	Least Concern
Global Status	Least Concern
Estimated Irish Population Size	0.54 to 1.2 million (2007-2012)
Irish Population Trend	2003-2013 ↑
Estimate Core Area (km²) (Lundy <i>et al.</i> 2011)	62,020

(Taken from Roche *et al.*, 2014)

Principal concerns for soprano pipistrelles in Ireland that are relevant for this survey area are as follows:

- Renovation or demolition of structures
- Tree felling
- Increasing urbanisation (e.g. increase in lighting)

4.2 Bat Foraging Habitat & Commuting Routes

A number of locations within the survey area have been identified as important foraging habitats and commuting routes for bats. These are represented on the aerial below. Yellow circled locations represent MEDIUM-HIGH importance (due to medium to high level of bat activity recorded within this area) and blue represent MEDIUM importance (due to medium level of bat activity recorded within this area).

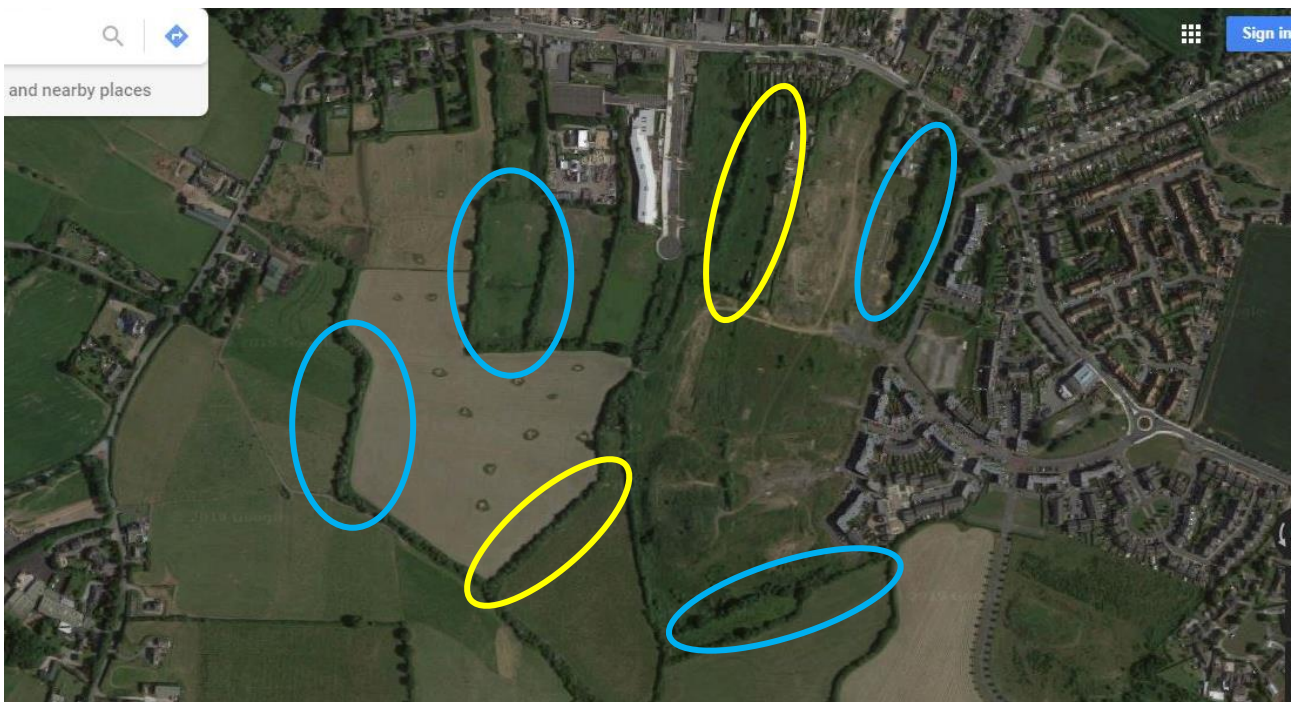


Figure 9: Aerial map of survey area indicating High and Medium important areas for local bat populations.

4.3 Zone of Influence – Bat Landscape Connectivity

The survey area is located south of the town of Newcastle, Co. Dublin. It is primarily an agricultural landscape and offers a well-connected landscape for local bat populations. There is an industrial zone located to the east of the town towards Dublin city. As a consequence, it is important to retain the connectivity within the survey area to allow local bat populations to continue to commuting and foraging post-construction of the proposed development.

4.4 Landscape & Lighting Plan

The landscape plan (Draft Version 19.7.2019 shown below) has marked linear habitat features proposed to be removed to make way for the proposed development. It also shows those to be retained post-development of the survey area.

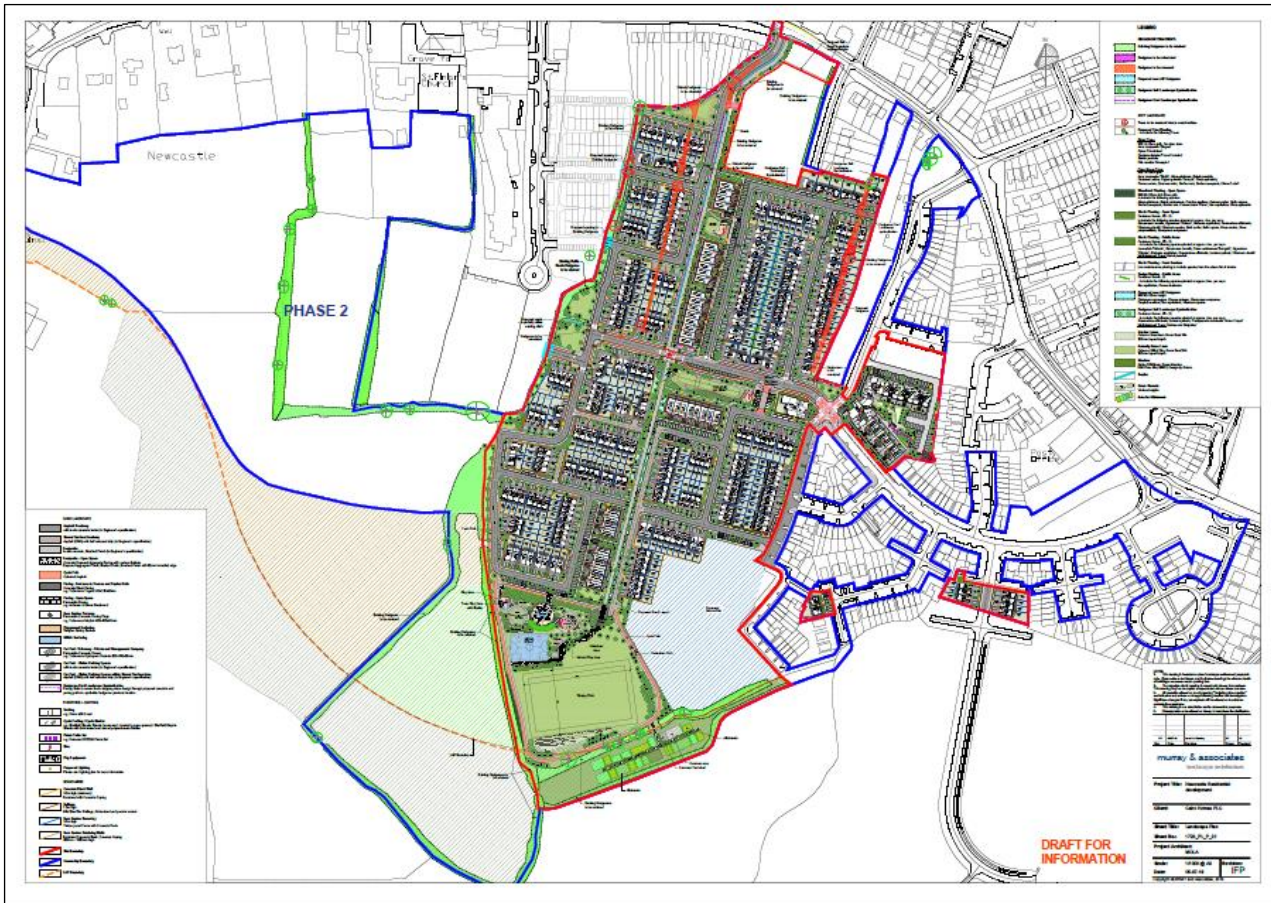


Figure 10: Draft Landscape Plan.

The linear habitat features to be removed are shown on the aerial below with a colour indication in relation to their importance as commuting and foraging habitats for local bat populations.

Linear feature 1 – to be removed. This will also result in one tree, identified as a Potential Bat Roost (PBR), located along this hedgerow to be removed.

Linear feature 2 – to be removed, but replanted post development. The proposed site layout plan and the landscape plan facilitate landscape connectivity to maintain this linear habitat.

All other linear habitats marked as important for bats are marked to be retained. The retention of the majority of the linear habitats will reduce the potential impact of the proposed development on local bat populations.

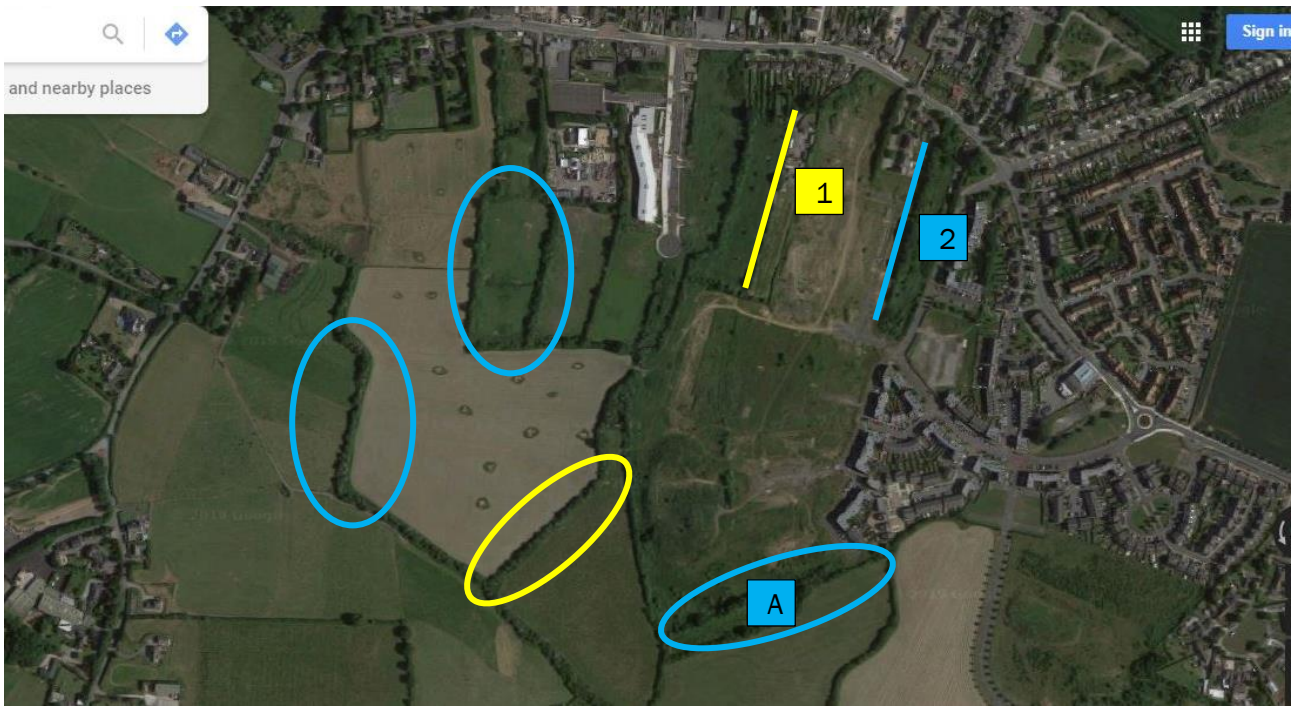


Figure 11: Aerial map of survey area indicating linear habitats to be removed to facilitate the proposed development. Linear habitat features coloured according to their High (Yellow) and Medium (Blue) importance for local bat populations.

The area marked A in the figure above is to be retained and used for allotments. As a consequence, this area is recommended to be the location of the rocket bat boxes. The remaining areas highlighted are outside the current proposed development.

5. Impact Assessment & Mitigation

The following bat species have been recorded during this bat survey: common pipistrelle, soprano pipistrelle, Leisler's bat, brown long-eared bat and Daubenton's bats. This represents the five of the nine residence bat species known to Ireland. Four of this species were recorded within the proposed development area: common pipistrelle, soprano pipistrelle, Leisler's bat and brown long-eared bat, with the later only encountered once during all of the surveys completed.

All bat species recorded during this Bat Survey are Annex IV species under the EU Habitats Directive and all have a Favourable Status in Ireland.

The presence of bats was given consideration at the design phases of the proposed development.

For this ecological assessment, the habitats adjacent to the proposed development may be considered in terms of extent, diversity, naturalness, rarity, fragility, typicalness, recorded history, position, potential value and intrinsic appeal (Regini, 2000). The potential of these habitats for bat fauna is considered in this framework also.

- Bats may use trees with heavy ivy growth as occasional roosts. Bats may use mature trees with tree holes etc., as roosting sites all year around. A tree assessment in relation to Potential Bat Roosts was undertaken and 18 trees were deemed to be PBRs, the majority of which are classed as Category 2 PBRs.
- Foraging and commuting areas were primarily recorded along hedgerows and treelines located within the proposed development site, particularly for common and soprano pipistrelles. The exception to this is Leisler's bats, which is a bat species that fly high over the landscape. They are not a reliant on linear habitats to traverse through the landscape.
- An extensive array of buildings are located adjacent to the survey area while a number of buildings are located within the survey area. All of buildings within the proposed development area have been surveyed as part of this bat survey, one of which have been recorded as a bat roost.

1 *agricultural grasslands.*

This habitat is present within the survey area as agricultural blocks surrounded by linear habitats. These agricultural blocks and associated hedgerows/treeline boundaries provides foraging habitat for common bat species especially common pipistrelle and Leisler's bat. May be considered as Medium ecological value.

2 *hedgerow and treeline boundaries, access tracks.*

These habitat types are present around agricultural blocks, boundaries of the survey area and roadways. Such provide wildlife corridors and foraging areas for many bat species. Bat roosts may be present in mature trees or larger ivy-covered trees. However, these linear habitats are essential for commuting bats. May be considered as High ecological value.

3 *areas of scrub.*

The survey area includes some small areas of scrub, much of which are associated with construction spoil areas. This provides a mosaic of habitat which is essential for foraging

and commuting bat species. Variable in species composition, any areas of scrub can provide foraging areas for bats with some commuting potential. May be considered as of Medium Local value for bats.

4 buildings.

There are a small number of buildings located within the survey area. One of these buildings provides roosting for common pipistrelles. Its ecological value increased when associated with hedgerows and treelines, which many of them area. May be considered as of Medium ecological value for bats.

Bat fauna within the survey area will be affected by both the construction phase and operational phase of the proposed development. The impact assessment and mitigation will be undertaken in relation to the four bat species recorded within the proposed development area: common pipistrelle, soprano pipistrelle, Leisler's bat and brown long-eared bat.

Principal impacts of the proposed development, in general, on bat fauna may be summarised as follows:

1. A variety of habitats occur within the proposed development area, which vary in their importance for bats. The loss of areas of agricultural grassland within the proposed development area will have a negligible or minor impact on bats. The main impact on bats arises through the loss of hedgerows and treelines within the proposed development area which are widely used by pipistrelles. Loss of bat habitats such as treelines, hedgerows as a result of construction will impact on commuting bats. This is considered as a Moderate Negative impact and maybe reduced to Minor-Moderate Negative impact if such linear features remain in the landscape and mitigation measures are strictly followed.
2. Loss or fragmentation of foraging habitats may diminish the available insect prey species and reduce feeding area for bats in some locations. This is considered as a Moderate Negative impact and maybe reduced to Minor Negative if such linear features remain in the landscape.
3. Bats are often faithful to a particular roost site from year to year. A single satellite roost for common pipistrelles were recorded within the proposed development site. The removal of the agricultural shed will result in the loss of a satellite roost for common pipistrelles. This is considered as a Moderate Negative impact and maybe reduced to Minor-Moderate Negative impact if alternative roosting sites are provided.
4. Bats will often use trees as roosting sites. Potential Bat Roosts in trees is also an important area to address and the proposed road route will be assessed for PBRs. There are 18 trees deemed to have roosting potential, however, many of these are located within treelines / hedgerows to be retained. Two linear habitats are proposed to be removed which will results in five trees identified as a PBR to be removed. An additional two trees are also recommended to be removed. One of these linear habitats will be replanted post-development. All other linear habitats deemed important for local bat populations are marked to be retained on the landscape map.

The loss of trees in the landscape as a result of proposed development is likely to be Minor-Moderate Negative impact.

In addition the operation of the proposed development is likely to entail the following:

a) Lighting of the general area (street lighting, residential lighting etc.).

Proposed lighting of the proposed development will potentially impact on all bat species in relation to commuting, roosting and foraging potential. But the degree of impact is dependent on how sensitive the particular bat species is to lighting as some bats are tolerant of lighting. It is also dependent on the type of lighting installed and the location of such lighting.

Leisler's bats are tolerant of street lighting. Common pipistrelles and soprano pipistrelles will tolerate low levels of lighting while brown long-eared bats are a lighting sensitive bat species. The latter species was only recorded in one area of the proposed development site and this area is located adjacent to linear habitat features that are proposed to be retained and developed as an allotment area. This will benefit this bat species, as well as the other bat species recorded.

Therefore the lighting of the proposed development is likely to have a Moderate Negative impact.

a) Infrastructure

There is some road infrastructure already in place within the Newcastle development (east of the survey site). Further preparation of infrastructure to support the current development site is proposed. This will result in the loss of some treelines/hedgerows and as a consequence commuting and foraging habitats. However, as stated above, minimal removal of hedgerows is planned with some replacement planting post-works.

The lighting of infrastructure will potentially impact on foraging and commuting bats as mentioned above.

Therefore the infrastructure of the proposed development is likely to have a Moderate Negative impact.

b) Operational post-development

The operation of the proposed development site as a housing estate will increase human usage of the site and as a consequence potential disturbance due to increased noise levels and lighting. However, as the proposed development site is primarily used as a commuting and foraging area for three common bat species, landscaping plan and lighting plan will reduce this impact. The two additional bat species recorded in the survey area are considered to be light-sensitive bat species and will be impacted by the operation of the proposed development site. However, the location of the records of these two species were on the external treelines / hedgerows and therefore landscaping and retention of the boundary linear habitats is likely to reduce the impact of the operation of the proposed development on these bat species.

This proposed development is considered to have an overall potential Moderate Negative impact on local bat populations if no mitigation measures were implement.

Table 10: Potential impact of the proposed development on the different bat species recorded during survey work prior to the implementation of mitigation measures.

Works	SP	CP	Leis	BLE
Removal of agricultural building	None	Moderate	None	None
Lighting of development area	Moderate	Moderate	Minor	Moderate
<ul style="list-style-type: none"> - Reduced foraging - Reduced commuting 				
Removal of linear habitats	Minor-Moderate	Moderate	Minor	Moderate
Operation of the development site	Moderate	Moderate	Minor	Moderate
Infrastructure	Moderate	Moderate	Minor	Moderate

SP = soprano pipistrelle, CP = common pipistrelle, Leis = Leisler's bat, BLE = brown long-eared bat.

5.1 Mitigation Measures

The following mitigation measures are recommended to reduce the potential impact of the proposed development on local bat populations from Moderate to Minor-Moderate Negative impact:

5.1.1 Removal of Agricultural shed

This building is a satellite roost for common pipistrelles. Therefore the removal of such will require an NPWS Derogation Licence* and mitigation measures to provide an alternative roosting site for bats. The following procedure will be as follows (subject to Derogation Licence and terms and conditions attached):

*** NPWS Derogation Licence received on 8th August 2019 (DER-BAT-2019-69)**

- i) Erection of an alternative roosting site prior to removal of the agricultural shed. This will be erected in the winter/spring months before planned demolition to allow local bat populations to become aware of it prior to removal of the agricultural shed.
 - a. Rocket Bat Box (x2) – free-standing chamber on free standing pole (See appendices).
 - b. Location of rocket boxes will be in the area of allotments as shown in a section of the Draft Landscape Plan (19.7.19) below. This site is chosen as there is well connected hedgerows/ treelines and located in an area where not lighting is planned.



Figure 10: Potential location of Rocket bat boxes (Orange & Black Circles).

- ii) The agricultural shed will be removed in the following autumn or springs months after the erection of the alternative roosts:
 - a. Check / survey building to ensure that no bats are present.
 - b. Remove corrugated roof in the presence of a bat specialists.
 - c. The bat specialist is to check cavity blocks for bats. Once cleared, removed blocks on the same day of inspection.

To ensure that bats use the rocket bat boxes, these will be carefully sited by a bat specialist. Some general points to follow include:

- Located adjacent to hedgerows / treelines.
- Rocket box is erected on 5m mild steel box poles set in 1m x 1m concrete (45 newton) ensuring that there is 4m of pole above ground. Rocket bat box is secured on top of this steel pole.
- Locations for bat boxes are selected to ensure that the lighting plan for the proposed site does not impact on the bat boxes.

5.1.2 Removal of other buildings

While other buildings located within the proposed development area were not recorded as bats roosts, the following buildings will require a re-survey prior to removal to ensure that no bats are roosting within:

- Fitzgibbon Dwelling 1 & 2.

5.1.3 Lighting plan

Nocturnal mammals are impacted by lighting. Therefore it is important that lighting installed within the proposed development site is completed with sensitivity for local wildlife while still providing the necessary lighting for human usage. The following principals are to be followed:

- Artificial lights shining on bat roosts, their access points and the flight paths away from the roost **must always be avoided**. This includes alternative roosting sites such as bat boxes.
- Lighting design will be flexible and be able to fully take into account the presence of protected species. Therefore, appropriate lighting will be used within a proposed development and adjacent areas with more sensitive lighting regimes deployed in wildlife sensitive areas.
- Dark buffer zones will be used as a good way to separate habitats or features from lighting by forming a dark perimeter around them. This will be used for habitat features noted as foraging areas for bats.
- Buffer zones will be used to protect Dark buffer zones and rely on ensuring light levels (levels of illuminance measured in lux) within a certain distance of a feature do not exceed certain defined limits. The buffer zone can be further subdivided in to zones of increasing illuminance limit radiating away from the feature or habitat that requires to be protected.
- Luminaire design is extremely important to achieve an appropriate lighting regime. Luminaires come in a myriad of different styles, applications and specifications which a lighting professional can help to select. The following will be considered when choosing luminaires. This is taken from the most recent BCT Lighting Guidelines (BCT, 2018).
 - All luminaires used will lack UV/IR elements to reduce impact.
 - LED luminaires will be used due to the fact that they are highly directional, lower intensity, good colour rendition and dimming capability.

- A warm white spectrum (<2700 Kelvins is achieved to reduce the blue light component of the LED spectrum).
- Luminaires will feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats.
- The use of specialist bollard or low-level downward directional luminaires should be considered in bat sensitive areas to retain darkness above.
- Column heights will be carefully considered to minimise light spill. The shortest column height allowed should be used where possible.
- Only luminaires with an upward light ratio of 0% and with good optical control will be used.
- Luminaires will always be mounted on the horizontal, i.e. no upward tilt.
- Any external security lighting will be set on motion-sensors and short (1min) timers.
- As a last resort, accessories such as baffles, hoods or louvres will be used to reduce light spill and direct it only to where it is needed.

In particular, lighting should not shine onto important commuting and foraging areas identified for local bat populations.

The Outdoor Lighting Report was consulted in relation to Lux levels within the proposed development site. The horizontal luminance provides information in relation to the projected Lux levels. In relation to hedgerows being retained (external boundary of proposed development site), a Lux level of 1 is projected along this area. For the common bat species (i.e. common pipistrelle, soprano pipistrelle and Leisler's bats) recorded foraging and commuting within the proposed development site, this Lux level is tolerable. However a higher Lux level is recorded along internal hedgerows and this may discourage *Pipistrellus* species from commuting along. This will be addressed to reduce the Lux level to allow continued use by *Pipistrellus* species.

Rocket bat boxes will be located in the allotment area as this area will have no street lighting and therefore is a suitable area for these alternative roosts.

5.1.4 Landscaping plan

It is important to ensure that Linear Habitat No. 2 is replanted with native Irish tree and shrub species and to plan landscaping that will reconnect this linear habitat to other linear habitats on the boundaries of the proposed development post development. If possible, additional planting should be undertaken to replace the loss of Linear habitat No. 1. The landscaping will incorporate:

- Native hedgerow tree species
- Individual deciduous trees to allow mature trees to develop over time
- Where possible, pockets (field corners) of small groups of deciduous trees to provide shelter belts for foraging.
- Planting incorporate retained hedgerows / treelines.
- Any semi-natural habitats will be protected from potential damage construction phase and post-construction.
- Minimise the use of chemicals (weed killers, etc.) within the development zone.
- Any gaps will be planted along the new boundary of the proposed development. The shrub / tree mixture will be native plant species replication what already exists in the landscape: hawthorn, ash and oak.

5.1.5 Removal of trees

- a) As many of the PBRs will be retained, where possible. A buffer zone will be in place of at least 10 m on either side of the treeline to ensure that there is a dark zone for commuting bats.
- b) If the trees are to be removed, planting will be undertaken to mitigate for tree removal and landscaping plans will be planted using “like for like” in relation to tree and shrub species removed. Consideration will be given towards hawthorn, blackthorn mix with individual ash, alder and birch to form a native tree hedge) and deciduous trees (native tree species include ash, oak, alder, birch) will be planted to buffer the new development area.

Trees, which are to be removed, will be felled during the autumn months of September, October or November (felling during the spring or autumn months avoids the periods when the bats are most active). Prior to tree removal, a resurvey of the trees proposed to be felled will be undertaken in consultation with the tree surgeon. This will allow a plan to be formulated in relation to tree felling. Surveying of trees, including a Phase II survey (closer examination of the trees) and dusk/dawn surveys of trees to determine their bat usage is recommended prior to felling and to inform the felling plan.

An assessment of trees according to their PBR value determines the methodology of felling. Trees with PBR Category 1 are highly suitable for roosting bats and require more intensive procedures prior to felling. The trees identified within the survey area are PBR Category 2. The procedure to fell these is as follows:

- Any ivy covered trees (Category 2) which require felling will be left to lie for 24 hours after cutting to allow any bats beneath the cover to escape.
- Category 1 trees will be felled by dismantling of the limbs prior to felling of the main trunk. This will be undertaken in the presence of a bat specialist.
- A bat box scheme will to be erected prior to any tree felling. The number of bat boxes will be calculated according to the number of trees felled and the category of trees felled. The bat boxes will be erected prior to felling at locations chosen by the bat specialist.

5.1.6 Monitoring

Monitoring is will be completed post-construction works. This monitoring will involve the following aspects:

- Inspection of bat boxes within one year of erection of bat box scheme/rocket box and inspection of current bat box scheme. Register bat box scheme with Bat Conservation Ireland. This will be undertaken for a minimum of 2 years.
- Monitoring of any bat mitigation measures. All mitigation measures will be checked to determine that they were successful. A full summer bat survey will be completed post-works.

Table 11: Potential impact of the proposed development on the different bat species recorded during survey work if bat mitigation measures are fully implemented.

Works	SP	CP	Leis	BLE
Removal of agricultural building under derogation licence conditions (e.g. erection of rocket bat boxes etc.)	None	Minor	None	None
Lighting of development area	Minor	Minor	Minor	Moderate
<ul style="list-style-type: none"> - No lighting in allotment area - Lighting plan using LED lighting, directional luminaires etc. 				
Linear habitats – retention of external boundary habitats, replanting of additional linear features	Minor	Minor to Moderate	Minor	Minor to Moderate
Operation of the development site	Minor	Minor to Moderate	Minor	Moderate
Infrastructure	Minor	Minor to Moderate	Minor	Moderate

SP = soprano pipistrelle, CP = common pipistrelle, Leis = Leisler's bat, BLE = brown long-eared bat.

6. Survey Conclusions

This report provides information on the bat usage of the proposed development site. Three bat species were frequently recorded during these bat surveys: common pipistrelle, Leisler's bat and soprano pipistrelle. The additional two bat species recorded were Daubenton's bat and brown long-eared bat within the survey area, one of which was only recorded in the proposed development area (brown long-eared bat).

The medium-high level of bat activity of common pipistrelles and Leisler's bats was recorded, while a low-medium level of soprano pipistrelle bat activity was recorded and a low level of bat activity was recorded for Daubenton's bat and brown long-eared bat. Overall, the level of bat activity could be considered as Medium level. A satellite roost of common pipistrelles was recorded both in 2018 and 2019 in an agricultural shed within the proposed development area. In relation to the bat evidence collected by this report, it is deemed that the bat populations recorded within the survey area are of Local Importance.

The proposed development will likely have a Moderate Negative impact on local bat populations.

A number of mitigation measures have been provided and incorporated into the design of the proposed development, and strict adherence to these will reduce the overall impact level to Minor-Moderate Negative impact.

The proposed development area will result in the loss of a number of commuting hedgerows/treelines, some of which will be replanted as part of the Landscape Plan.

The proposed development will increase the degree of lighting. However, the lighting plan is designed to reduce lighting spillage onto external hedgerows/treelines which will allow their continued usage by commuting and foraging bats.

The proposed development will result in the loss of a satellite roost for common pipistrelles but alternative roosting will be erected south of the proposed development (allotment area).

The proposed development will result in the felling of a small number of mature trees but this will be undertaken in a manner to ensure that no bats are harmed and alternative roosting will be provided in the form of bat boxes.

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8. Appendices

Appendix 1 Bat Habitat & Commuting Route Classifications

Table 1.A: Hedgerow Category (Bat Conservation Ireland, 2015)

Type of Hedgerow / Treeline	Code	Description / Bat Potential
Small Hedgerow	SH	Hedgerow is less than approximately 1.5 m high, there are no, or very few, protruding bushes or trees. This type of hedgerow would provide little shelter to bats. 
Medium Hedgerow	MH	Hedgerow is approximately 1.5 to 3 m high. This type of hedgerow will provide foraging and commuting potential for bats. 
Sparse Treeline Hedgerow	ST	Hedgerow, low or medium in height, with individual trees (where tree canopies, for the most part, do not touch). 
Dense Treeline Hedgerow	DT	Large uncut hedgerows or treelines, dominated by mainly large tree or very tall scrub species (e.g. tall hawthorn, blackthorn or hazel), where

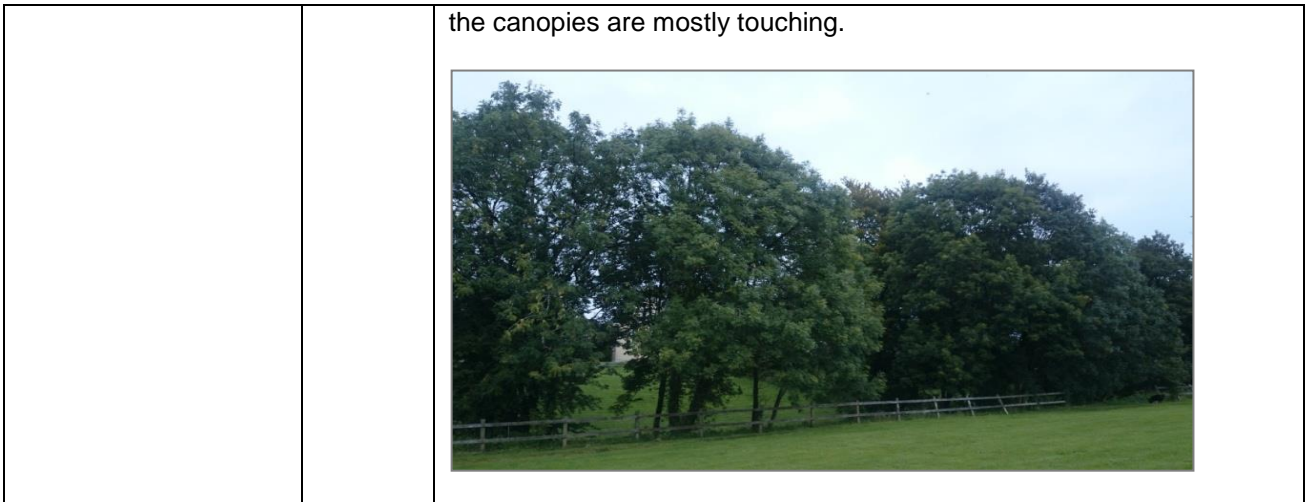


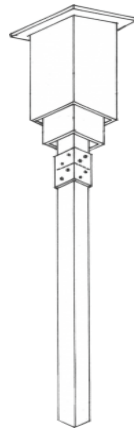
Table 1.B: Habitat Classification (Bat Conservation Ireland, 2015, based on Fossit, 2000)

Cultivated land		Salt marshes		Exposed rock		Fens/flushes	
Built land		Brackish waters		Caves		Grasslands	
Coastal structures		Springs		Freshwater marsh		Scrub	
Shingle/gravel		Swamps		Lakes/ponds		Hedges/treelines	
Sea cliffs/islets		Disturbed ground		Heath		Conifer plantation	
Sand dunes		Watercourse		Bog		Woodland	

Appendix 2 Alternative Bat Roosting

Habibat Double Chambered Rocket Box

Pole-mountable bat box to provide extensive roosting space



(please view on www.nhbs.com)

9. Static Unit Results

As a general guide, the average number of bat passes per hour and summarised for each survey night is assigned as follows - Activity level: Low = <10 bat passes/hr; Medium = >10 - <50 bat passes/hr; High = >50 bat passes/hr). This is an arbitrary guide designed by the author. Static unit recording in 2018 was for 8 hours per night and recording in 2019 was for 7 hours per night.

Static Unit Results - 2018

Table 1: Songmeter SM2 BAT+ Unit 4 located along treeline/hedgerow (Orange circle)

Time (hrs)	Leis	SP	CP
2nd to 3rd May 2018			
21:00-22:00	0 passes	6 passes	0 passes
22:00-23:00	0 passes	0 passes	0 passes
23:00-00:00	0 passes	1 pass	57 passes
00:00-01:00	0 passes	0 passes	50 passes
01:00-02:00	0 passes	0 passes	22 passes
02:00-03:00	0 passes	0 passes	16 passes
03:00-04:00	0 passes	1 pass	4 passes
04:00-05:00	0 passes	0 passes	3 passes
3rd to 4th May 2018			
21:00-22:00	6 passes	8 passes	5 passes
22:00-23:00	0 passes	5 passes	18 passes
23:00-00:00	0 passes	2 passes	48 passes
00:00-01:00	1 pass	8 passes	138 passes
01:00-02:00	2 passes	147 passes	130 pass
02:00-03:00	0 passes	0 passes	0 passes
03:00-04:00	0 passes	0 passes	0 passes
04:00-05:00	0 passes	0 passes	0 passes

Table 2: Songmeter SM2 BAT+ Unit 2 located along treeline/hedgerow (Blue circle)

Time (hrs)	Leis	SP	CP	Myotis
2nd to 3rd May 2018				
21:00-22:00	0 passes	1 pass	11 passes	0 passes
22:00-23:00	0 passes	1 passes	3 passes	0 passes
23:00-00:00	0 passes	2 passes	0 passes	0 passes
00:00-01:00	0 passes	2 passes	11 passes	1 pass
01:00-02:00	0 passes	0 passes	0 passes	0 passes
02:00-03:00	0 passes	0 passes	0 passes	0 passes
03:00-04:00	0 passes	0 passes	0 passes	0 passes
04:00-05:00	0 passes	0 passes	2 passes	0 passes
3rd to 4th May 2018				
21:00-22:00	10 passes	3 passes	10 passes	1 pass
22:00-23:00	1 pass	14 passes	165 passes	1 pass
23:00-00:00	2 passes	0 passes	189 passes	0 passes
00:00-01:00	0 passes	27 passes	56 passes	1 pass
01:00-02:00	0 passes	1 pass	38 passes	0 passes
02:00-03:00	0 passes	8 passes	64 passes	0 passes
03:00-04:00	0 passes	0 passes	61 pass	0 passes
04:00-05:00	0 passes	0 passes	102 passes	0 passes

Table 3: BatLogger A+ Unit A located adjacent to treeline (Purple Circle)

Time (hrs)	Leis	SP	CP
2nd to 3rd May 2018			
21:00–05:00	4 passes	26 passes	137 passes
3rd to 4th May 2018			
21:00–05:00	35 passes	32 passes	128 passes

Table 4: BatLogger A+ Unit B located along treeline/hedgerow in the southern area of the proposed development area (Green Circle)

Time (hrs)	Leis	SP	CP
2nd to 3rd May 2018			
21:00–05:00	25 passes	18 passes	171 passes
3rd to 4th May 2018			
21:00–05:00	23 passes	25 passes	38 passes

Table 5: Static units results from 2019 (Triangles)

Static Unit	Date	Leis	passes/hr	SP	passes/hr	CP	passes/hr	BLE	passes/hr	Myotis	passes/hr
SM4 Unit 1	24/06/2019	36	5.1428571	105	15	89	12.714286	0	0	1	0.1428571
	25/06/2019	44	6.2857143	88	12.571429	95	13.571429	0	0	1	0.1428571
	26/06/2019	32	4.5714286	57	8.1428571	77	11	0	0	0	0
	27/06/2019	18	2.5714286	86	12.285714	66	9.4285714	0	0	0	0
SM4 Unit 2	24/06/2019	121	17.285714	137	19.571429	324	46.285714	1	0.1428571	0	0
	25/06/2019	146	20.857143	132	18.857143	403	57.571429	0	0	0	0
	26/06/2019	69	9.8571429	98	14	370	52.857143	0	0	0	0
	27/06/2019	68	9.7142857	117	16.714286	365	52.142857	0	0	0	0
SM2 Unit 2	24/06/2019	51	7.2857143	18	2.5714286	52	7.4285714	0	0	1	0.1428571
	25/06/2019	1740	248.57143	242	34.571429	1428	204	1	0.1428571	1	0.1428571
	26/06/2019	382	54.571429	398	56.857143	2588	369.71429	0	0	0	0
SM2 Unit 5	24/06/2019	357	51	402	57.428571	2214	316.28571	0	0	1	0.1428571
	24/06/2019	97	13.857143	11	1.5714286	44	6.2857143	0	0	0	0
	25/06/2019	40	5.7142857	11	1.5714286	20	2.8571429	0	0	0	0
	26/06/2019	14	2	6	0.8571429	21	3	0	0	0	0
	27/06/2019	6	0.8571429	3	0.4285714	10	1.4285714	0	0	1	0.1428571

Appendix 10.C Derogation Licence



An Roinn Cultúir,
Oidhreacht agus Gaeltachta
Department of Culture,
Heritage and the Gaeltacht

Licence No.: DER/BAT 2019 – 69 (amended)

**EUROPEAN COMMUNITIES (BIRDS AND NATURAL HABITATS) REGULATIONS,
2011 (S.I. No 477 of 2011)**

DEROGATION LICENCE

Granted under Regulation 54 of the European Communities (Birds and Natural Habitats) Regulations 2011, hereinafter referred to as “the Habitats Regulations”.

Licence

The Minister for Arts, Heritage and the Gaeltacht, in exercise of the powers conferred on her by Regulation 54 of the Habitats Regulations hereby grants to **Cairn Homes Properties Ltd.** supervised by **Dr Tina Aughney** a licence in respect of the following **bat species**:

- **common pipistrelle** *Pipistrellus pipistrellus*

This licence authorises the following:

- (a) roost disturbance;
- (b) damage or destruction of breeding sites or resting places;

(“the authorised action(s)”).

This licence is subject to the terms and conditions set out overleaf.



Terms and Conditions

1. This licence is granted solely to allow the activities specified in connection with the **removal of an agricultural shed as part of a proposed residential development** located at **Newcastle, Co. Dublin**, for **Cairn Homes Properties Ltd.**
2. All activities authorised by this licence, and all equipment used in connection herewith, shall be carried out, constructed and maintained (as the case may be) so as to avoid unnecessary injury or distress to any species of **BAT**.
3. This licence may be modified or revoked, for stated reasons, at any time.
4. The mitigation measures outlined in the application report (**Derogation Licence Application for removal of agricultural shed, Newcastle, Co. Dublin., 3. Mitigation Measures, pp 6-7, 2019 Bat Assessment, 'Newcastle_2019_Final.pdf,' 5.1 Mitigation Measures, pp 44-48**), together with any changes or clarification agreed in correspondence between NPWS and the agent or applicant, are to be carried out. Strict adherence must be paid to all the proposed measures in the application.
5. No work can begin before **1st September 2019** and must be completed by **31st December 2020**.
6. The works will be supervised by a licensed bat specialist **agent, Dr Tina Aughney**.
7. This licence shall be produced for inspection on a request being made on that behalf by a member of An Garda Síochána or an authorised NPWS officer appointed under Regulation 4 of the Habitats Regulations.
8. The local National Parks and Wildlife Service field officer **Terry Doherty** terry.doherty@chg.gov.ie, **087-6795862** or **District Conservation Officer Roy Thompson**, roy.thompson@chg.gov.ie, **0761-002593**, should be contacted prior to the commencement of any activity, and if bats are detected on site during the course of the work, under the terms of this licence.
9. A report shall be submitted to Wildlife Licensing Unit, National Parks and Wildlife Service Department of Culture, Heritage and the Gaeltacht, R. 2.03, 90 North King Street, Smithfield, Dublin 7, D07 N7CV on completion of the actions which this licence authorises, describing the activities carried out in pursuance of this licence.





Gerry Leckey

(a person authorised by the Minister to sign on her behalf)

8th August 2019

Wildlife Licensing Unit
National Parks and Wildlife Service
Department of Culture, Heritage and the Gaeltacht
R. 2.03
90 North King Street
Smithfield
Dublin 7
D07 N7CV



NOTES (1 to 2).

- This licence is granted for the period specified and subject to compliance with the conditions specified. Anything done other than in accordance with the terms of this licence may constitute an offence.
- This licence applies to **bats** and to no other species.



Appendix 10.D Japanese Knotweed Management Plan

Treatment of Japanese Knotweed at Cairn Lands, Newcastle 2019.

1.0 Existing Japanese Knotweed Stands

There are two small stands of Japanese Knotweed on the site. The Knotweed stands were first identified in 2018, by Consulting Ecologists Openfield whilst undertaking a site walkover survey and their locations are shown on fig. 1.0 below.

Japanese Knotweed Stand 01 is located to the centre of the site and JKW Stand 02 is located on the southern edge of the site in front of a field boundary hedgerow.

Cairn have appointed an Invasive Species Treatment specialist (Knotweed Control Ireland) to treat the Knotweed in-situ by means of stem injection with herbicide. The first treatments were undertaken in 2018 and follow up treatments were undertaken during August 2019.

2.0 Treatment Proposals

JKW Stand 02 is in a peripheral location a considerable distance from any proposed excavation works. In consideration of same it will be possible to complete the treatment of this Japanese Knotweed in-situ by means of stem injection. The Japanese Knotweed stand will be protected with fencing and appropriate signage will be erected to inform the construction workers and later the public of the presence of the Japanese Knotweed. The environs of the Knotweed Stand will require monitoring for a further 2 years before the areas can be certified as Knotweed free. It will not possible to complete the treatment of JKW Stand 01 in-situ as it is in the centre of the works area and will require removal and treatment using the Bund Method.

3.0 The Bund Method

A quarantine area is set up around the Knotweed Stand and any working space required for machinery and operatives. The Japanese knotweed infestation; stems and roots are excavated whilst supervised by our appointed Invasive Species specialist. The infested material will then be stockpiled in a quarantine area on site as indicated in Fig. 1.0 below. The infested material which will consist primarily of excavated soil will be spread within the quarantine area to shallow depths of 50-100mm over a Knotweed resistant membrane. All plant, machinery, hand tools and footwear of operatives used in excavating and spreading the infested material will be thoroughly cleaned before leaving the quarantine area on completion of all operations. When the infested materials is transported on site in 'dumpers', the dumpers will not be filled higher than 450mm below the top rim and the dumper will be lined with Knotweed Proof Membrane.

The shallow spread of the infested soil will encourage any residual Knotweed rhizomes (roots) to sprout and thus it can be then treated by controlled spray application of a translocated herbicide. Care will be taken when spraying the stockpiled material to avoid drift to any surrounding vegetation / ground. The quarantine areas will be clearly signed and fenced. Stockpiling of contaminated material may be undertaken in winter and subsequently sprayed with herbicide during spring / summer, when in leaf. Japanese Knotweed does not spread by seed in Ireland; it typically spread to new locations when viable pieces of rhizome (root) are transported in disturbed soil and along watercourses.

4.0 Conclusion

Whilst Japanese Knotweed is listed as an invasive alien species, it does not pose any public health risk.



Fig. 1.0 Locations of Knotweed Stands recorded by Consulting Ecologists; Openfield in 2018

Daibhi Mac Domhnaill MILI

Head of Landscape and Urban Design