MOTT MACDONALD

Mungret Link Streets Project

Ecological Impact Assessment (EcIA)

14 May 2019

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Contents

1 Introduction

1.1 Introduction

This Ecological Impact Assessment (EcIA) has been prepared by Mott MacDonald on behalf of Limerick City and County Council for the proposed Mungret Link Street Project. The Mungret Link Street Project (hereafter referred to as the Project) consists of the provision of 1.7km of new public road within the Mungret / Loughmore Common area of County Limerick. Further details on the Project are provided in section 1.2.

The report follows the CIEEM (2018) *"Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine".*

1.2 Project Description

The Mungret Link Streets project consists of the provision of ca. 1.7km of new public road within the Mungret / Loughmore Common area of County Limerick. The project includes the following associated infrastructure:

- Driving Lanes,
- Cycleways,
- Footpaths,
- Roadside Parking,
- Surface water drainage / sustainable urban drainage, and
- Street lighting

The purpose of the project is to accommodate the future construction of new residential development in Mungret, Limerick (Limerick 2030 housing), within lands zoned for residential development under the Southern Environs Local Area Plan 2011 – 2017 (Extended until May 2021).

Ducting for the provision of services detailed below will also be installed to facilitate the future implementation of the area masterplan.

- Foul water drainage connection into Limerick Main Drainage Scheme
- Water mains
- Gas Mains
- Telecommunications

The Project will require the excavation of lands which are predominantly in agricultural use. The aim of the design will be to achieve an optimal cut/fill balance such that excavated material is reused on site where possible thereby minimising waste. Several old farm sheds will likely be removed to accommodate the road. A number of field boundaries will be removed to accommodate the road.

The works area will be accessed via the R859 and R510 roads.

Drainage from the road will be to two attenuation basins.; one servicing the eastern extent of the road and one servicing the western extent of the road. The road drainage has been designed to accommodate drainage from future residential development within lands zoned for development

under the Southern Area Local Area Plan 2011-2017 (as extended). The attenuation basins will drain in to the existing drainage networks associated with the R859 and R510 roads.

1.3 Aims and Objectives

The main objectives of this assessment are to:

- Identify any habitats or flora of ecological value including those protected under the Wildlife Act (under Flora Protection Order) or the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) which could be impacted by the proposed development.
- Identify fauna (and/or their breeding and resting places) protected under the Wildlife Act or the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) which could be impacted by the proposed development.
- Recommend mitigation measures as appropriate to prevent adverse effects to habitats and species of ecological value which might be impacted by the proposed development.

2 Methodology

2.1 Legislation and Best Practice Guidelines

This EcIA was prepared in accordance with the following legislative requirements:

- Planning and Development Acts and Regulations 2000-2015;
- Wildlife Act 1976 and Wildlife (Amendment) Act 2000;
- Flora (Protection) Order 2015;
- EU Water Framework Directive 2000/60/EC; and
- European Communities (Birds and Natural Habitats) Regulations 2011 (as amended).

In addition, the assessment was carried out having regard to the following guidance documents:

- Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2018)
- Guidelines for Assessment of Ecological Impacts of National Road Schemes (National Roads Authority, 2009);
- Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (National Roads Authority, 2009);
- Guidelines for the Treatment of Badgers Prior to the Construction of National Road Schemes (National Roads Authority, 2005);
- Guidelines for the Treatment of Bats During the Construction of National Road Schemes (National Roads Authority, 2005);
- Guidelines for the Protection and Preservation of Trees, Hedgerows and Scrub Prior to, During and Post Construction of National Road Schemes (National Roads Authority, 2006);
- A Guide to Habitats in Ireland (Fossit, 2000);
- Best Practice Guidance for Habitat Survey and Mapping (Smith et al., 2011); and
- Bat Tree Habitat Key. AEcol, Bridgwater. Andrews, H et al. (2013).

2.2 Study Area

The study area comprises all lands located within the zone of influence of the Project. The current guidance on ecological assessments (CIEEM, 2018) states that:

"*The 'zone of influence' for a project is the area over which ecological features may be subject to significant effects as a result of the proposed project and associated activities. This is likely to extend beyond the project site, for example where there are ecological or hydrological links beyond the site boundaries.*" and that "*The zone of influence will vary for different ecological features depending on their sensitivity to an environmental change."*

The zone of influence was defined through desk assessment, having regard to the sensitivity of habitats and species likely to be present / previously recorded in the locality of the Project. The main habitats within the proposed development site comprise agricultural grasslands, hedgerows, treelines, a canal and swamp habitat. The main species likely to occur within the habitats include badger *(meles meles),* bat *(Chiroptera),* frog *(Rana temporaria)*, breeding bird species and whorl snail (*Vertigo spp.).*

The National Road Authority (NRA) 'Guidelines for the Treatment of Badgers Prior to the Construction of National Road Schemes' (NRA, 2005) which states that disturbance from construction works can impact breeding badger setts within 150m of the works (this has been construed to pertain to all the protected mammals listed above, with the exception of bats). The study area was therefore defined as the proposed development site plus a 150m buffer zone from the proposed development site boundary. Ecological connectivity (e.g. linear habitats / ecological corridors) and hydrological connectivity (e.g. the canal) were also taken into consideration when defining the zone of influence.

Figure 1:Survey Area

2.3 Desktop Assessment

A desktop review was carried out to identify features of ecological importance within the zone of influence of the proposed development site. The ecological assessment included designated and sensitive areas in the vicinity of the study area, to enable sufficient assessment to identify and quantify any significant impacts on the habitats, flora and fauna likely to arise with regard to the proposed development.

Principal sources of information utilised for the desktop assessment included:

- Existing relevant mapping and databases e.g. species and habitat distribution etc. (sourced from the Environmental Protection Agency (EPA), the National Biodiversity Data Centre (NBDC) and the National Parks and Wildlife Services (NPWS);

- Published and unpublished NPWS reports on protected habitats and species including Irish Wildlife Manual reports, Species Action Plans and Conservation Management Plans;
- Conservation Status Assessment Reports (CSARs), Backing Documents and Maps prepared in accordance with Article 17 of the Habitats Directive;
- Published data from Bat Conservation Ireland;
- Published data from BirdWatch Ireland; and
- Published documents from Inland Fisheries Ireland.

2.4 Consultations

A consultation letter was issued to the Development Applications Unit (DAU) on 31/10/2017 (DAU reference: G Pre00222/2017). A formal response was not received via the DAU, rather a meeting was arranged with NPWS Conservation Ranger Pat Foley in January 2018. Mr Foley identified the requirement for winter bird survey. A bird survey was therefore carried out in February and March 2018 (the survey report is presented in Appendix A).

2.5 Field Assessment

An ecological field assessment was undertaken on the 15th of September 2017 and on the 6th and 7th of June 2018 by Mott MacDonald Ecologists. Weather on all three days was warm and dry. Equipment used for the surveys included base maps, iPad, template target notes, digital camera, Explorer Premium wireless inspection endoscope (Model 8003AL) and binoculars.

The aim of the survey was to determine the presence or absence of habitats and species of ecological value/significance, including Annex I habitats and Annex II and IV species, Wildlife Act species and Flora Protection Order species. The survey was also undertaken to assess the suitability of the habitats along the proposed development site to support protected species. The methodologies employed during the field survey are set out hereunder.

Habitats and Flora Survey

Habitat survey was carried out with regard to '*Best Practice Guidance for Habitat Survey and Mapping*' (Heritage Council, 2011). Habitats were classified in accordance with '*A Guide to Habitats in Ireland*' (Fossitt, 2000).

The area was searched for evidence of invasive plant species listed in Part 1 of the Third Schedule of S.I No. 477 of 2011, European Communities (Birds and Natural Habitats) Regulations 2011.

Species protected under Flora (Protection) Order, 2015 (S.I. No. 356 of 2015) were also searched for.

Volant Mammals[1] Survey

Bat surveys comprised a daytime visual assessment survey and an emergency/re-entry survey which were carried out in accordance with *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn) (Collins, 2016).*

The daytime ground level visual assessment was carried out in line with *Bat Tree Habitat Key (Andrews, H et al., 2013)* to determine potential roost features. Trees were examined for potential roost features which included:

- Horizontal / vertical cracks along tree limbs / trunk

[1] Mammals capable of flight

- Knot holes and cankers in trees
- Voids in trees
- Crevices including lifting bark or thick ivy growth (where stems are a minimum of 50mm diameter)

Similarly, buildings / structures were assessed externally for potential access points, gaps, cracks, voids, and crevices. The internal features of the buildings were not examined for health and safety reasons. The suitability of habitat features for bats, within the survey area, were assessed in accordance with Collins (2016) as described in Table 1 below.

Table 1: Guidelines for Assessing Potential Bat Roosts

Suitability	Description/Roosting Habitats	Commuting and Foraging Habitats
Negligible	Negligible habitat features on site likely to be used by roosting bats.	Negligible habitat features on site likely to be used by commuting or foraging bats.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions, and/or suitable surrounding habitat likely to be used on a regular basis by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation). A tree of sufficient size and age to contain potential roost features but with none seen from the ground or with features seen only with very limited roost potential.	Habitats, that could be used by small numbers of commuting bats such as gappy hedgerows or unvegetated streams, but are isolated, i.e. not very well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions, and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland, or water.
High	A structure with one or more potential roost sites that could be used that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions, and surrounding habitat.	Continuous high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edges. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses, and grazed parkland. Site is close to and connected to known roosts.

Source: Collins, 2016

The emergence/re-entry survey was undertaken on the 6th and 7th of June 2018. The emergency/dusk survey was started 15 minutes before sunset until 1.5 – 2 hours after sunset and the re-entry/dawn survey was commenced 1.5 – 2 hours before sun rise until approximately 15 minutes after sunrise in accordance with *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn) (Collins, 2016).* Bat activity was recorded using a bat detector (Bat

Box Duet) and visual observations were made to determine whether potential roost features (PRF) were being used.

Non-Volant Mammal Surveys

Mammal surveys were carried out with regard to Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (NRA 2009) and included surveys for breeding and resting places of protected mammal species and survey for direct evidence of mammals.

The methodologies and assessment criteria used were based on current published guidance.

Badger survey followed *Surveying Badgers (Harris et. al.1989)* Signs of badger were searched for which included:

- Latrines and dung pits
- Hair
- Path and footprints
- Scrapes
- Snuffle holes
- Setts including:
  - A description of the sett location: hedgerows, earth banks, woodland or scrub habitat
  - Type of sett and level of usage: main, maternity, ancillary, abandoned etc.
  - Signs of activity: discarded bedding, spoil heaps etc.)

The proposed development site was determined as unsuitable to support otter. The Loughmore Canal which traverses the site has a low volume of water (depth of approximately 5cm) and no fishery value.

The potential for the study area to support additional protected mammal species such as Irish hare *(Lepus timidus)*, pine marten (*Martes martes*), red squirrel (*Sciurus vulgaris*), pygmy shrew (*Sorex minutus*), Irish stoat (*Mustela erinea Hibernica*), hedgehog (*Erinaceus europaeus)* etc. was assessed during the field surveys.

Aquatic Habitat & Fisheries

Aquatic habitat assessments in relation to fish and aquatic ecological interests were carried out using the methodology given in the Environment Agency's *'River Habitat Survey in Britain and Ireland Field Survey Guidance Manual*' (EA, 2003).

Bird Survey

Observations of ornithological activity within the study area were made during the field survey. The bird species recorded were typical farmland bird species.

A wintering bird survey was undertaken between February and March 2018.

2.6 Ecological Assessment

The criteria used in evaluating ecological features as set out in the *Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009)* is described in Table 2 below.

Table 2: Site Evaluation Criteria

Ecological Valuation	Description
Internationally Important	• Sites designated (or qualifying for designation) as an SAC or SPA under the EU Habitats or Birds Directives • Undesignated sites that fulfil criteria for designation as a European Site • Features essential to maintaining the coherence of the Natura 2000 network • Sites containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive • Resident or regularly occurring populations of birds listed in Annex I of the Birds Directive and species listed in Annex II and/or Annex IV of the Habitats Directive • Ramsar Sites • World Heritage Sites • Biosphere Reserves • Sites hosting significant species populations under the Bonn Convention • Sites hosting significant populations under the Berne Convention • Biogenetic Reserves • European Diploma Sites • Salmonid waters
Nationally Important	• Sites or waters designated or proposed as an NHA • Statutory Nature Reserves • Refuge for fauna and flora protected under the Wildlife Acts • National Parks • Undesignated sites fulfilling criteria for designation as a NHA; Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act and/or a National Park • Resident or regularly occurring populations (assessed to be important at the national level) of species protected under the Wildlife Acts and/or species listed on the relevant Red Data list) • Site containing viable areas of the habitat types listed in Annex I of the Habitats Directive.
County Importance	• Areas of Special Amenity • Area subject to a Tree Preservation Order • Area of High Amenity, or equivalent, designated under the County Development Plan • Resident or regularly occurring populations (assessed to be important at the County level) of species of birds listed in Annex I of the Birds Directive, species listed in Annex II and/or IV of the Habitats Directive, species protected under the Wildlife Acts and/or species listed on the relevant Red Data list • Site containing area(s) of the habitat types listed in Annex I of the Habitats Directive that do not fulfil criteria for valuation as of International or National Importance • County important populations of species, or viable area of semi-natural habitats or natural heritage features identified in the National of local Biodiversity Action Plan • 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 within the county • Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level
Local Importance (higher value)	• Locally important populations of priority species or habitats or natural heritage features identified in the Local Biodiversity Action Plan • Resident or regularly occurring populations (assessed to be important at the Local level) of species of birds listed in Annex I of the Birds Directive, species listed in Annex II and/or IV of the Habitats Directive, species protected under the Wildlife Acts and/or species listed in the relevant Red Data list • Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality • 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
Local Importance (lower value)	• Sites containing small areas of semi-natural habitat that are of some local importance for wildlife • Sites of features containing non-native species that are of some importance in maintaining habitat links

Source: NRA 2009

2.6.1 Impact Assessment Criteria

Impacts were assessed and characterised in accordance with the *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' EPA (May 2017)* as described in Table 3.

Table 3: Impact Magnitude and Duration Criteria

Impact magnitude	Definition
Quality of Effects	**Positive Effects** A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
	Neutral Effects No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error
	Negative/adverse Effects A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).
Significance of Effects	**Imperceptible** An effect capable of measurement but without significant consequences.
	Not significant An effect which causes noticeable2 changes in the character of the environment but without significant consequences.
	Slight Effects An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
	Moderate Effects An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
	Significant Effects An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment
	Very Significant An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
	Profound Effects An effect which obliterates sensitive characteristics
Duration and Frequency of Effects	**Momentary Effects** Effects lasting from seconds to minutes
	Brief Effects Effects lasting less than a day
	Temporary Effects Effects lasting less than a year
	Short-term Effects Effects lasting one to seven years
	Medium-term Effects Effects lasting seven to fifteen years.
	Long-term Effects Effects lasting fifteen to sixty years.
	Permanent Effects Effects lasting over sixty years
	Reversible Effects Effects that can be undone, for example through remediation or restoration

Impact magnitude	Definition
	Frequency of Effects Once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually

Source: EPA, 2017

3 Baseline Environment

3.1 Site location

The proposed Project will be located within agricultural grasslands within the Mungret / Loughmore Common area, approximately 4.5km south-west of Limerick city.

The proposed development site is currently used for agricultural purposes and the fields are lightly grazed by cattle. Residential development occurs to the east and south-west of the survey area. The R526 regional road is located to the south-east of the survey area and the R859 regional to the north of the survey area. Mungret House and Woods occur towards the centre of the survey area. A school and sport fields are located at the north-western area of the survey are. Loughmore Common Turlough pNHA (000438) and Loughmore Canal are located along the southern section of the survey area. Loughmore Canal which forms part of the pNHA site and flows in east to west direction.

3.2 Output of Desktop Assessment

Designated Sites of International Importance

The Birds Directive (2009/147/EC) and the Habitats Directive (92/42/EEC) put an obligation on EU Member States to establish the Natura 2000 network of sites of highest biodiversity importance for rare and threatened habitats and species across the EU. In Ireland, the Natura 2000 network of European sites comprises Special Areas of Conservation (SACs, including candidate SACs) and Special Protection Areas (SPAs, including proposed SPAs). SACs are selected for the conservation of Annex I habitats (including priority types which are in danger of disappearance) and Annex II species (other than birds). SPAs are selected for the conservation of Annex I birds and other regularly occurring migratory birds and their habitats.

Mott MacDonald prepared a report for Screening for Appropriate Assessment which investigated the potential for the proposed Mungret Link Street Project to have significant effects on all European Sites. This screening report is included as part of the planning package.

The screening assessment concluded that there is no source-pathway-receptor connectivity between the Project and European Sites, there is therefore no potential for significant effects.

Designated Sites of national Importance

Natural Heritage Areas (NHA) are the basic wildlife designation in Ireland. The areas are considered important for the habitats present or which holds species of plants and animals whose habitats needs protection. Under the Wildlife Amendment Act (2000), NHAs are legally protected from damage from the date they are formally proposed for designation (source: www.npws.ie). Proposed Natural Heritage Areas (pNHA) were published on a non-statutory basis in 1995 and have not since been statutorily proposed or designated.

All NHA's and pNHA's located within 15km of the Project site, or where connectivity exists (physically, ecologically or hydrologically), were identified using GIS Software. Table 4 shows the location of the Mungret Link Streets Project in relation to these sites, the features of interests for which they have been designated and identifies source-pathway-receptors for each.

No source-pathway-receptor was identified between the project and Natural Heritage Areas.

Table 4: National Sites within 15km or with connectivity to the Project

Site Name and Code	Distance to National Site	Feature of Interests	Source-Pathway-Receptor
National Heritage Sites			
Woodcock Hill Bog NHA (002402)	8.8km north of the Project. There is no hydrological connectivity to the site.	Peatlands	There is no potential for impact to the site due to distance and lack of connectivity to the Project site.
Proposed National Heritage Site			
Loughmore Common Turlough (000438)	180n south of the Project.	Turlough habitat	The proposed road will be constructed approximately 180m to the north of the pNHA. The road drainage will connect to the existing road drainage. There will be no discharge to ground. There is no physical or hydrological connectivity to the turlough.
Inner Shannon Estuary – South Shore (000435)	Located ca. 1km north of the Project	Estuarine complex supporting wintering and migrating waterfowl.	There is no hydrological or physical connectivity between the pNHA and the project. Bird survey did not identify any wetland birds using the proposed development site. There is no potential for impact to the pNHA.
Fergus Estuary and Inner Shannon, North Shore (002048)	Located ca. 2.5km north of the Project.	Estuarine complex supporting wintering and migrating waterfowl. Triangular Clubrush	There is no hydrological or physical connectivity between the pNHA and the project. Bird survey did not identify any wetland birds using the proposed development site. There is no potential for impact to the pNHA.
Knockalisheen Marsh (002001)	Located ca. 6.2km north of the Project. There is no hydrological connectivity to the site.	Wet grassland and fen communities	There is no potential for effects due to distance between the sites.
Garrannon Wood (001012)	Located ca. 8.3km north-west of the Project. There is no hydrological connectivity to the site.	Oak woodland habitat	There is no potential for effects due to distance between the sites.
Dromore & Bleach Loughs (001030)	Located ca. 8.6km west of the Project. There is no hydrological connectivity to the site.	Lake habitat	There is no potential for effects due to distance between the sites.
Adare Woodlands (000429)	Located ca. 9km west of the Project. There is no hydrological connectivity to the site.	Broad-leaved woodland habitat	There is no potential for effects due to distance between the sites.
Tory Hill (000439)	Located ca. 9km south of the Project. There is no hydrological connectivity to the site.	Wooded limestone Orchid-rich calcareous grassland	There is no potential for effects due to distance between the sites.
Skoolhill (001996)	Located ca. 11km south-east of the Project. There is no hydrological connectivity to the site.	*Festuca heterophylla*	There is no potential for effects due to distance between the sites.
Curraghchase Woods (000174)	Located ca. 13km south-west of the Project. There is no hydrological connectivity to the site.	Woodland and grassland habitats	There is no potential for effects due to distance between the sites.

Source: NPWS

3.2.1.1 Records of protected species and habitats

National Biodiversity Data Centre

A review of records from National Biodiversity Data Centre (NBDC) within the two 2km square grids (R55L and R55G) which encompasses the Project site was undertaken and is presented in Table 6 below.

Table 5: Records of protected and invasive species within the 2km square grids (R55L and R55G) which encompass the Project

Name	Date of record Title of dataset	Title of Dataset	Location in relation to the Project site	Designation
Common Frog *(Rana temporaria)*	31/07/1974	Reptiles and Amphibians Distribution Atlas 1978 (An Foras Forbartha)	Frog have been recorded within the 10km square grid which encompasses the Project.	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts
Common Linnet *(Carduelis cannabina)*	31/12/2011	Bird Atlas 2007 - 2011	Linnet have been recorded within the 10km and 2km square grids which encompasses the Project.	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Wood Pigeon *(Columba palumbus)*	31/12/2011	Bird Atlas 2007 - 2011	Wood pigeon have been recorded within the 10km and 2km square grids which encompasses the Project.	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species
Meadow Barley *(Hordeum secalinum)*	31/12/1998	BSBI tetrad data for Ireland	Meadow Barley was previously recorded approximately 600m south-east of the Project site boundary.	Protected Species: Flora Protection Order || Threatened Species: Endangered
Opposite-leaved Pondweed *(Groenlandia densa)*	31/12/1999	BSBI tetrad data for Ireland	Opposite-leaved pondweed has been recorded within Loughmore Common Canal.	Protected Species: Flora Protection Order || Threatened Species: Endangered
Eurasian Badger *(Meles meles)*	24/03/2010	Road Kill Survey	A dead badger was recorded on the R510 regional road 20m south of the Project.	Protected Species: Wildlife Acts
Eurasian Red Squirrel *(Sciurus vulgaris)*	31/12/2012	Irish Squirrel Survey 2012	A red squirrel was previously recorded approximately 700m south-east of the Project site boundary.	Protected Species: Wildlife Acts
European Otter *(Lutra lutra)*	23/04/2009	Road Kill Survey	A dead otter was recorded on the R526 regional road approximately 200m south-east of the Project site boundary.	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts

Name	Date of record Title of dataset	Title of Dataset	Location in relation to the Project site	Designation
Pipistrelle *(Pipistrellus pipistrellus sensu lato)*	16/06/2014	National Bat Database of Ireland	Soprano pipistrelle bat was previously recorded 1.2km south-east of the Project site boundary.	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Soprano Pipistrelle *(Pipistrellus pygmaeus)*	16/06/2014	National Bat Database of Ireland	Soprano pipistrelle bat was previously recorded 1.2km south-east of the Project site boundary.	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Eastern Grey Squirrel *(Sciurus carolinensis)*	31/12/2012	Irish Squirrel Survey 2012	An Eastern grey squirrel was previously recorded approximately 700m south-east of the Project site boundary.	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> EU Regulation No. 1143/2014 || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)

Source: NBDC

A review of past ecological surveys which were carried out within the study area was also undertaken. Roger Goodwillie undertook a vegetation survey and evaluation of Loughmore Turlough in 1992. Goodwillie described the turlough as dry and likely fed from a swallow hole located at the north-eastern end. Salt marsh plants were identified within the turlough which suggests either a slight salt influence in the floodwater or might be due to the turlough's close proximity to the Shannon Estuary. Goodwillie identified the presence of the rare species; slender spikerush *(Eleocharis uniglumis),* greater bird's-foot-trefoil *(Lotus pedunculatus)* and opposite-leaved pondweed *(Groenlandia densa)* within the turlough.

3.3 Output of the Field Assessment

3.3.1 Habitats and Flora

A description of the habitats within the site are presented hereunder. Habitats were described in accordance with Fossitt (2000). A habitat map of the proposed development is provided in Figure 2 below.

Improved Agricultural Grassland (GA1)

The Project site predominantly comprises improved agricultural grassland which is dominated by rye-grass *(Lolium spp.)*. The fields are currently used as grazing for beef cattle and sheep. The habitat was assessed as having Local Importance (lower value) due to the low species diversity.

Hedgerows (WL1)

The agricultural fields are separated by mature hedgerows which predominantly comprise hawthorn (*Crataegus monogyna*) and blackthorn (*Prunus spinose*), with intermittent ash (*Fraxinus excelsior*) and elder (*Sambucus nigra*), and with an undergrowth of bramble (*Rubus fruticosus agg.*). Sections of hedgerows will be required to be removed to facilitate the proposed

road. The hedgerow habitat was assessed as having Local Importance (lower value) due to the low species diversity.

Treelines (WL2)

A number of treelines form the boundary of the grassland fields. The treelines predominantly comprise ash, sycamore *(Acer pseudoplatanus)*, horse chestnut *(Aesculus hippocastanum)* and *elder (Sambucus nigra)*. The treelines within the study area were assessed as having Local Importance (lower value) due to the low species diversity.

A mature treeline which comprised beech *(Fagus sylvatica)*, sycamore, horse-chestnut and cypress (*Cupressus x leylandii*) occur along towards the rear of the school. This treeline was assessed as having Local Importance (higher value) as it was confirmed to support bats.

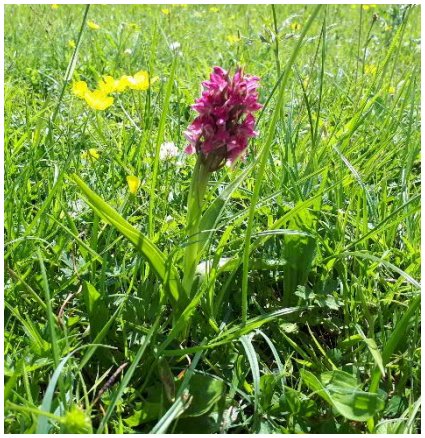
Loughmore Canal Turlough pNHA (000438)

Loughmore Common **Turlough (FL6)** is located, at its nearest point, 180m south of the proposed road.

The pNHAh comprises areas of heavily grazed **calcareous grassland (GS1)** comprising red fescue (*Festuca rubra*), creeping bent (*Agrostis stolonifera*), silverweed (*Potentilla anserine*), red clovers (*Trifolium pratense*), white clover *(Trifolium repens),* creeping buttercup (*ranunculus repens*), meadowsweet (*Filipendula ulmaria*), common sedge *(Carex nigra),* and tawny sedge (*Carex hostiana*). Two early marsh orchids *(Dactylorhiza incarnata)* and three common spotted-orchids *(Dactylorhiza fuchsia)* were also identified within the calcareous grassland habitat. This habitat does not equate to Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) in accordance with the Interpretation Manual of European Union Habitats - EUR28.

Further west, species typical of wetter conditions were present which included a high frequency of hard rush (*Juncus inflexus*), compact rush (*Juncus conglomeratus*) common sedge (*Carex nigra*), glaucous sedge *(Carex flacca)*, hairy sedge *(Carex hirta)* with occasional devil's- bit scabious (*Succisa pratensis)* quaking grass *(Briza media)* crested dog tail *(Cynosurus crstatus)* and black bog rush (refer to Image 2).

Image 1 Orchids within Calcareous Grassland



Source: Mott MacDonald 06/06/2018

Image 2 Calcareous grassland GS1

Source: Mott MacDonald 15/09/2017

Reed and large sedge swamp (FS1)

An area of large sedge swamp (Image 3) occurs immediately south of the Loughmore Canal, within the pNHA boundary. This swamp is ca. 0.5ha in area. The road is not located in proximity to this habitat. This habitat is wet under foot and is dominated by reed canary-grass (*Phalaris arundinacea*). Other frequently occurring species include bulrush (*Typha latifolia*), yellow-flag iris (*Iris pseudacorus*), long-stalked yellow-sedge (*Carex viridula ssp. Brachyrrhyncha)*, water horsetail (*Equisetum fluviatile*), timothy (*Phleum pratense*), meadowsweet (*Filipendula ulmaria*), silverweed, marsh cinquefoil (*Potentilla palustris*), glaucous sedge, common vetch (*Vicia sativa*), water mint (*Mentha aquatica*), and short-fruited willowherb (*Epilobium obscurum*). This habitat has a high degree of biodiversity and is of National importance given it occurs within the pNHA boundary.

A second smaller patch of large sedge swamp was identified immediately north of the canal and was dominated with pendulous sedge *(Carex pendula).* A patch of **tall-herb swamp (FS2)** occurs immediately east of the sedge swamp habitat. Species identified within the habitats were dominated with hard rush, compact rush, water horsetail, water mint and occasional lesser water-plantain *(Baldellia ranunculoides),* water forget-me-not *(Myosotis scorpioides).* Two adult common frogs *(Rana temporaria)* were recorded within the habitat.

Rich Fen and flush (PF1)

An area of rich fen habitat occurs towards the centre of the pNHA site. The habitat is dominated with black bog rush *(schoenus nigricans)* sedge species *(carex spp.)* and *Campylium stellatum* in the ground layer. Tussocks of rush, devil's bit scabious and marsh cinquefoil.

Canal (FW3)

Loughmore Canal traverses the southern section of the pNHA and forms part of Loughmore Common Turlough pNHA. The canal flows to the Barnakyle River, a tributary of the River Maigue (which is part of the Lower River Shannon SAC: some 7.7 river kilometres downstream).

The rare plant species opposite-leaved pondweed (*Groenlandia densa*) has been recorded in the canal in the past. None however, was recorded during the survey. The water in the canal was stagnant and approximately 5cm deep. Vegetation within the canal was dominated with water-cress (*Nasturtium officinale*) with frequent pendulous sedge *(Carex pendula),* bulrush *(Typha latifolia),* yellow iris (*Iris pseudacorus)*, soft rush (*Juncus effusus*), water-plantain. Some individual willow trees are also present on the banks of the canal (refer to Image 4).

Image 3 Sedge swamp habitat

Source: Mott MacDonald 06/06/2018

Image 4 Loughmore Canal

Source: Mott MacDonald 06/06/2018

Scrub Habitat (WS1) and Mature Trees

There are several areas of blackthorn (*Prunus spinose*) and hawthorn (*Crataegus monogyna*) scrub within the site which are of local ecological value. Many of these are associated with archaeological features e.g. ringfort LI013-011, ringfort LI013-007, enclosure LI013-133 and enclosure LI013-008. The ringforts and enclosures are included on the National Monument Service Records. The road alignment is outside of the zone of notification for these records. A disused cattle path at Baunacloka (Image 5) will be removed to accommodate the road.

The scrub habitats within the site are in use by badger and act as stepping stones within the agricultural lands. The ringforts and enclosures will not be affected by the Project. A section of the cattle path will be removed to accommodate the road. The scrub and ringfort/enclosure habitats were assessed as having Local Importance (higher value) due to the potential for the habitats to support badger.

Image 5 Disused cattle path

Source: Mott MacDonald 15/09/2017

Image 6 Treeline within the study area

Source: Mott MacDonald 06/06/2018

Woodlands

The pNHA encompasses an area of planted ash (*Fraxinus excelsior)* woodland with a boundary of Pedunculate Oak (*Quercus robur*) to the south of the canal. Immediately east of the ash woodland is planted conifer. The habitats were assessed as having Local Importance (higher value).

Buildings (BL3)

Mungret House occurs towards the centre of the study area. The proposed new road link will be located approximately 100m south of the building. A primary school and sport fields (**amenity grassland GA2**) occurs towards the north-west boundary of the site.

There are a number of derelict farm sheds located to the south-west of the school, which will be removed to facilitate the proposed works (refer to Image 10). The sheds were assessed as having 'Moderate' bat roost potential. Due to the building's potential to support protected bat species, the habitat was assessed as having Local Importance (higher value).

Residential developments occur towards the north-eastern boundary of the site, either side of the proposed road.

Protected and invasive plant species

No Floral Protection Order (FPO) species or invasive plant species were recorded within the survey area.

3.3.2 Fauna

Badger

Badgers and their setts are protected under the Wildlife Act. One disused badger sett (annex set with one entrance) was observed within the ringfort LI013-01 located approximately 500m south-west of the proposed road link (refer to Image 7). No other badger setts were identified during the surveys. Badger paths, snuffle holes and prints (refer to Image 8) were also observed within scrub habitat, particularly in proximity to Mungret House.

Scrub habitat, particularly in proximity to Mungret House and along the western boundary of the site boundary was identified as important habitats for badgers.

Image 7 Badger Sett Entrance

Source: Mott MacDonald 15/09/2017

Image 8 Badger Prints

Source: Mott MacDonald 15/09/2017

Other Mammal Species

No evidence of otter was recorded within the study area. The canal was identified as unsuitable to support otter due to the low volume of water and lack of fishery value.

No other mammal species were recorded during the surveys. It is likely however that fox *(Vulpes Vulpes),* Irish hare, pygmy shrew and hedgehog occur within the study area.

Bats

All bat species in Ireland are protected under both national and European legislation. There is additional protection for lesser horseshoe bat *(Rhinolophus ferrumequinum).*

The suitability of the landscape associated with the proposed Project site to support bat species was determined with regard to the bat 'habitat suitability' index presented on www.maps.biodiversityireland.ie/#/Map. The bat 'habitat suitability' index is the research outcome of a study by (Lundy *et al*. 2011) examining the relative importance of landscape and habitat associations across Ireland for bats. The 'habitat suitability' index ranges from 0 to 100 with 0 being least favourable and 100 most favourable for various bat species. The habitat / landscape at the Project site has a high bat suitability index score of 37.11. The bat 'habitat suitability' index score was referred to in scoping the field assessment for bats and bat habitat.

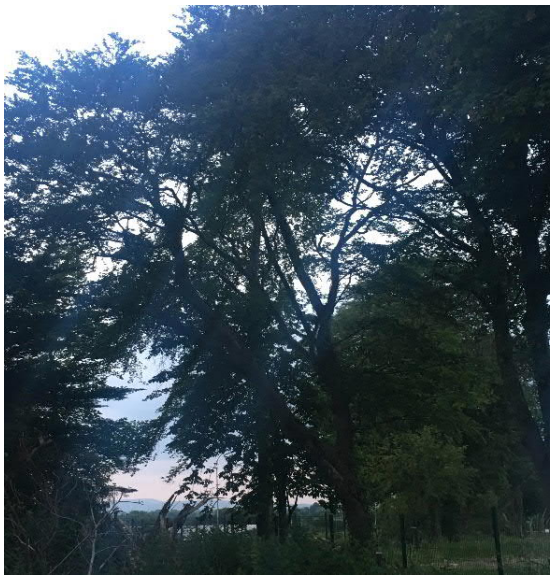
A daytime ground-level visual assessment of the treelines and derelict sheds within the Project site was undertaken. Only the mature treeline located immediately west of the school and sports fields was assessed as having 'High' bat roost potential. All other treelines within the study area were assessed as having 'Negligible' suitability to support bats due to the lack of suitable roost features. It is likely however that the treelines within the study area are used as foraging and commuting routes by bats. The derelict farm sheds were assessed as having 'Moderate' bat roost potential.

The emergency/dusk survey was therefore undertaken at the treeline line west of the school and sports field and at the derelict farm sheds.

Sunset was at 21:53 so the survey was commenced at 21:35 (15 minutes prior to sunset). The first bat, a soprano pipistrelle (*Pipistrellus pygmaeus),* was recorded at 22:20 foraging along the tree line. Two more soprano pipistrelles were recorded a short time later also foraging along the tree line. A fourth soprano pipistrelle was observed emerging from a roost within the beech tree, which confirmed the tree as an active bat roost. Two common pipistrelles (*Pipistrellus pipistrellus)* were recorded foraging along the southern section of the tree line. No bats were recorded emerging from the derelict farm sheds during the emergency survey.

The re/entry dawn survey was commenced at 03:45 (1.5 hours before sunrise). Both soprano pipistrelle and common pipistrelles were again observed foraging along the treeline.

Image 9 Treeline located along the north-western boundary of the site confirmed as an important foraging and commuting route for bats



Source: Mott MacDonald, 06/06/2018

Image 10 Derelict farm buildings

Source: Mott MacDonald, 06/06/2018

Birds

All wild bird and their nests are protected under the Wildlife Act (1976 and 2000). The study area comprises numerous hedgerows and treeline which are likely to provide suitable nesting sites for breeding bird species.

During the field surveys undertaken by the Mott MacDonald Ecologists a number of bird species were recorded within the study area. Species recorded included magpie (*pica pica*), woodpigeon *(Columba palumbus),* robin *(Erithacus rubecula),* jackdaw *(Corvus),* swallow *(Hirundo rustica)* and *a* buzzard *(Buteo buteo).* All species are Green-listed in Ireland with the exception of swallow which are Amber-listed in Ireland due to concerns over the entire European population (source: www.birdwatchireland.ie).

A winter bird survey was undertaken by Ecofact in February and March 2018 assess the bird species using the site. The survey report is presented in Appendix A. There were 2 species on the BoCCI red list, Meadow Pipit and Grey Wagtail.

The Loughmore Common turlough area and the Loughmore canal have the better ecological value within the survey area from a bird conservation point of view.

Invertebrates, Herpetofauna and Reptiles

A number of butterflies and damselflies were recorded during the survey which included Red admiral *(Vanessa Atalanta),* common blue (*Polyommatus icarus*) *and* common blue damselfly *(Enallagma cyathigerum).*

Two common frogs were recorded in the tall-herb swamp habitat located adjacent to the canal. Both the canal and fen habitats are likely to provide optimal habitat for frogs. The spawning season for frogs occurs between 1st of March – 31st June inclusive. No frog spawn was

recorded during the survey however there is potential that tadpoles had already hatched at this point. Frogs are listed on Annex V of the EU Habitat Directive (92/42/EEC) and are protected under the Wildlife Act.

The sedge swamp habitat within the pNHA site was identified as suitable habitat for whorl snail species. Three species of whorl snail, (*Vertigo geyeri)*, (*V. angustior)* and (*V. moulinsiana)* are protected under Annex II of the Habitat Directive. A whorl snail survey of the swamp habitat was carried out on 18th of October 2018 (within the ideal survey window for Vertigo). Weather conditions at the time of the survey were clear and dry, 16°C. Liaison with National Parks and Wildlife confirmed that there is no requirement for license to undertake this survey.

The survey was carried out as per Moorkens & Killeen (2011). Initially a transect through the suitable habitat was identified, with defined intervals every 5m. Evidence of any management of the site overall was recorded eg grazing, weed cutting, or grass mowing. At each interval, the habitat condition was recorded. This required recording vegetation height and dominant plant species. Ground moisture classes (on a scale of 1-5 with 1 being dry, and 5 being standing water over 5cm deep) were also recorded at each interval.

At each interval a $1m^2$ beating sheet was placed on the ground. The vegetation above was then agitated. This was repeated on either side of the transect line at each 5m interval. Any whorl snails which fell on to the sheet were identified and recorded on site using a hand lens, and the key "*Identifying British Vertiginidae*" (Buckle 2012). To allow for identification, the key makes use of features including the direction of coiling of shell, the shape of the apertural lip, overall size and shape of shell, and the number and position of the "teeth".

The results from the survey are presented in Table 1. Location refers to the defined 5m intervals, while A and B corresponds to the left and right sides of the transect respectively. Moisture level corresponds to the scale provided in Morkens & Killeen (2011).

Table 6 Whorl snail survey results

Location	Replicate	Height of vegetation	Dominant plant species	Moisture level	Vertigo recorded
0m	A	1m	Reed canary grass (*Phalaris arundinacea*)	1	None
	B	1m	Reed canary grass	1	None
5m	A	1m	Reed canary grass	1	None
	B	1m	Reed canary grass	1	None
10m	A	1m	Reed canary grass	2	None
	B	1m	Reed canary grass	2	None
15m	A	1m	Reed canary grass	2	None
	B	1m	Reed canary grass	2	None
20m	A	1.3m	Reed canary grass	2	None
	B	1.3m	Reed canary grass	2	None

Location	Replicate	Height of vegetation	Dominant plant species	Moisture level	Vertigo recorded
25m	A	1m	Bulrush (*Typha latifolia*)	2	None
	B	1m	Bulrush	2	None
30m	A	1.3m	Bulrush	2	None
	B	1.3m	Bulrush	2	None
35m	A	1.3m	Pedunculate Sedge (*Carex pedunculate*) and Bulrush	3	4 adult striated whorl snail (*Vertigo substriata*)
	B	1.3m	Pedunculate Sedge (*Carex pedunculate*) and Bulrush	3	1 adult striated whorl snail
40m	A	1m	Pedunculate Sedge (*Carex pedunculate*) and Bulrush	3	None
	B	1m	Pedunculate Sedge (*Carex pedunculate*) and Bulrush	3	None

Conditions within the study area on the day of the survey were generally very dry, with conditions as per the scale ranging from 1-Dry (No visible moisture on ground surface) to 3- Wet (water rises under light pressure). No standing water was recorded along the transect. The water table was likely below typical levels as a result of the extremely dry summer experienced this year. There was no evidence of any grazing or cutting of vegetation within the suitable habitat at the time of the survey.

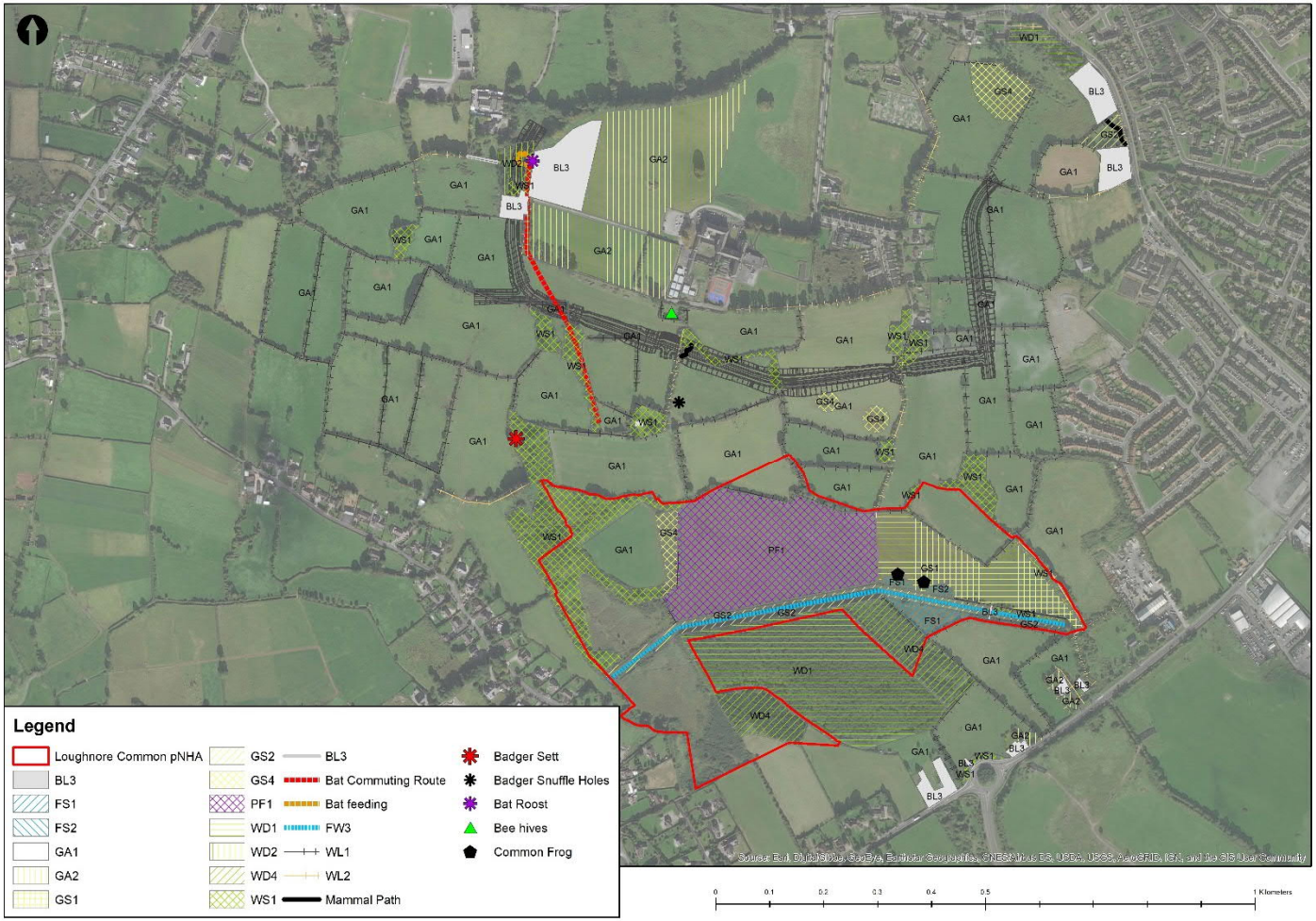
A total of 5 adult striated whorl snail (*Vertigo substriata*) were recorded along the transect. These were recorded within the mixed pedunculate sedge and bulrush portion of the turlough. Striated whorl snails are listed as “Near Threatened” in the Irish Red List of species. The species is not listed under Annex II of the Habitat’s Directive.

No whorl snails listed under Annex II of the Habitat’s Directive were recorded during the survey.

The striated whorl snail is listed as “Near Threatened” in the Irish Red List for Non-Marine Molluscs. The habitats with which the species is associated, sedge swamps and other wetland habitats, are rare in the wider landscape. Within the sedge swamp striated whorl snail (*Vertigo striata*) were only recorded within a very small area. The restriction of the snails to this pocket may be due to low water tables. The lower water tables caused by summer drought may have resulted in individuals remaining low down in the vegetation. They may therefore have been missed during the survey. However, it is of note that the outer fringes of the habitat appeared degraded, possibly caused by nitrification of adjacent watercourses, and draining of surrounding lands.

Given the rarity of sedge swamps within the wider landscape, the listing of striated whorl snails as “near threatened” on the Red List, both the snails and associated habitat are considered to be of **Local Importance (Higher Value).**

Figure 2: Habitat Map



4 Description of Likely Impacts

The impact assessment and significance of impacts during both the construction and operational phases was assessed with respect to the key ecological receptors identified within the proposed study area.

4.1 Construction Phase

4.1.1 Loss of Habitat

The proposed Project will be approximately 1.7km in length. No protected plant species of conservation value were identified within the study area. There will be no direct damage to protected flora or to habitats protected under the Habitat Directive.

Habitat required to be removed will include agricultural grassland, scrub habitat, sections of hedgerows and treelines and a number of derelict buildings. These habitats were assessed as having Local Importance (higher and lower value). The loss of habitat within the study area will not constitute a significant effect.

The road will not pass through Loughmore Common Turlough pNHA. Loughmore Common Turlough pNHA which is assessed as having National Importance. The road is located 180m northof the turlough at its closest point, and is separated from the habitat by treelines, hedgerows and agricultural grassland. There will be no dust effects or surface water runoff to the turlough during construction given the distance from the site and the intervening habitat which will form a natural barrier.

Sections of hedgerows and treelines will be removed to facilitate the proposed road link. The treelines and hedgerows were identified as important foraging and commuting sites for bats. The loss of foraging and commuting route has the potential to impact local bat populations within the area. The treeline located immediately west of the school and sports fields was identified as having High bat roost potential. A beech tree located within the treeline was confirmed as an active bat roost during the emergency survey.

The derelict farm sheds located south-west of the school will be removed to facilitate the proposed Project. The sheds were identified as having ‘Moderate’ bat roost potential. No bats were recorded emerging or entering the sheds during the bat surveys, however there is potential that bat may utilise the sheds in the future.

Treelines and hedgerows within the study area are also likely to provide suitable nesting sites for breeding birds. Removal of hedgerows and treelines within the study area would have a moderate effect (depending on the area vegetation cleared) on the carrying capacity of the local environment for nesting birds.

The canal and tall-herb swamp habitats were identified as optimal habitat for common frog. These areas will not be disturbed to facilitate the works. There will be no impact on frogs.

No invasive species listed under Part 1 of the Third Schedule of S.I No. 477 of 2011 were recorded within the study area during the field surveys. Machinery and material movement between sites however can result in the introduction of invasive species. The risk of spreading / translocating invasive species during construction works must be controlled and managed.

4.1.2 Noise / Disturbance

During the construction phase, there will be a temporary increase in noise. The existing background noise levels within the study area is low and characteristic of rural-agricultural areas. The background noise levels increase slightly towards the outer site boundaries which are located in proximity to regional roads and residential areas.

A badger sett was identified approximately 320m from the proposed road. The sett was not in use however there is potential that the sett may be utilised in the future. The NRA guidelines (NRA, 2005) state that no construction works should be undertaken within 50m of active setts and no blasting or piling should be undertaken within 150m of active setts. As the sett occurs 320m from the proposed works area there is no potential for disturbance.

A bat roost was confirmed within a beech tree located at the north-western corner of the site. The treeline is also used as a foraging and commuting route by two species of bat. All other treelines within the study area were identified as having Negligible suitability to support bat roosts but are used as foraging and commuting routes by bats. The derelict farm sheds were identified as having 'Moderate' bat roost potential. Highway sounds, both from construction and operation can create a loud noise environment that may potentially interfere with bats' abilities to hear and respond to the many other biologically important sounds that surround them (The California Department of Transportation, 2016). Therefore, in the event that construction works are undertaken after sunset and before sunrise when bats are active, in proximity to the treelines and confirmed bat roost, there is potential for disturbance to the bats. However, this would not be considered significant given the ample availability of alternative high quality hedgerows for foraging and commuting in the locality.

4.1.3 Pollution

During the construction phase there is potential for spills and leaks of oils, fuels and chemicals from storage areas, plant, and equipment used during construction to impact on the surrounding habitats. Accidental spills of fuels, oils and construction materials (e.g. concrete) can affect habitat quality through deposition of materials in the environment. The works are removed from any habitats of significant ecological value. The surrounding agricultural grasslands will form a natural swale to any accidental spill.

The excavation activities are likely to generate small amounts of dust within the works area. The deposition of dust on habitats can inhibit effective photosynthesis and transpiration. The proposed road is located at such a distance from sensitive ecological receptors that dust deposition will not occur within such habitats.

The use of lighting is likely to be necessary during the construction phase of the Project. Any direct illumination of a bat roost would constitute a significant effect as it could affect bat emergence from the roost.

4.2 Operational Phase Impacts

4.2.1 Pollution

Drainage will be to attenuation basins which will connect to existing road drainage. The proposed drainage system will be designed in accordance with the NRA guidelines *Drainage Design for national Road Schemes – Sustainable Drainage Options (NRA, 2014)* which will ensure effective surface water drainage. There is no potential for impact to the receiving waters during the operational phase.

4.2.2 Noise / Disturbance

The operation of the road link will result in a change in noise levels within the area due to the redistribution in traffic along the new roads. The roads however are located in proximity to existing regional roads and residential area and existing background noise are likely to be slightly elevated. The increase in noise level is therefore unlikely to have a significant impact on the surrounding environment.

The risk of traffic related mortality of mammals during the operation of the road is considered low. Traffic on the roads will be slow flowing due to the presence of a number of roundabouts.

4.2.3 Lighting

Street lighting will be installed along the proposed roads which will result in an increase of artificial lighting within the immediate surrounding area. An increase in light can deter nocturnal fauna, in particular bat species. Lighting can impact bats' roosting sites, commuting routes and foraging areas (Bat Conservation Ireland, 2010). A treeline located west of the school was assessed as having high bat roost potential. A bat roost was confirmed within the beech within the treeline. The treeline was also confirmed to be used as a foraging and commuting route by two species of bat. Direct illumination of a bat roost or commuting and foraging routes is likely to affect bat emergence from the roost, alter feeding patterns, and deter bats from commuting along affected corridors, ultimately affecting the bat population.

5 Mitigation Measures

Mitigation which should be employed to ensure no significant effects on biodiversity from the Project are described hereunder.

Mitigation is prescribed in accordance with the hierarchical hierarchy set out in the CIEEM guidelines; *Guidelines for Ecological Impact Assessment in the UK and Ireland Terrestrial, Freshwater and Coastal (2016)* which states that a sequential process should be adopted to avoid, mitigate and compensate ecological impacts.

5.1 Construction Phase

5.1.1 Vegetation Clearance

Birds

Under subsection 1 of Section 40 of the Wildlife Acts 1976 to 2012, it is not an offence to clear vegetation in the course of road or other construction works or in the development of preparation of sites on which any building or other structure is intended to be provided. However, the Contractor shall aim to limit disturbance to breeding birds and their nests/eggs as far as possible. Where feasible, vegetation clearance should be carried out outside of the bird breeding season. If this is not possible, a pre-construction survey must be undertaken by an ecologists/ornithologist who will identify any nests present along the proposed road route. Where an amber or red listed species nest is identified, the nest will be isolated until such a time that the chicks have fledge or where breeding has failed.

Bats

A bat roost was confirmed within a beech tree located immediately west of the primary school and sports field. In the event that the tree is required to be removed to facilitate the proposed road link a derogation license under the Wildlife Act should be sought from NPWS prior to the works commencing. Proposed mitigation measures agreed with NPWS as part of the derogation license will be implemented to minimise impacts to bats.

The remaining trees within the treeline were identified as having high bat roost potential and should be retained where possible. If the trees are required to be felled a pre-construction bat survey of the remaining trees within the treeline should be undertaken to determine the presence or absence of bat roosts. If a bat roost is confirmed a derogation license should be sought from NPWs in order to fell the tree(s).

All trees required to be felled to facilitate the Project should be felled in accordance with NRA guidelines.

In the event that the derelict farm sheds are required to be removed to facilitate the Project, a pre-construction bat survey of the derelict farm sheds should also be undertaken to determine the presence of any new bat roosts. If a bat roost is confirmed within the derelict sheds a derogation license to destroy the building will be required from NPWS.

It is recommended that bat boxes are installed to provide alternative, safe roosting sites for bats. The bat boxes should be designed in accordance with Bat Conservation Ireland guidelines; *Bats and Bat Boxes Guidance Notes for: Agri-environmental Scheme (2015).* The bat boxes should

be erected prior to the construction works commencing and should not be placed in lit up areas or areas of future development.

Frog

No impacts on frog are likely.

Rare and protected plant species

No protected plant species were recorded within the study area, however opposite-leaved pondweed has previously been recorded within the pNHA site. No works will take place in proximity to the canal. No mitigation is required.

A number of early marsh orchids and common spotted orchids were identified within the calcareous grassland. The two species of orchid are not protected but are considered rare. These will not be affected directly or indirectly by the road. As such no mitigation is necessary.

5.1.2 Pollution control

For the purpose of general environmental protection, pollution control measures should be employed during construction. These should be designed, installed and maintained in accordance with the CIRIA (C648) guidelines; *Control of water pollution from linear construction projects Technical guidance.*

In order to comply with regulations under 49 and 50 of the European Communities (Birds and Natural Habitat) Regulations (2011) the appointed Contractor should ensure biosecurity measures are implemented during the construction phase to ensure the introduction and translocation if invasive species is prevented. The biosecurity measures should include the visual inspection of vehicles for evidence of attached plant or animal material prior to entering and leaving the works area. All machinery and equipment should be dry and disinfected (if previously used in a contaminated site).

5.2 Operational Phase

5.2.1 Lighting

Lighting requirements in proximity to the confirmed bat roost (if retained) or to the bat boxes should be designed in accordance with the Bat Conservation Ireland guidelines; *Bats and Lighting Guidance Notes: Planners, engineers, architects and developers.* It is of note the lighting will likely be LED lights. Directional lighting and light shields should be used where possible to minimise light spill.

5.3 Residual Impacts

It is anticipated that with the implementation of mitigation measures (as detailed above), the construction and operational phases of the proposed Mungret Link Streets Project is unlikely to impact significantly on the fauna and flora of the study area and surroundings.

6 References

- *Andrew H., et al (2013) Bat Tree Habitat Key AEcol, Brightwater*
- *Bat Conservation Ireland (2015) Bats and Bat Boxes Guidance Notes for: Agri-environmental Scheme.*
- *Bat Conservation Ireland (2010) Bats and Lighting Guidance Notes for: Planners, engineers, architects and developers.*
- *CIEEM (2016) Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater and Coastal.*
- *CIRIA C741(2015) Environmental good practice on site guide (fourth edition).*
- *Environmental Agency (2003) Field Survey Guidance manual: 2003 Version.*
- *Fossit (2000) A Guide to Habitats in Ireland*
- *Goodwillie, R., (1992). Turloughs Over 10ha, Vegetation Survey & Evaluation. A report for the National Park & Wildlife Service, Office of Public Works.*
- *NRA (2014) Drainage Design for National Road Scheme – Sustainable Drainage Options*
- *NRA (2009a) Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*
- *NRA (2009b) Guidelines for Assessment of Ecological Impacts of National Road Schemes*
- *NRA (2005a) Guidelines for the Treatment of Badgers Prior to the Construction of National Road Schemes*
- *NRA (2005b) Guidelines for the Treatment of Bats During the Construction of National Road Schemes*
- *NRA 2006) Guidelines for the Protection and Preservation of Trees, Hedgerows and Scrub Prior to, During and Post Construction of National Road Schemes*
- *The California Department of Transportation. (2016). Technical Guidance for the Assessment and Mitigation of the Effects of Traffic Noise and Road Construction Noise on Bats. July. (Contract 43A0306.) Sacramento, CA.*
- *Smith et al., (2011) Best Practice Guidance for Habitat Survey and Mapping*

Appendices

A. Wintering Bird Survey

Winter Bird Survey of lands at Mungret, Co. Limerick

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INTRODUCTION

This report outlines the results of a winter bird survey completed at lands at Mungret, Co Limerick, during February and March 2018. The purpose of the survey was to assess the bird species using the site during this period using a combination of walkover and vantage point surveys. Figure 1 illustrates the location of the lands at Mungret, Co. Limerick. The site consists mainly of grass fields bounded by hedgerows. To the south of the site there is an area of rough/wet grassland and a small area of planted broadleaved woodland.

METHODOLOGY

A desktop study was undertaken to identify bird species that have the potential to occur on the proposed development site.

A review of records of birds from the area was undertaken by reviewing the websites of the National Biodiversity Data Centre (NBDC) and the National Parks and Wildlife Service (NPWS). The Bird Atlas 2007-2011 was also used to gather information on bird species that may occur in the Mungret Area (Balmer, D.E., *et al.,* 2013). A full bibliography of information sources reviewed is given in the reference section.

The site was visited on the 17th February 2018, 23rd February 2018, 8th March and 24th March 2018. On these days site the site was surveyed using a combination of vantage point watching and walkover surveying from dawn to the early afternoon. The surveys coincided with dry bright days and were considered to be ideal survey conditions. All bird species seen and heard were recorded. A dusk survey was also completed on the 17th February 2018. The surveys were completed by Kevin Collins and Dr. Will O'Connor.

RESULTS

Desk study

A full list of bird records from the NBDC online maps for the lands at Mungret, Co. Limerick and the likelihood of these species occurring on the site is included in Appendix 1.

Desk study involved review of available data from the most recent Atlas 2007-2001. The site falls into two tetrads, R55G and R55L. For R55G there were no winter records. Breeding season records were of a Cuckoo in song. For R55L there were 10 species in winter; Woodpigeon, Collared Dove, Blackcap, Great Tit, Magpie, Rook, Chaffinch, Goldfinch, Linnet and Redpoll. There was a record of Buzzard present during the breeding season.

Field survey

The lands at Mungret, Co. Limerick are located approximately 360m south of Mungret, covering a wide area consisting mostly of agricultural grassland with small sections of woodland and buildings. The south and south-east of the site borders part of the R526 for ca. 2.3km, the east of the site roughly borders the R510 for ca. 1.6km, the north of the site with the R859 for ca. 2km and the west of the site cuts through farmland areas for approximately 3.3km. Mungret Woods housing estate is located in the middle of the site with Mount Mungret Estate to the east in the Liskelly townland. No watercourses occur on the site, but a large drain runs through the south of the site. No Natura 2000 Sites, including SPAs, occur within the lands at Mungret, Co. Limerick. The locations of the Lower

River Shannon SAC and River Shannon and River Fergus Estuaries SPA, in relation to the site, are indicated in Figure 2.

Overall, a total of 34 bird species were recorded during this site visit. Details of the species recorded, their BoCCI status (Colhoun & Cummins 2013), and which habitat they are associated with, are given in Table 1.

The bird species recorded were considered to be typical farmland bird species. Buzzards were recorded during all site visits are likely to breed on the site. Kestrels were also regularly noted and will breed on the proposed development site.

Snipe were observed in the wet grassland area to the north of the lands at Mungret. Coot, Sparrowhawk and Mallard were some of the other species noted to occur on the site.

Most species are associated with hedgerows and fields. Many of these species are also associated with woodland. Hedgerow birds are really birds of the woodland edge. Most of the species associated with the area of wet/rough grassland are classed as either amber or red on the BoCCI list.

A section of broadleaved woodland is present to the south of the site which would provide suitable habitat and shelter for woodland bird species such as Cuckoo, which could potentially occur during the breeding season.

There is a large drain to the south of the site just north of the section of broadleaved woodland. The drain was noted to be heavily overgrown with vegetation and is likely to have poor water quality. There are various other small drains scattered around the lands at Mungret. These drains are likely to contribute to insect production in the area serving as an attraction for bird species. Coot, Mallard, Grey Heron and Snipe were recorded along this drain.

The hedgerows on the site are considered to be of good quality, with dense coverage and scattered mature trees. This provides suitable habitat for farmland birds which occur on the site. The woodland and hedgerows present on site support bird species such as Blue Tit, Great Tit, Coal Tit, Blackbird, Rook, Jackdaw, Song Thrush, Wren, Blackbird, Dunnock and many others.

Wet grassland is present in the southern part of the site which provides suitable habitat for bird species such as Snipe.

Other ecological observations

The site is used by Hares and they are likely to breed on the site.

CONCLUSIONS AND RECOMMENDATIONS

The number of species found at this site and the species composition are in line with what would be expected in farmland in Co. Limerick. There were no species on Annex 1 of the EU Birds Directive. There were also no species associated with the River Shannon and River Fergus estuaries SPA recorded on the site. It is considered unlikely that they would use the site.

There were 2 species on the BoCCI red list, Meadow Pipit and Grey Wagtail. These two species were added because of a steep decline in their numbers during the severe winters of 2009/10 and 2010/11. These populations have since recovered.

Grey Wagtails were recorded along the drain on the south-eastern side of the site. These are common and widespread breeding birds in Ireland but suffered a severe decline following the very cold winters of 2009/10 to 2011/12. This species has shown a strong recovery since then (Crowe *et al*. 2017). As the decline in the breeding population of Grey Wagtails was due to severe winter conditions, and not habitat loss, I do not believe that mitigation measures are required.

The numbers of Snipe on the site, roughly 20, is well short of the threshold for national importance of 100.

The area of wet/rough grassland is the most important from a bird conservation point of view, but it is too small and isolated to support important populations of species of concern.

The most important habitat on the site for birds is the wet grassland habitat. The hedgerows and treelines are also of importance. Water quality in the drain on the site is poor but if that was improved this would be an important ecological feature on the site. Any development on the site should try to protect the wet grassland area, protect hedgerows and mature trees and also address the apparent water quality problems in the drain.

Table 1 Result of the winter bird survey at the lands at Mungret, Co Limerick.

	BoCCI status	Fields/Hedgerows	Rough/Wet Grass	Woodland	Drain
Grey Heron			*		*
Common Buzzard		*	*	*	
Kestrel	Amber	*	*		
Sparrowhawk	Amber			*	
Snipe	Amber		*		
Wood Pigeon		*		*	
Magpie		*			
Jackdaw		*			
Rook		*			
Hooded Crow		*			
Great Tit		*		*	
Long-tailed Tit		*		*	
Blue Tit		*		*	
Wren		*		*	
Goldcrest	Amber	*		*	
Starling	Amber	*			
Blackbird		*		*	
Mistle Thrush	Amber	*		*	
Redwing		*			
Fieldfare		*	*		
Song Thrush		*		*	
Stonechat	Amber		*		
Robin	Amber	*			
Dunnock		*			
Pied Wagtail		*			
Grey Wagtail	Red		*		
Meadow Pipit	Red		*		
Chaffinch		*		*	
Goldfinch		*		*	
Linnet	Amber	*			
Bullfinch		*			
Coot					*
Mallard					*
Snipe					*

Site Location	Date: 20.02.2018	Drawn by: Amy Butler Checked by: William O'Connor
	Location of lands at Mungret, Co. Limerick for Winter Bird Survey	ecofact Environmental Consultants

Figure 1 Location of Lands at Mungret, Co. Limerick for Winter Bird Survey.

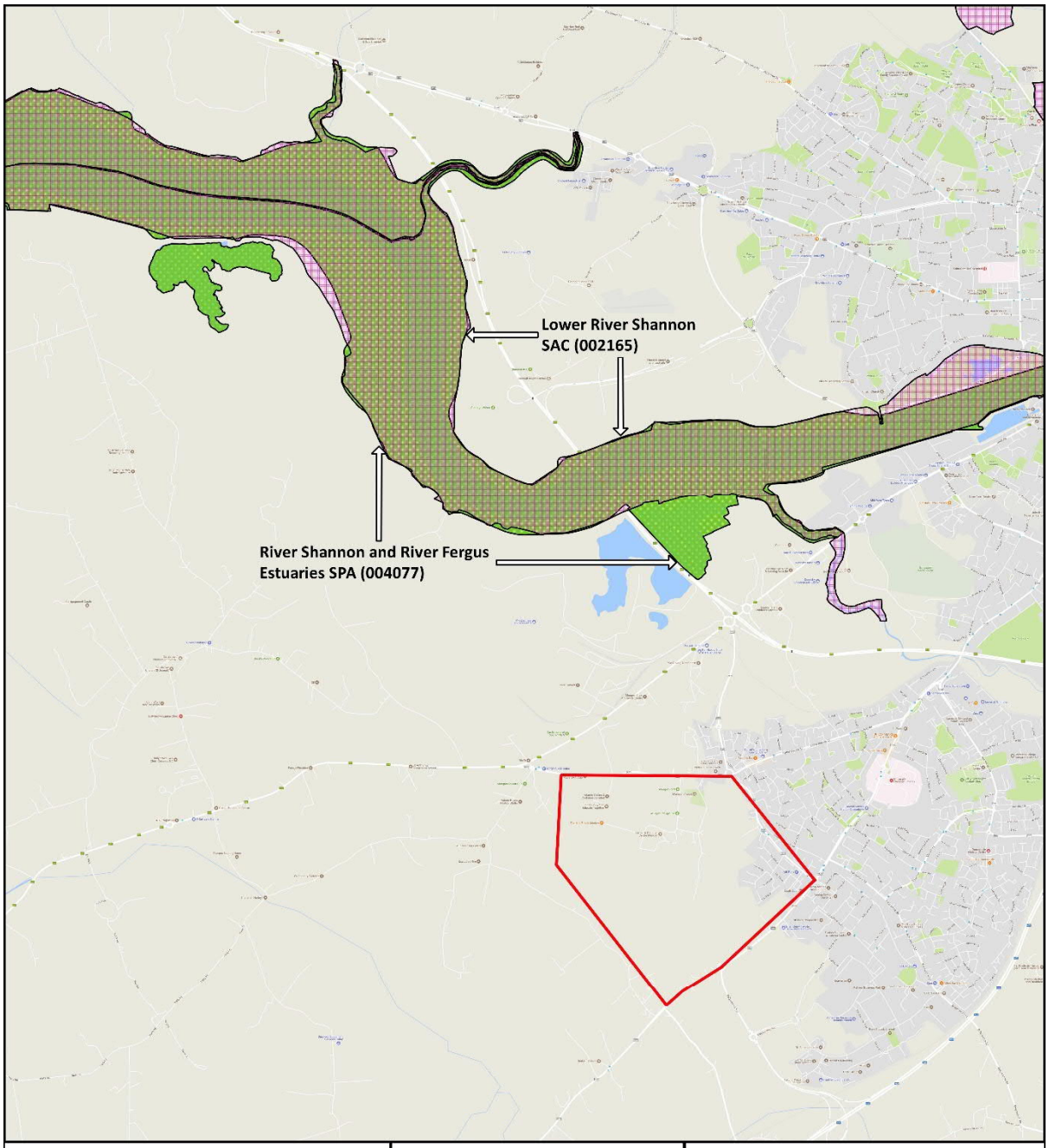

Figure 2 Locations of the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA, in relation to the lands at Mungret.

REFERENCES

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PLATES

Plate 1 Wet grassland at the Mungret site.

Plate 2 Large drain bordering planted broadleaved woodland at the Mungret site.

Plate 3 Improved agricultural grassland at the Mungret site.

Plate 4 Improved agricultural grassland at the south of the Mungret site.

Plate 5 Planted broadleaved woodland.

Plate 6 Buzzard flying over site, February 2018.

Plate 7 Grey Heron on wet grassland on the site, February 2018.

Plate 8 Fieldfare on the Mungret site, February 2018.

Plate 9 Redwing are also winter visitors and were recorded during the current survey.

Plate 10 Redwing and Mistle thrush on the Mungret site, February 2018.

Plate 11 Sparrowhawk flying into woodland on the site.

Plate 12 Stonechat on the Mungret site, February 2018.

APPENDIX 1

Table A.1 The NBDC online maps show records of the bird species below found in the 10km Grid Square R55 which includes the lands at Mungret, Co. Limerick.

Common Name	Scientific Name	Likely to occur on the site
Mute Swan	*Cygnus olor*	
Whooper Swan	*Cygnus cygnus*	
Greylag Goose	*Anser anser*	
Common Shelduck	*Tadorna tadorna*	
Wigeon	*Anas penelope*	
Gadwall	*Anas strepera*	
Teal	*Anas crecca*	
Pintail	*Anas acuta*	
Shoveler	*Anas clypeata*	
Pochard	*Aythya ferina*	
Tufted Duck	*Aythya fuligula*	
Scaup	*Anas marila*	
Goldeneye	*Bucephala clangula*	
Red-breasted Merganser	*Mergus serrator*	
Goosander	*Mergus merganser*	
Pheasant	*Phasianus colchicus*	✓
Cormorant	*Phalacrocorax carbo*	
Little Egret	*Egretta garzetta*	
Grey Heron	*Ardea cinerea*	✓
Little Grebe	*Tachybaptus ruficollis*	
Great Crested Grebe	*Podiceps cristatus*	
Hen Harrier	*Circus cyaneus*	
Sparrowhawk	*Accipiter nisus*	✓
Kestrel	*Falco tinnunculus*	✓
Merlin	*Falco columbarius*	
Peregrine	*Falco peregrinus*	
Water Rail	*Rallus aquaticus*	
Moorhen	*Gallinula chloropus*	✓
Coot	*Fulica atra*	✓
Oystercatcher	*Haematopus ostralegus*	
Ringed Plover	*Charadrius hiaticula*	
Golden Plover	*Pluvialis apricaria*	
Lapwing	*Vanellus vanellus*	
Dunlin	*Calidris alpina*	
Jack Snipe	*Lymnocryptes minimus*	
Snipe	*Gallinago gallinago*	✓
Woodcock	*Scolopax rusticola*	
Black-tailed Godwit	*Limosa limosa*	
Curlew	*Numenius arquata*	
Greenshank	*Tringa nebularia*	
Redshank	*Tringa totanus*	
Turnstone	*Arenaria interpres*	
Black-headed Gull	*Larus ridibundus*	
Common Gull	*Larus canus*	
Lesser Black-backed Gull	*Larus fuscus*	
Herring Gull	*Larus argentatus*	
Great Black-backed Gull	*Larus marinus*	
Rock Dove / Feral Pigeon	*Columba livia*	✓
Stock Dove	*Columba oenas*	✓
Woodpigeon	*Columba palumbus*	✓
Cuckoo	*Cuculus canorus*	✓
Barn Owl	*Tyto alba*	
Long-eared owl	*Asio otus*	
Kingfisher	*Alcedo atthis*	

Common Name	Scientific Name	Likely to occur on the site
Magpie	*Pica pica*	✓
Swift	*Apus apus*	✓
Jay	*Garrulus glandarius*	✓
Skylark	*Alauda arvensis*	✓
Sand Martin	*Riparia riparia*	
House Martin	*Delichon urbicum*	✓
Treecreeper	*Certhia familiaris*	✓
Dipper	*Cinclus cinclus*	
Brambling	*Fringilla montifringilla*	✓
Linnet	*Carduelis cannabina*	✓
Lesser Redpol	*Carduelis flammea cabaret*	✓
Jackdaw	*Corvus monedula*	✓
Rook	*Corvus frugilegus*	✓
Hooded Crow	*Corvus cornix*	✓
Raven	*Corvus corax*	✓
Goldcrest	*Regulus regulus*	✓
Blue Tit	*Parus caeruleus*	✓
Great Tit	*Parus major*	✓
Coal Tit	*Parus ater*	✓
Swallow	*Hirundo rustica*	✓
Long-tailed Tit	*Aegithalus caudatus*	✓
ChiffChaff	*Phylloscopus collybita*	✓
Willow Warbler	*Phylloscopus trochilus*	✓
Blackcap	*Sylvia atricapilla*	✓
Whitethroat	*Sylvia communis*	✓
Grasshopper Warbler	*Locustella naevia*	✓
Sedge Warbler	*Acrocephalus schoenobaenus*	✓
Wren	*Troglodytes troglodytes*	✓
Starling	*Sturnus vulgaris*	✓
Blackbird	*Turdus merula*	✓
Fieldfare	*Turdus pilaris*	✓
Song Thrush	*Turdus philomelos*	✓
Redwing	*Turdus iliacus*	✓
Mistle Thrush	*Turdus viscivorus*	✓
Spotted Flycatcher	*Musciapa striata*	✓
Robin	*Erithacus rubecula*	✓
Stonechat	*Saxicola torquata*	
Dunnock	*Prunella modularis*	✓
House Sparrow	*Passer domesticus*	✓
Grey Wagtail	*Motacilla cinerea*	✓
Pied Wagtail	*Motacilla alba yarrellii*	✓
Meadow Pipit	*Anthus pratensis*	✓
Chaffinch	*Fringilla coelebs*	✓
Greenfinch	*Carduelis chloris*	✓
Goldfinch	*Carduelis carduelis*	✓
Siskin	*Carduelis spinus*	✓
Bullfinch	*Pyrrhula pyrrhula*	✓
Reed Bunting	*Emberiza schoeniclus*	✓

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