Cork Line Level Crossings

Volume 3, Chapter 7: Biodiversity

Iarnród Éireann

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Contents

Table of Acronyms

Acronym	Meaning
BCI	Bat Conservation Ireland
BoCCI	Birds of Conservation Concern in Ireland
CCTV	Closed Circuit Television
CIEEM	Chartered Institute of Ecology and Environmental Management
EC	European Commission
EcoW	Ecological Clerk of Works
eDNA	Environmental DNA (deoxyribonucleic acid)
EEC	European Economic Community
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EPA	Environmental Protection Agency
IFI	Inland Fisheries Ireland
I-WeBS	Irish Wetland Bird Survey
KER	Key Ecological Receptor
NIS	Natura Impact Statement
NBDC	National Biodiversity Data Centre
NHA	National Heritage Areas
NPWS	National Parks and Wildlife Service
NRA	National Roads Authority
NTA	National Transport Authority
pNHA	Proposed National Heritage Area
PRF	Potential Roost Feature
QI	Qualifying Interest
SAC	Special Area of Conservation
SCI	Special Conservation Interest
WeBS	Wetland Bird Survey
WFD	Water Framework Directive
ZoI	Zone of Influence

7. Biodiversity

7.1 Introduction

This chapter of the EIAR considers the potential impact of the proposed Project on biodiversity during the construction and operational phase identifying, describing and assessing the likely direct and indirect significant effects. Assessment is in accordance with the requirements of Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (*i.e.* the EIA Directive). Particular attention is made to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC (*i.e.* the Habitats and Birds Directives) and species protected pursuant to the Wildlife Acts 1976 (as amended). The overarching policy context for the proposed Project is set out in Volume 2, Chapter 4: EIA Process and Methodology.

The EIA Directive does not provide a definition of biodiversity. The Convention on Biological Diversity, however, gives a formal definition of biodiversity in its article 2: "*biological diversity means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems*". Alongside the term "*biodiversity*" the terms "*ecology*" and "*ecological*" are also used throughout this chapter as a broader term to consider the relationships of biodiversity receptors to one another and to their environment.

The following sections of the chapter comprise:

- Section 7.2 presents the methodology including underpinning legislation and guidance.
- Section 7.3 describes the existing baseline environment.
- Section 7.4 summarises the main characteristics of the proposed Project which are of relevance for biodiversity.
- Section 7.5 evaluates the predicted impacts of the proposed Project on biodiversity.
- Section 7.6 describes the measures proposed to mitigate identified impacts.
- Section 7.7 describes the residual impacts.
- Section 7.8 describes the difficulties encountered in compiling information.
- Section 7.9 describes the cumulative impacts and impact interrelations.
- Section 7.10 describes the compensatory measures proposed to address the residual impacts.

7.2 Methodology

7.2.1 Introduction and Scope

A combination of desk-based review and field surveys was used to collect information on the study area. The Zone of Influence (ZoI) for the proposed Project varied according to the ecological receptor and is described in Section 7.3.5. The methodologies used to collate information on the baseline biodiversity environment and assessment of potential impacts are detailed in the following sections.

7.2.2 Extent of Project Area

The seven manned crossings are within a 24km section of the Dublin – Cork Railway Line between Limerick Junction and Mallow Stations straddling the Cork/Limerick county boundary. Level crossings XC187 Fantstown and XC201 Thomastown are in County Limerick, lying directly south of Limerick City, while the remaining sites are located in County Cork, directly north of Mallow. Urban areas in close proximity to the study are Kilmallock, which

lies between existing crossings XC187 Fantstown and XC201 Thomastown; Charleville, which lies to the south-west of XC201 Thomastown and north of crossing XC209 Ballyhay; and directly southeast of crossing XC219 Buttevant. Each crossing is more than 2km apart with the exception of XC211 Newtown and XC212 Ballycoskery that serve the same crossing.

7.2.3 Study Area

The study area extent and surveys varied at each of the proposed level crossing locations based upon the characteristics of the proposals for each of the level crossings (see Table 7.1 below) and the likely significant effects on the receiving environment during construction and/or operation. Surveys were carried out for each of the biodiversity receptors as listed in Table 7.2, within a specific study area, and focussed on assessing potential impacts within the ZoI[1] of the proposed Project.

Table 7.1: Overview of the key Elements of the proposed Project

Location	Infrastructure	Description
XC187 Fantstown	N/A	Straight Closure: Alternative route along existing roads to existing road-over-rail bridge approximately 3km to the north east.
XC201 Thomastown	1no. road-over-rail bridge.	New road-over-rail bridge: Tie in to existing local road to south and new junction on Regional Road R515 to north.
XC209 Ballyhay	CCTV solution.	Replace the existing manned level crossing with a remote monitored CCTV solution.
XC211 Newtown	New access road.	New Access Road: Immediately east of the existing road-over-rail bridge to the north of XC211 Newton; tie in to existing Local road to the east of XC211 Newtown. Carriageway widths are proposed to match existing widths for safety reasons, with passing bays located in accordance with TII standards.
XC212 Ballycoskery	1 no. road-over-rail bridge, 1no. retaining wall.	New road-over-rail bridge: Tie in to existing Local Road to East and West, new carpark proposed for existing school. Tie into Beechwood Housing Estate and Ballyhea National School to North and existing Local road to south.
XC215 Shinanagh	Tie into existing road-over-rail bridge. Upgrade of existing junction on N20, closure of existing N20 junction at current level crossing location. Resurfacing of section of existing local road.	New access road to tie into existing road-over-rail bridge approximately 1km to the north.
XC219 Buttevant	1no. road-over-rail bridge, 1no. portal frame road-over-river bridge culvert, 1no. ditch box culvert, 1no.access road box culvert, 2no. retaining walls.	New road-over-rail bridge. Tie in to existing regional road to east and west.

[1] *The 'zone of influence' for a project is the area over which ecological features may be affected by biophysical changes 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* (CIEEM, 2018).

Table 7.2: Study area and survey extent for each ecological receptor

Ecological Receptor	Study Area Description	(XC187) Fantstown	(XC201) Thomastown	(XC209) Ballyhay	(XC212) Ballycoskery (XC211) Newtown	(XC215) Shinanagh	(XC219) Buttevant
Habitats (including rare and/or protected flora, and non-native invasive plant species[2])	The study area extended to a minimum of 100m from the red-line boundary.	√	√	√	√	√	√
Fauna species (other than bats *i.e.* otter, badger, other small mammals, amphibians, reptiles and fish)	The study area extended to a minimum of 100m from the red-line boundary. This was extended further if required (i.e. along watercourses hydrologically linked to the proposed Project).	-	√	-	√	√	√
Bats	The study area extended to a minimum of 100m from the red-line boundary covering areas of suitable bat roosting, foraging and/or commuting habitats that could be impacted as part of the proposed Project.	-	√	-	√	√	√
Breeding birds	The study area in most instances extended 100m from the red-line boundary. Focused on areas of suitable bird nesting habitat.	-	√	-	√	√	√
Aquatic macroinvertebrates (white-clawed crayfish only)	eDNA sampling of watercourses crossed by the proposed Project (Pepperhill River at Buttevant only).	-	-	-	-	-	√
Winter Bird Surveys	The study area in most instances extended 500m from the red-line boundary. Focused on areas of suitable habitat for foraging winter birds. Kilcolman Bog SPA was also included in the survey scope to better understand the current distribution of wintering whooper swan.	-	√	-	√	√	√

[2] Non-native invasive plant species are not considered as KERs, as they can result in negative effects on biodiversity and it is in that context they are included within the impact assessment.

7.2.4 Specific surveys scoped out from the assessment and justification for same:

Amphibians and Reptiles. Amphibian and reptile surveys comprised a habitat suitability assessment only. These species are assumed present where suitable habitat is found within the study area unless otherwise stated.

Bats - Static Detector Activity Surveys. Given the minimal loss of hedgerow, trees/treelines as part of the proposed Project bat species and general bat activity within the study area was recorded during dusk emergence and dawn re-entry surveys (see Section 7.2.4 bats) of trees and buildings scheduled for removal. These surveys are considered to give a representative picture of bat species likely to be utilising the study area and immediate surrounding environments. For example, it would be reasonable to conclude that bat species recorded during these surveys would be utilising treelines, hedgerows and watercourse within the study area for foraging and commuting. As such impacts on foraging or commuting bats as a result of losing or lighting these habitats will be considered within the assessment and appropriate mitigation recommended (where required). It should be noted that the proposed Project study area does not overlap the known distribution or range for the Lesser Horseshoe bat (NPWS, 2019a).

Breeding Birds. The proposed Project will not result in the loss of any significant bird nesting habitat (e.g. woodland). The main habitats present within the study area comprised agricultural land with scrub, tree lines and hedgerows, all of which are suitable to support common garden/woodland nesting bird species rather than Annex I species, as such dedicated breeding bird surveys were not considered necessary given the scale of the proposed Project. Bird species present within the study area were recorded during habitat surveys undertaken in July.

Aquatic Receptors. An aquatic habitat assessment was undertaken to identify the presence of supporting habitat for fish species and macrophytes and/or invertebrates of conservation importance. Desk-based data was also used to inform decision making. With the exception of white-clawed crayfish, watercourses were found to have limited potential to support species of conservation concern. Therefore, no further surveys were undertaken. However, these watercourses are hydrologically linked to the Awbeg River which is known to support Atlantic salmon (*Salmo salar*) for example and direct impacts on fish species as a result of the proposed project (e.g. pollution event) are possible. Therefore, for the purposes of the assessment these species are considered to be present within the study area downstream of the proposed Project.

7.2.5 Relevant Legislation, Policy & Guidelines

The assessment of the likely impacts of the proposed Project on ecological resources has considered legislation, policy documents, and guidelines. The overarching policy and legislation applicable to the proposed Project is set out in Volume 2, Chapter 4: EIA Process & Methodology, however, the following are of relevance:

International and National Legislation

The following international legislation is relevant to the proposed Project:

- Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (as amended); hereafter the 'Habitats Directive'.
- Council Directive 2009/147/EC on the Conservation of Wild Birds (as amended); hereafter the 'Birds Directive'.
- Directive 2000/60/EC; EU Water Framework Directive.

The following national legislation is relevant to the proposed Project:

- Wildlife Act, 1976 and Wildlife (Amendment) Act (2000) (as amended); referred to hereafter collectively as the Wildlife Acts. At national level these are the principal pieces of legislation for the protection and control of activities that may harm wildlife.
- Planning and Development (Amendment) Act 2010 (as amended). This Act is the basis for land use planning in Ireland. Under this legislation, mandatory objectives for the conservation of natural heritage

and for the conservation of European Sites must be included in development plans (usually implemented at local authority level).

- European Communities (EC) (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011 (as amended); hereafter the 'Birds and Habitats Regulations'. The transposition of the Habitats and Birds Directives into Irish law is through this legislation. Regulations (49 and 50) that deal with invasive species (those included within the Third Schedule) are also included.
- Flora (Protection) Order, 2015. Species of plant which receive protection under Section 21 of the Wildlife Act, 1976 are listed in this legislation.
- Inland Fisheries Acts 1959 to 2017, hereafter referred to as the Fisheries Acts.

Policy and Planning Documents:

- National Planning Framework;
- National Development Plan 2018 – 2027;
- National Biodiversity Plan 2017-2021 (Department of Culture, Heritage and the Gaeltacht, 2017;
- Cork County Development Plan 2014 – 2020 (Cork County Council, 2014);
- Cork 2050. Cork's Submission to the National Planning Framework (Cork County Council, Cork City Council, 2017);
- Kanturk Mallow Municipal District Local Area Plan (Cork County Council, 2017);
- Fermoy Municipal District Local Area Plan (Cork County Council, 2017);
- Limerick 2030, An Economic and Spatial Plan for Limerick (Limerick City and County Councils, 2013);
- Mid-West Area Strategic Plan 2012 – 2030 (Mid-West Regional Authority, 2012); and
- Kilmallock Local Area Plan 2019 – 2025 (Limerick City and County Councils, 2019).

Relevant Guidelines

Key guidance used for this assessment included the following non-exhaustive list:

- A Guide to Habitats in Ireland (Fossitt, 2000);
- Bat Mitigation Guidelines for Ireland (Kelleher and Marnell, 2006);
- Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn) (Collins 2016);
- Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes (NRA, 2006a);
- Ecology of the White-clawed Crayfish. Conserving Natura 2000 Rivers Ecology Series No. 1. English Nature, Peterborough (Holdich, 2003);
- Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (National Roads Authority, 2008a);
- Environmental Impact Assessment of Projects, Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017);

- Bird Monitoring Methods (Gilbert et al., 1998);
- 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 (NRA, 2009);
- Guidelines for the Treatment of Badgers during the Construction of National Road Schemes (NRA, 2006b);
- Irish Vegetation Classification (IVC) – An Overview of Concepts, Structure and Tools. In Practice, CIEEM, December 2018, pp 15-19. (Perrin et al., 2018);
- The monitoring and assessment of three EU Habitats Directive Annex I grassland habitats. Irish Wildlife Manuals, No. 102 (Martin et al., 2018);
- The Irish semi-natural grasslands survey 2007-2012. Irish Wildlife Manuals, No. 78 (O'Neill et al., 2013); and
- Scottish Fisheries Co-ordination Centre, Habitat Surveys Training Course Manual (SFCC, 2007).

7.2.6 Data Collection Methods

A desktop study was carried out to inform the initial scope of the ecological surveys required to inform the environmental impact assessment. The desktop study involved collection and review of relevant published and unpublished sources of data, collation of existing information on the ecological environment and consultation with relevant statutory bodies.

Desk Study

The following sources were consulted during the desk study to inform the scope of the ecological surveys:

- Online data available on European sites 3 and nationally designated sites 4 as held by the National Parks and Wildlife Service (NPWS, 2019b);
- Online data records available on National Biodiversity Data Centre Database (NBDC, 2019);
- Ordnance Survey Ireland mapping and aerial photography www.osi.ie – utilised for desk review of potential habitats within the subject lands and their surroundings;
- Irish Wetland Bird Survey (I-WeBS) data available on Birdwatch Ireland I-WeBS section at https://birdwatchireland.ie/our-work/surveys-research/research-surveys/irish-wetland-bird-survey/.
- Records of rare and protected species for the 10km grid squares R50, R51, R52 and R62 held by the NPWS;
- Bat records from Bat Conservation Ireland's (BCI) database;
- Information on Lowland Hay Meadows from BSBI Ireland Annex I Grassland Resources at https://bsbi.org/wp-content/uploads/dlm_uploads/Lowland_Hay_Meadows_6510-1.pdf;
- Environmental information/data for the area available from the Environmental Protection Agency website (EPA, 2019);

[3] European site" replaced the term "Natura 2000 site" under the EU (Environmental Impact Assessment and Habitats) Regulations 2011 S.I. No. 473 of 2011. European site refers to Special Areas of Conservation (SACs) or Special Protection Areas (SPAs) which have been designated by legislation implementing the Birds and Habitat Directives.

[4] Natural Heritage Areas (NHAs) or proposed Natural Heritage Areas (pNHAs)

- Article 17 reports containing information on the status of EU protected habitats and species in Ireland (NPWS 2019a, 2019c and 2019d); and
- Records of rare / protected species (from NPWS, NBDC or BCI) were requested or searched for within 5km of the proposed Project boundary.

Field Survey Methods

This section describes the various ecological survey methodologies used to collate baseline ecological information informing this chapter. Surveys were carried out between July 2019 and March 2020 and are summarised in Table 7.3 below.

Table 7.3: Ecology Surveys Informing the EIAR

Species/Habitat	Survey date(s)
Habitat Survey	July and August 2019
Habitat Suitability Assessment (reptile and amphibian)	July 2019
Habitat Suitability Assessment (fish and aquatic macroinvertebrates [white-clawed crayfish only])	July and October 2019
Mammal Survey (other than bats i.e. otter, badger etc.)	July and October 2019
Breeding Birds (combined with habitat survey/walkover – see Section 7.2.2)	July 2019
Bats Identification of potential roost features (PRFs) in trees/buildings Emergence/re-entry surveys (structures and trees)	July 2019 July and August 2019
eDNA Sampling for white-clawed crayfish (Pepperhill River, Buttevant only)	February 2020
Winter Bird Surveys	January, February and March 2020
Newt Survey	January 2020

Habitat Survey

Habitat surveys were undertaken between the 23 and 26 of July 2019 and on 14 August 2019. All habitats were mapped and classified using A Guide to Habitats in Ireland (Fossitt, 2000). Plant species present that were either representative of a habitat or considered to be of conservation interest were recorded, along with their relative abundances. The extent of habitat was mapped onto an aerial photograph. Target notes are included in the habitat map, these indicate any points of interest within the study area (e.g. describing a habitat in more detail, information on conservation interests within the study area or information land use practices etc.). Vascular plant nomenclature follows that of the New Flora of the British Isles 3rd Edition (Stace, 2010).

Where habitats of notable interest were identified (e.g. affinities with Annex I habitat) a detailed species list representative of the habitat was taken to help in the determination as to whether the habitat conformed to the Annex I habitat or not. This data was also used to assign a vegetation community to the habitat type (Perrin *et al.,* 2018) where required.

Habitat Suitability: Amphibians

Habitats and water features (watercourses and drainage ditches) within the study area were assessed for their suitability to support projected amphibians. This was carried out during the multi-disciplinary walkover undertaken between the 23 and 25 of July 2019, a further visit was made on 9 October. Incidental sightings of these species where present were recorded. A nocturnal newt survey was undertaken in January 2020.

Habitat Suitability: Reptiles

Habitats within c.100m of the proposed Project were assessed for their potential to support common lizard (*Lacerta vivipara*). This was carried as part of the multi-disciplinary walkover undertaken between the 23 and 25 of July 2019. Incidental sightings of these species where present were recorded.

Habitat Suitability: Fish and White-Clawed Crayfish

Watercourse crossing points and a minimum of 100m to either side where visually assessed for the potential to support fish of conservation interest and white-clawed crayfish. The presence of macrophytes were also noted where present. This was carried out during the multi-disciplinary walkover undertaken between the 23 and 25 of July 2019, a further visit was made on 9 October.

Mammal Survey (other than bats)

Surveys for large mammals (e.g. badger (*Meles meles*) and otter (*Lutra lutra*)) were carried out as part of the multi-disciplinary walkover survey undertaken between the 23 and 25 of July 2019, a further visit was made on 9 October. Otter and badger were surveyed through the detection of field signs including resting sites (holts and setts) as well as mammal tracks, markings, feeding signs, and droppings. Where potentially active resting sites were identified infra-red motion cameras (Bushnell) were deployed (under licence from the NPWS) to monitor any activity and identify the level of use and important of the resting site (e.g. breeding sett or natal holt).

Species-specific surveys were not undertaken for other protected mammal species which are harder to detect through field signs such as hedgehog (*Erinaceus europaeus*), Irish stoat (*Mustela erminea hibernica*) or pine marten (*Martes martes*). Nevertheless, during all survey's, searches for any signs of these species such as footprints in soft muds and or droppings was carried out. Potential presence of these species within the study area was noted based on the species distribution and habitat preferences (Marnell *et al.*, 2019).

Bats

Assessment of Potential Roost Features (Initial Daytime Assessment)

An assessment of trees and buildings within the study area was undertaken to identify their potential to support a bat roost. This daytime assessment comprised an external inspection of trees and buildings to identify potential roost features (PRFs) or signs of bat presence (bat droppings, insect remains etc.). The criteria used to categorise PRFs or suitability of buildings and trees as a roost are summarised in Table 7.4 (based on Collins, 2016). No internal surveys of buildings were undertaken due to restricted access.

Table 7.4: Assessing the Value of Trees and Buildings to Roosting Bats (based on Collins, 2016)

Category	Description	Recommended No. of Survey Visits*	Recommended Survey Timings**
High Trees / buildings that are suitable for use by large numbers of bats on a regular basis.	(PRFs in trees include but are not limited to knotholes, wounds, frost cracks or split limbs[5] that provide voids and/or crevices suitable for bats. In buildings, examples include eaves, barge boards, gable ends and corners of adjoining beams, ridge and hanging tiles, behind roofing felt or within cavity walls. **Further survey is required to determine whether or not bats are present and if so, the bat species present. Appropriate mitigation and potentially licensing requirements may then be determined. Seasonal constraints may apply.**	**Buildings / trees –** Three separate visits. One dusk emergence and a separate dawn re-entry survey. The third survey visit can be dusk or a dawn survey. NB. Multiple survey visits should be spread out as much as possible, with surveys at least two weeks apart, preferably more.	**Buildings / trees –** May to September (with at least two of the surveys between May and August).
Moderate Moderate potential is assigned to trees / structures with potential to support bat roosts but supports fewer features than a high potential building / tree and is unlikely to support a roost of high conservation value.	From the ground, building / tree appears to have features that may provide suitable roosting opportunity for bats. However, owing to the characteristics of the feature, they are deemed to be sub-optimal for large numbers of roosting bats. **Further survey is required to determine whether or not bats are present and if so, the bat species present. Appropriate mitigation and potentially licensing requirements may then be determined. Seasonal constraints may apply.**	**Buildings / trees –** Two separate visits. One dusk emergence and a separate dawn re-entry survey. NB. Multiple survey visits should be spread out as much as possible, with surveys at least two weeks apart, preferably more.	**Buildings / trees –** May to September (with at least two of the surveys between May and August).
Low Low potential is assigned to structures and trees with features that could support individual bats opportunistically.	If no features are visible but owing to the size and age and structure, hidden features, sub-optimal for roosting bats may occur that only and elevated inspection may reveal. In respect of ivy cover this could be hiding a PRF. **Further survey may be required for buildings only or works may proceed using reasonable precautions (e.g. controlled working methods, under licence or supervision of a bat worker. Seasonal constraints may apply.**	**Buildings–** One survey visit. One dusk emergence or dawn re-entry survey. **Trees –** No further surveys required.	**Buildings / trees –** May to September (with at least two of the surveys between May and August).

Dusk Emergence and Dawn Re-entry Surveys

Dusk emergence and dawn re-entry surveys of buildings, individual trees and treelines identified as having PRFs were undertaken to determine the presence / probable absence of bat roosts within the study area. The locations of buildings/trees surveyed are shown in Volume 4, Figures 7.1 and 7.2. Surveys were undertaken on the following dates:

- 23, 25 July 2019; and
- 14,15 August 2019.

[5] Further detailed information on the type of PRFs found in trees is detailed in Andrews (2018).

Surveyors were positioned at potential roost access / egress points to identify any bats emerging from or returning to roost. Surveyors recorded bat activity using heterodyne Elekon Batscanner detectors, EchoMeter Touch 2 and / or the frequency division Anabat SD2. Dusk emergence surveys commenced approximately 15 minutes before and continued for at least 90 minutes after sunset. Dawn re-entry surveys commenced at least 90 minutes prior to, and continued until, sunrise. Surveys were undertaken during suitably warm and dry weather conditions.

Bat Call Analysis

Bat call analysis was undertaken using Analook software. Bat species identification was interpreted using known call parameters (British Bat Calls: A Guide to Species Identification, Jon Russ 2012) and existing literature on the ecology of Irish and UK bat species, including distribution, range, habitat associations and behavioural characteristics, in addition to professional judgement. Every attempt was made to identify bats to species level. However, in some instances it was only possible to take the analysis to genus level (distinguishing between certain bat species echolocation calls can be very difficult due to the overlap in call parameters e.g. those species within the Myotis genus).

eDNA Sampling - White-clawed Crayfish

Non-invasive environmental DNA (eDNA) surveys were used to detect the presence/probable absence of white-clawed crayfish (*Austropotamobius pallipes*) from one watercourse within the study area, namely Pepperhill River at Buttevant (XC219). eDNA sampling provides a tool for surveying aquatic communities without the need to catch the animals themselves. It has been shown to be effective in a wide variety of aquatic ecosystems (ponds, lakes, streams, rivers, estuaries and oceans) and can be used either to detect the presence of particular species, or to survey whole communities of organisms.

Samples were collected on 11 February 2020 and sent to NatureMetrics[6] for subsequent analysis. Due to programming constraints sampling was undertaken outside the optimal survey period for this species which is taken to be April to October inclusive.

Breeding birds

Breeding bird surveys were conducted at the same time as the habitat walkover undertaken between the 23 and 26 July (see Section 7.1 breeding birds). All suitable breeding bird habitats located within c. 100m of the proposed Project were walked allowing the surveyor to identify birds by sight and song. Effort was also focused on identifying recently fledged/juvenile birds and/or late nesting bird species. Birds recorded within the study area were assessed against the Birds of Conservation Concern in Ireland (BoCCI) list which classifies bird species into three categories: Red List – birds of high conservation concern; Amber List – birds of medium conservation concern; and Green List – birds not considered threatened (Colhoun & Cummins, 2013).

Wintering birds

A desk study was undertaken to gather information on wintering bird species and current habitat usage of the area surrounding each site. Information was sought to gauge the importance of the sites and establish if there is the potential to disturb roosting and/or foraging wintering bird species. From the information gathered during the desktop review and following on from consultation undertaken with NPWS it was established that updated wintering bird surveys were required to ensure a robust assessment was undertaken.

Wintering bird surveys were undertaken over two consecutive days each month on 15/16 January, 11/12 February and 03/04 March encompassing an area out to 500m at XC219 Buttevant, XC212/XC211 Ballycoskery/Newtown, XC215 Shinanagh and XC201 Thomastown sites. These five sites were considered to contain suitable habitat to support wintering birds. No suitable habitat was recorded at XC187 Fantstown or XC209 Ballyhay and where therefore excluded from the bird surveys. 500m is determined to be the ZoI of likely significant disturbance effects from the proposed Project. Wintering birds collectively considered at risk of disturbance at up to 500m based on compilation of data from Madsen (1985); Smit and Visser (1993) and Rees et al. (2005). Surveys were undertaken

[6] https://www.naturemetrics.co.uk/wildlife-services/aquatic-surveys-edna/

in accordance with the Wetland Bird Survey (WeBS), the International Swan Census, and standard methodologies for identifying concentrations of wintering waterfowl in Gilbert et al. (1998). To better understand the current distribution of whooper swan in the area Kilcolman Bog SPA was also surveyed during each visit to assess the presence/absence of swans.

Following the initial survey areas of unsuitable habitat (woodland, dense vegetation, steep fields etc.) and urban areas identified were discounted and the focus was placed on agricultural grassland fields and flooded land. The surveys were designed to identify roosting/foraging whooper swans (*Cygnus cygnus*) however all wader and wildfowl species including other notable species e.g. Annex I/ red-listed species were recorded. Monthly visits were timed to be at least three weeks apart. Surveys consisted of drive-overs with short stops at suitable vantage points. Surveys remained flexible allowing surveyors to react to conditions within the survey area, including notable observations of bird behaviour. Where vantage points (VPs) were used, they were selected to provide the least obstructed view of the entire survey area. Two surveyors (one driving and one experienced ornithologist) drove along the available roads within the survey area while scanning for flocks of foraging waders and wildfowl. Upon observing waders and/or wildfowl, surveyors stopped in a safe location to record and map flock sizes and behaviour. Surveyors also stopped at locations that provided good views over wide areas of suitable habitat to observe for any birds which were not observed during the drive-by survey. Meteorological data was also recorded on each day of survey (Volume 5, Appendix 7F, Table F1). The following data were recorded when waders and wildfowl were encountered: time of day; species; number; and behaviour (flying, foraging, loafing or roosting).

Limitations of Field Surveys/Data Deficiencies

Ecological surveys are limited by a variety of factors which affect the presence of flora and fauna; for example, climatic variation, season and species behaviour. Evidence of protected species is not always recorded during a survey. This does not mean that a species is absent; hence the surveys also record and assess the ability of habitats to support species. Ecological surveys provide evidence of ecological activity for a snapshot of time. No major limitations were encountered in gathering data. It is considered that the baseline data collected is sufficient to inform a robust and thorough assessment of potential impacts. White-clawed crayfish sampling was undertaken outside the optimal survey window. However, although crayfish are less active in winter their presence should still be detected at this time of year. Although a small number of fields at XC219 Buttevant and XC201 Thomastown were out of the viewshed during the whooper swan surveys this was not deemed a limitation as all were assessed as being unsuitable to support foraging/roosting swans. Nocturnal newt surveys were undertaken in January 2020 outside of the optimal survey period (March – May), however a precautionary approach was taken and where suitable supporting habitat was present it was assumed that newts were present if none were found during field survey.

7.2.7 Consultation

Table 7.5: Consultation

Consultee	Comment	Response
NPWS	It was concluded that wintering bird surveys would be required to inform any mitigation in relation to whooper swan and potential impacts on Kilcolman Bog SPA. Further consultation was undertaken in relation to the translocation of habitat corresponding to Annex I habitats, the installation of bird boxes and landscape planting. No changes to the mitigation proposed were required.	Wintering bird surveys were undertaken in January – March 2020. This data was used to inform mitigation measures detailed in Section 7.7. Mitigation measures detailed in Section 7.7 and Volume 5, Appendix 7G.
IFI	It was confirmed that salmonid spawning habitat is present upstream of the study area in the Pepperhill River but that this habitat is minimal. It was requested that any instream works be carried out between July and September inclusive if salmonid spawning habitat was within or in proximity to impacted area. No other changes to the mitigation proposed were required.	Mitigation measures to protect salmonid habitat and avoid impacts from pollution are detailed in Section 7.7. Mitigation to protect aquatic species are detailed in Section 7.7.

Consultation was undertaken with National Parks and Wildlife Service (NPWS) and Inland Fisheries Ireland (IFI) in relation to existing survey data for the study area, survey scope and project design. Consultation with the district conservation ranger with the NPWS (Danny O'Keeffe) occurred between 9 and 17 December 2019 regarding the presence/absence of whooper swan around the level crossing sites in Cork. No whooper swans were recorded in the vicinity of the crossings during weeks following initial consultation. However, it was confirmed that whooper swan was observed in fields in the general area. The absence of birds during one visit could not conclude that birds were not using the fields around the sites. Therefore, in the absence of this information it was concluded that it would be necessary to undertake wintering bird surveys and it would suffice to undertake these surveys during the remainder of the wintering bird season (i.e. January – March). This would enable a robust assessment in relation to potential impacts on the Kilcolman Bog SPA and inform whether mitigation in relation to wintering birds is required or not. Further consultation with NPWS (Danny O'Keeffe) was undertaken on 12 November 2020 (response received on 27 November 2020) regarding the translocation of two areas of habitat corresponding to Annex I habitats, the installation of bird boxes at indicative locations and landscape planting. No changes to the mitigation proposed were required. Consultation with IFI (Andrew Gillespie) on 3 December 2019 confirmed the presence of small pockets of salmonid spawning in the Pepperhill River well upstream of the study area but it was noted that these are minimal due to effects of agricultural drainage in the area. Consultation with IFI (Andrew Gillespie) on 12 November 2020 (response received 24 November 2020) confirmed that the proposed mitigation measures to protect aquatic species at Buttevant were satisfactory with one requested amendment. IFI noted that it was intended to conduct in-stream works between May and September inclusive, and requested that the works be carried out between July and September inclusive where the works location overlaps salmonid spawning habitat or where similar habitat is situated close to the works footprint.

7.3 Appraisal Method for the Assessment of Impacts

The criteria used to assess the ecological value and significance of the study area for habitats and species present follows Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009) and Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2018).

7.3.1 Valuing the Ecological Receptors

In accordance with NRA guidelines (2009) impact assessment is only undertaken of Key Ecological Receptors (KERs). KERs are within the ZoI of the proposed Project and are 'both of sufficient value to be material in decision making and likely to be affected significantly'. To qualify as KERs, features must be of Local Ecological Importance

(Higher Value) or higher as per the criteria from the NRA guidelines these are provided in Volume 5, Appendix 7A. Features valued at Local Ecological Importance (Lower Value) are not subject to impact assessment.

As Annex I habitats are of high conservation concern all that lie outside of European sites are valued as being of national importance. A value of international importance is afforded to all priority Annex I habitats outside of European sites.

7.3.2 Characterising and Describing Ecological Impacts

The parameters considered in characterising and describing the potential impacts and effects of the proposed Project are based on CIEEM (2018) guidelines and outlined in Table 7.6 below.

Table 7.6: Parameters used to characterise and describe the potential impacts and effects of the proposed Project

Parameter	Categories
Type of impact	**Positive/Neutral/Negative**
Extent	The extent is the spatial or geographical area over which the impact/effect may occur under a suitably representative range of conditions.
Magnitude	Magnitude refers to size, amount, intensity and volume. It should be quantified if possible e.g. the amount of habitat lost, percentage change to habitat area, percentage of population affected.
Duration	The period of time over which the effect will occur[7]. Duration should be defined in relation to ecological characteristics (such as the lifecycle of a species).
Frequency and Timing	How often the effect will occur; particularly in the context of relevant life-stages or seasons. The number of times an activity occurs will influence the resulting effect.
Reversibility	An irreversible effect is one from which recovery is not possible within a reasonable timescale or there is no reasonable chance of action being taken to reverse it (e.g. loss of limestone pavement or ancient woodland). A reversible effect is one from which spontaneous recovery is possible or which may be counteracted by mitigation.

7.3.3 Conservation Status

When assessing potential effects on an ecological receptor the conservation status of that receptor must be taken into account (e.g. the known or likely background trends and variations in its status). The level of ecological resilience or likely level of ecological conditions that would allow the population of a species or area of habitat to continue to exist at a given level or continue to increase along an existing trend or reduce a decreasing trend, should also be estimated.

7.3.4 Impact Significance

With respect to ecology, best practice guidance advises that significance should not be defined as 'high', 'moderate' or 'low' due to the complexities of ecological processes. Therefore, all impacts defined as 'significant' are considered to be significant in the context of the EIA Regulations. Therefore, impacts are described as being either significant or not significant. Broadly, significant effects encompass impacts on the integrity of the ecological feature and the conservation status of habitats and species (including extent, abundance and distribution) within a given geographical area. The level of significance of that impact is related to the geographical scale at which the impact will occur (i.e. local, county, national, international).

[7] The following terms/definitions for describing the duration of impacts are provided in the Environmental Protection Agency guidelines (Draft August 2017): 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.

In response to the above, and to ensure significant impacts on ecological features are still placed within an appropriate context, a geographical approach is adopted to determine the ecological value of a feature. Significance is then considered at the same geographical scale. For example, when a significant impact is predicted on a feature of local value, it may be considered to be significant 'at a local level'. However, in some cases, where only a small part of an ecological feature is affected, the geographical scale at which the significant impact will occur may be lower, for example an impact may only be significant at a local level on an internationally important species if it is considered that the particular impact will not have a negative effect on the overall conservation status of the species.

7.3.5 Zone of Influence

The ZoI is a distance over which a likely significant effect may occur to key ecological receptors (KERs) given the nature and scale of the proposed Project. There is no set recommended distance for the ZoI of a project, and it will vary according to the predicted impact, the impact pathways and the sensitivity of the KER in question. To inform the ZoI a detailed desk study is carried out to establish the habitats and species likely to be present. The ZoI of the proposed Project ranges from 0m, under the footprint of the proposed Project (terrestrial habitats) up to 500m (e.g. for wintering birds) and beyond for freshwater environments. The potential effects from the proposed Project and the ZoI for the various ecological receptors are outlined in Table 7.7 below.

Table 7.7: Potential Effects and Zones of Influence

Potential Impact and Effect	Zone of Influence – Likely area over which impact could occur
Land-take resulting in habitat loss or degradation	Land under the footprint for the proposed Project including access routes.
Changes in water quality from hydrological impacts	Changes in surface water quality as a result of the proposed Project are assessed downstream of the proposed Project/watercourse crossings, but the potential spatial extent of effects is difficult to quantify due to the significant variables including the varying concentrations/types of contaminants which could be released during construction/operation (e.g. sediment, hydrocarbons etc) the resilience of different receiving waterbodies (i.e. assimilative capacity) and the sensitivity of the receiving waters.
Direct mortality (terrestrial species)	Land within the footprint for the proposed Project and access routes.
Direct mortality (aquatic plant and animal species)	Includes all freshwater habitats under the footprint of the proposed Project and downstream of the proposed watercourse crossings.
Spread of invasive non-native species resulting in habitat degradation.	Land within and adjacent the footprint for the proposed Project and access routes. Proposed Project footprint and access routes.
Noise and vibration resulting in disturbance.	Generally assessed within 500m of the proposed Project (e.g. for wintering birds) but can be significantly lower (e.g. 150m for otter and or badger resting sites).
Human / machinery presence resulting in disturbance to highly sensitive bird species at significant distance from works.	Generally assessed within 500m of the proposed Project (e.g. for wintering birds).

7.4 Baseline Environment and Valuation

The following section describes the receiving ecological environment and biodiversity within the ZoI of the proposed Project and also an evaluation of each ecological receptor. A full description of the proposed Project is presented in Volume 2, Chapter 3: Project Description.

In general, the local receiving environment is dominated by:

- the railway line adjacent to all sites;
- agricultural fields (primarily used for pasture) delineated by hedgerows and treelines; and
- private properties, including residential gardens and landscaped areas or hardstanding associated with local roads and amenities e.g. schools.

The ZoI of the proposed Project is described in Section 7.3.5 above. Sections 7.4.1. and 7.4.2 summarises the results of the desk and field studies in relation to Designated Areas and Habitats within the ZoI of the proposed Project. For all other ecological receptors (projected species, non-native invasive species etc.) the ecological baseline is presented by individual crossing points in sections 7.4.3 to 7.4.8. Section 7.5 provides a summary of the ecological valuation of each ecological receptor potentially affected by the proposed Project and identifies those which are KERs and subject to impact assessment.

7.4.1 Designated Sites

European Designated Sites

The proposed Project does not overlap with any European site. The closest European site is the Blackwater River (Cork/Waterford) Special Area of Conservation (SAC) located approximately 240m from the proposed crossing at XC219 Buttevant. This next nearest site is Kilcolman Bog Special Protection Area (SPA) located approximately 4.3km from XC219 Buttevant (see Volume 4, Figure 7.3).

The crossing at XC219 Buttevant is hydrologically linked to the Blackwater SAC by the Pepperhill River and an unnamed ditch immediately north of this river, both will be crossed as part of the proposed Project. The Pepperhill River flows directly into the Awbeg River (Buttevant) 240m downstream. The Awbeg River is within the Blackwater River (Cork/Waterford) SAC. The proposed crossing at XC212 Ballycoskery is located 250m north of the Newton River which flows directly into the Awbeg (Buttevant East) River approximately 450m downstream which also forms part of the SAC. A ditch within the study area at XC212 Ballycoskery is hydrologically linked to the Newton River providing a direct link to the SAC. The crossing at XC209 Ballyhay is approximately 19m from the Awbeg (Buttevant East) River, which joins the Blackwater River SAC approximately 1.5km downstream. There is no hydrological link to any SAC from the proposed crossings at XC187 Fantstown, XC201 Thomastown and XC215 Shinanagh.

Kilcolman Bog SPA is located just over 4km from the proposed Project at the closest point. Whopper swan (*Cygnus Cygnus*) which is a Qualifying Interest (QI)/Special Conservation Interest (SCI) species for which the site is designated have been recorded in close proximity to the proposed crossings at XC187 Buttevant and XC215 Shinanagh (see Table 7.6 in Section 7.3.5) as such this European site is considered to be within the ZoI for the proposed Project.

These two European sites (SAC and SPA) encompass all European sites considered to be within the ZoI of the proposed Project (see Volume 4, Figure 7.3). Table 7.8 below lists these sites, their distance from the proposed Project boundary, and the sites' QI/SCI.

These European sites are valued as being of International Importance.

Table 7.8: Designated Sites (SACs and SPAs) Potentially Within the Zone of Influence of the proposed Project.

Designated Site and Code	Distance from proposed Project	Reasons for designation (*= Priority Habitat)
Special Area of Conservation (SAC)		
Blackwater River (Cork/Waterford) SAC (002170) (NPWS, 2012)	240m (from the crossing at XC219 Buttevant)	**Annex I Habitats:** ▪ Estuaries [1130]; ▪ Mudflats and sandflats not covered by seawater at low tide [1140]; ▪ Perennial vegetation of stony banks [1220];

Designated Site and Code	Distance from proposed Project	Reasons for designation (*= Priority Habitat)
		▪ Salicornia and other annuals colonising mud and sand [1310]; ▪ Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330]; ▪ Mediterranean salt meadows (*Juncetalia maritimi*) [1410]; ▪ Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260]; ▪ Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]; and ▪ Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) [91E0] **Annex II Species:** ▪ Freshwater pearl mussel (*Margaritifera margaritifera*) [1029]; ▪ White-clawed crayfish (*Austropotamobius pallipes*) [1092]; ▪ Sea lamprey (*Petromyzon marinus*) [1095]; ▪ Brook lamprey (*Lampetra planeri*) [1096]; ▪ River lamprey (*Lampetra fluviatilis*) [1099]; ▪ Twaite shad (*Alosa fallax fallax*) [1103]; ▪ Atlantic salmon (*Salmo salar*) [1106]; ▪ Otter (*Lutra lutra*) [1355]; ▪ Killarney fern (*Trichomanes speciosum*) [1421];
Special Protection Area (SPA)		
Kilcolman Bog SPA (004095) (NPWS, 2018)	4.3km (from the crossing at XC219 Buttevant)	▪ Whooper swan (*Cygnus cygnus*) [A038]; ▪ Teal (*Anas crecca*) [A052]; ▪ Shoveler (*Anas clypeata*) [A056]; and ▪ Wetland and waterbirds [A999].

Natural Heritage Areas

National Heritage Areas (NHAs) are sites designated under the Wildlife Amendment Act (2000) to protect habitats, species or geology of national importance. Sites proposed for NHA designation are referred to as proposed National Heritage Areas (pNHAs). NHAs are legally protected from damage from the date they are formally proposed, however many of the pNHAs have not been formally proposed instead they were published on a non-statutory basis in 1995. In the interim period pNHAs are offered protection under the county or city development plans which requires that planning authorities give due regard to their protection in planning policies and decisions. Many of the pNHA sites, and some of the NHAs, in Ireland overlap with the boundaries of European sites.

There are no NHAs and 13 pNHAs located in the vicinity of the proposed Project (see Volume 4, Figure 7.4). and potentially within the ZoI of the proposed Project. Table 7.9 below lists these sites, their distance from the proposed Project boundary, and a site description outlining the sites ecological interest.

These proposed Natural Heritage Areas are valued as being of National Importance.

Table 7.9: Proposed Natural Heritage Areas (pNHAs) in the vicinity of the proposed Project.

Site Name	Distance from Proposed Project	Site Description
Eagle Lough pNHA (Site Code 001049)	2.6km from the crossing at XC219 Buttevant	Displays many features of a turlough, believed to be the only turlough-type lake in Cork. Several rare plants are present including orange foxtail (*Alopecurus aequalis*).
Ballyhoura Mountains pNHA (Site Code 002036)	3.2km from crossing at XC211 Newtown & XC212 Ballycoskery	See above under Ballyhoura Mountains SAC.

Site Name	Distance from Proposed Project	Site Description
Ballinvonear Pond pNHA (Site Code 000012)	3.4km from the crossing at XC215 Shinanagh	The site comprises a field and a small pond which supports the rare Red Data Book species golden dock (*Rumex maritimus*).
Kilcolman Bog pNHA (Site Code 000092)	4.4km from the crossing at XC219 Buttevant	See above under Kilcolman SPA.
Mountrussell Wood pNHA (Site Code 002088)	4.9km from the crossing at XC201 Thomastown	Habitats include wet meadows leading to wet deciduous woodland. Species include willow (*Salix* spp.), alder (*Alnus* spp.) and ash (*Fraxinus excelsior*).
Awbeg Valley (Above Doneraile) pNHA (Site Code 000075)	5.6km from the crossing at XC219Buttevant	See above under Blackwater River (Cork/Waterford) SAC.
Ballyroe Hill & Mortlestown Hill pNHA (002089)	6.7km from the crossing at XC187 Fantstown	Habitats include upland grassland/gorse (*Ulex* spp.) scrub and heath/blanket bog.
Castleoliver Woods pNHA (Site Code 002090)	8.2km from the crossing at XC187 Fantstown	The site consists of a series of long woodland strips. In addition to ash (*Fraxinus excelsior*) and oak (*Quercus* spp.) much of the deciduous population includes non-natives such as sycamore (*Acer pseudoplatanus*), beech (*Fagus sylvatica*) and horse-chestnut (*Aesculus hipposcastanum*).
Glen Bog pNHA (Site Code 001430)	9.5km from the crossing at XC187 Fantstown	See above under Glen Bog SAC.
Ballynacourty Wood pNHA (Site Code 002087)	10.7km from the crossing at XC187 Fantstown	This is a remnant oak (*Quercus* spp.) wood.
Lough Gur pNHA (Site Code 000437)	10.9km from the crossing at Xc187 Fantstown	Two large wetlands are associated with the site, hosts many important species including golden dock (*Rumex maritimus*) and a variety of wetland birds.
Herbertstown Fen pNHA (Site Code 000436)	12.5km from the crossing at XC187 Fantstown	This is a large wet fen supporting wading birds and a wide range of fen plants and habitats.
Carrigeenamronety Hill pNHA (Site Code 002037)	12.9km from the crossing at XC187 Fantstown	See above under Carrigeenamronety Hill SAC.

7.4.2 Description of Habitats for all Sites

Habitats were mapped within a defined area at each crossing point. Habitats recorded across the study area are described below. While considering this information reference should be made to the habitat maps (see Volume 4, Figures 7.5 – Figure 7.10), supporting target notes (TNs) in Appendix 7B and corresponding photographs in Appendix C. Habitat descriptions below are in the past tense, to reflect their accuracy at a point in the recent past (i.e. July/August 2019).

- Fantstown – See Volume 4, Figure 7.5 and Volume 5, Appendix 7B target notes 1 and 2.
- Thomastown – See Volume 4, Figure 7.6 and Volume 5, Appendix 7B target notes 3-7.
- Ballyhay – See Volume 4, Figure 7.7 and Volume 5, Appendix 7B target notes 8-19.
- Newton/Ballycoskery – See Volume 4, Figure 7.8 and Volume 5, Appendix 7B target notes 20-24,
- Shinanagh – See Volume 4, Figure 7.9 and Volume 5, Appendix 7B target notes 25-31.
- Buttevant – See Volume 4, Figure 7.10 and Volume 5, Appendix 7B target notes 32-35.

Habitats within the study area comprised a combination of natural, semi-natural and artificial habitats. The dominant habitats throughout the study area comprised improved agricultural grassland and hedgerows which formed most field boundaries. The habitat types recorded within the study area of the proposed Project, as discussed in this section, are as follows:

- Hedgerows (Wl1);
- Broadleaved woodland (WD1);
- Scrub (WS1);
- Treeline (WL2);
- Depositing lowland rivers (FW2);
- Drainage ditches (FW4);
- Tall Herb Swamps (FS2);
- Dry meadows and grassy verges (GS2);
- Wet grassland (WS4);
- Improved agricultural grassland (GA1);
- Amenity grassland (GA2);
- Building or Artificial (BL3); and
- Stone walls (Bl1).

Hedgerows (WL1)

This habitat type was recorded across the study area of the proposed Project forming the majority of field boundaries. Hedgerows comprised a combination of well-maintained box hedges to those that were overgrown and unmanaged. Hawthorn (*Crataegus monogyna*) was the most dominant hedgerow species recorded within the study area followed by ash (*Fraxinus excelsior*) with occasional elder (*Sambucus nigra*) and willow (Salix spp.). Ground flora associated with hedgerows varied but dominant species comprised ivy (*Hedera helix*), bramble (*Rubus fruticosus agg*.,) cleavers (*Galium aparine*) with occasional hart's-tongue fern (*Asplenium scolopendrum*). Many of the hedgerows were also associated with field ditches. Other ornamental/non-native shrub species were recorded on occasion within hedgerows generally in close proximity to gardens including snowberry (*Symphoricarpos albus*), cotoneaster (*Cotoneaster spp.*), fuchsia (*Fuchsia spp.*) and charry laurel (*Prunus laurocerasus*).

This habitat type is valued as being of Local Importance (Higher Value) as it is not common in the surrounding area, while hedgerows provide an important wildlife corridor for a range of species. This habitat also provides habitat and refuge for nesting birds and small mammals.

Broadleaved woodland (WD1)

This habitat type was scarce throughout the study area only recorded at two locations at XC209 Ballyhay. The first area of woodland was recorded adjacent to the Awbeg River and comprised mixed broadleaved woodland dominated by sycamore (*Acer pseudoplatanus*) with occasional ash (*Fraxinus excelsior*). The understory was sparse comprising willow, ivy and occasional elder. The ground layer was dense and overgrown dominated by nettle and butterbur and occasional ivy and figwort (*Scrophularia nodosa*). The ground flora is indicative of moist, fertile soils. It is likely that the woodland is regularly inundated when the adjacent river floods.

This woodland type is most closely linked to the Irish Vegetation Classification (IVC) community WL2C Ash-Sycamore woodland (*Fraxinus excelsior – Acer pseudoplatanus* woodland). According to the community synopsis[8] this is not considered to be a particularly species rich woodland community[9].

This native woodland habitat is valued as being of Local Importance (Higher Value) as it is not common in the surrounding area.

This second area of woodland within this habitat type comprised an area of alder (*Alnus glutinosa*) plantation woodland at Ballyhay which had an understory dominated by iris (*Iris pseudacorus*) and meadowsweet (*Filipendula ulmaria)* indicating that the ground is somewhat wet for a large proportion of the year.

The plantation woodland is valued as being of Local Importance (Lower Value).

Scrub (WS1)

This habitat type was recorded in relatively small isolated patches across the study area associated with areas of discussed land in close proximity to the railway embankment or railway yard for example at Buttevant this habitat type was associated with a strip of disused land along the railway embankment, here the habitat was dominated by dense bramble scrub, while willow dominated this habitat type at XC209 Ballyhay.

This habitat is valued as being of Local Importance (Higher Value) as it provides habitat and refuge for nesting birds and small mammals.

Treeline (WL2)

Treelines were dominated by ash with occasional sycamore (*Acer pseudoplatanus*). Other occasionally recorded species comprised horse chestnut (*Aesculus hippocastanum*), crab apple (*Malus sylvestris*), hazel (*Corylus avellana*) and willow (*Salix spp*.) the former two species generally forming a scrubby understory to the treelines.

This habitat is valued as being of Local Importance (Higher Value) as it provides habitat and refuge for nesting birds and small mammals.

Depositing lowland rivers (FW2)

Four of the watercourses within the study area fall within this habitat category i.e. the Ahnagluggin Stream (at XC187 Fantstown), the Newton River (at XC212 Ballycoskery), the Pepperhill River (at XC219 Buttevant) and the Awbeg River (at XC219 Buttevant/ XC209 Ballyhay).

The Water Framework Directive (WFD) and water quality values presented for each watercourse were obtained from the Environmental Protection Agency environmental mapper (EPA, 2019). Watercourses with values of: Q5, Q4-5 and Q4 are considered "*Unpolluted*" ("*High*" WFD status); Q3-4 are considered "*Slightly polluted*" ("*Moderate*" WFD status), Q3 or Q2/3 are considered "*Moderately polluted*" ("*Poor*" WFD status) and Q2, Q1/2 or Q1 are considered "*Seriously polluted*" ("*Bad*" WFD status).

This habitat type is valued as being of International Importance due to the presence of the Awbeg River within the study area. This river falls within the River Blackwater (Cork/Waterford) SAC, while the Pepperhill River is a tributary of the Awbeg/ River Blackwater SAC.

Ahnagluggin Stream

This water course is located 10m north of the existing crossing point at XC187 Fantstown. It comprised a narrow (1.5m wide), shallow and slow flowing watercourse, heavily silted at time of survey and with heavily vegetated banks. The watercourse was noted to supporting a small number of stickleback fish at the time of survey (see

[8] http://www.biodiversityireland.ie/wordpress/wp-content/uploads/WL2C.pdf (Accessed December, 2019)
[9] http://www.biodiversityireland.ie/wordpress/wp-content/uploads/WL2C.pdf (Accessed December, 2019)

Volume 5, Appendix 7C, Photograph 1). According to the EPA's latest data this watercourse is of Moderate status (Q3-Q4).

Newton River

This river is located 250m south of the crossing at XC212 Ballycoskery and flows directly into the Awbeg (Buttevant East) River approximately 450m downstream which forms part of the Blackwater (Cork/Waterford) SAC. A ditch at XC212 Ballycoskery is hydrologically linked to the Newton River. This ditch was heavily overgrown and supported the habitat tall herb swamps including the Annex I habitat (6430) Hydrophilous tall herb swamp communities (described below).

Pepperhill River

This ephemeral watercourse was noted to be dry during the initial walkover in June (at the location of the existing bridge at Buttevant). Although wetted in October the watercourse was shallow and slow flowing (see, Volume 5, Appendix 7C, Photograph 20b). The substrate was predominantly a mixture of organic matter and brown earth with little very larger substrates. Flow type was glide and some riffle and run evident (when flowing) and was very overgrown (100% dense scrub cover along the majority of the watercourse). On average the watercourse was approximately 1.5m wide and has been over-deepened. No salmonid or lamprey spawning substrates where present within the section surveyed. Given the ephemeral nature of the watercourse it is not considered suitable to support fish throughout the year, however, the watercourse was considered suitable to support white-clawed crayfish. According to the EPA's latest data this watercourse is of Moderate status (Q3-Q4).

Awbeg River

The Awbeg River was approximately 10m wide at the point it converges with the Pepperhill River. The Pepperhill River was heavily chocked with vegetation at this point (see, Volume 5, Appendix 7C, Photograph 21). The Awbeg River appeared to be relatively deep, although was in high flow on survey day and as such substrate could not be visually assessed. Both banks where heavily vegetated but there was shading from tree canopy. Plantation forest was present along a section of the right bank. Flow type was glide and run. According to the EPA's latest data this watercourse is of Moderate status (Q3-Q4) immediately downstream of the Pepperhill River at XC219 Buttevant, while it is classed as Good (Q4) in the vicinity of the crossing at XC209 Ballyhay.

Drainage ditches (FW4)

Both dry and wet ditches were recorded mainly associated with farmland field boundaries. Most wet or occasionally wet ditches within the study were heavily vegetated. Commonly recorded species included meadowsweet (*Filipendula ulmaria*), yellow iris (*Iris pseudacorus*), nettle and cleavers. The wet ditch at Thomastown supported additional species including fool's-water-cress (*Apium nodiflorum*), great willowherb (*Epilobium hirsutum*), water mint (*Mentha aquatica*) and wild Angelica (*Angelica sylvestris*). This vegetation was noted to support an abundance of invertebrates at time of survey.

This habitat is valued as being of Local Importance (Higher Value) as it provides habitat and refuge for amphibians within the study area.

Tall Herb Swamps (FS2), including the Annex I habitat (6430) Hydrophilous tall herb swamp communities

This habitat was rare within the study area only recorded at one location, namely Ballycoskery (see Volume 4, Figure 7.8 and Volume 5, Appendix 7B and 7C Target Note 21, and Photograph 12). This strip of tall herb swamp habitat was associated with a wet ditch at the base of the existing railway embankment and covered an area of approximately 30m x 3m. Tall-herb swamps are comparatively species-rich stands of herbaceous vegetation that occur in wet areas where the water table is above the ground surface for most of the year.

This habitat supported a variety of species and was dominated by tall herbs such as yellow Iris, meadowsweet, wild Angelica (*Angelica sylvestris*) and great willowherb (*Epilobium hirsutum*) while other smaller vascular plants were recorded including water mint (*Mentha aquatica*), water forget-me-not (*Myosotis scorpioides*) marsh bedstraw

(*Galium palustre*), hoary willowherb (*Epilobium parviflorum*), hemlock water-dropwort (*Oenanthe crocata*) and greater bird's-foot-trefoil (*Lotus pedunculatus*). Common spotted orchid (*Dactylorhiza fuchsia*) was rare within the sward while grasses and sedges were also present in lower densities including reed canary grass (*Phalaris arundinacea*), soft rush (*Juncus effuses*) and sharp-flowered rush (*Juncus acutiflorus*).

Species data collected from this habitat inputted into ERICA (Perrin et al., 2018) showed that this habitat is closely linked to the IVC community FW3F Meadowsweet – Common Reed tall-herb swamp (*Filipendula ulmaria – Phragmites australis tall-herb swamp*) see Volume 5, Appendix 7D. According to the community synopsis[10] this is a species-rich community compared to other swamp types, being transitional to wet grassland. Examples of this vegetation are likely to correspond with EU HD Annex I habitat 6430 Hydrophilous tall herb.

This habitat type is considered to correspond to the Annex I habitat Hydrophilous tall herb (6430) as it supported eight positive indicator species of this Annex I habitat (O'Neill et al., 2013), i.e. *Angelica sylvestris, Epilobium hirsutum, Epilobium parviflorum, Filipendula ulmaria, Galium palustre, Iris pseudacorus, Mentha aquatica, Myosotis scorpioides*

This habitat is valued as being of National Importance. It is a habitat of high conservation concern.

Dry meadows and grassy verges (GS2), including the Annex I habitat (6510) Lowland hay meadows

This habitat type was uncommon within the study area mainly associated with unmanaged grass verges dominated by a variety of grasses and forbs. Frequently recorded grasses comprised false oat-grass (*Arrhenatherum elatius*), cock's-foot (*Dactylis glomerata*), sweet vernal-grass (*Anthoxanthum odoratum*) and Yorkshire fog (*Holcus lanatus*). While commonly recorded forbs comprised creeping cinquefoil (*Potentilla reptans*), clovers (*Trifolium spp.*), common knapweed (*Centaurea nigra*), lady's bedstraw (*Galium verum*), yarrow (*Achillea* millefolium), and wild carrot (*Daucus carota*). Other less commonly recorded species included greater birds-foot-trefoil (*Lotus pedunculatus*) and oxeye daisy (*Leucanthemum vulgare*) while devil's-bit scabious (*Succisa pratensis*) was recorded on one occasion within a grassed verge at XC201 Thomastown.

This habitat (where it is associated with grassy verges) is valued at Local Importance (High Value) as it is uncommon in the wider area and provides habitat for a range of invertebrate and pollinator species.

This habitat type was also recorded within an abandoned/disused area of land immediately adjacent the railway at Buttevant embankment (see Volume 4, Figure 7.10 and Volume 5, Appendix 7B and 7C Target Note 35 and Photographs 19a/19b and 19c). This area of grassland was relatively species rich supporting a variety of grasses and forbs including common knapweed, wild carrot, bird's-foot trefoil, false oat-grass, ribwort plantain (*Plantago lanceolata),* red and white clover, yarrow (*Achillea millefolium),* sweet vernal grass *(Arrhenatherum elatius),* red fescue *(Festuca rubra),* creeping thistle *(Cirsium arvense),* black medic *(Medicago lupulina),* creeping cinquefoil (*Potentilla reptans*) and ox-eye daisy *(Leucanthemum vulgare).* Pyramidal orchid (*Anacamptis pyramidalis)* was also abundant within this area of grassland. Species data collected from the grassland at this location and inputted into ERICA showed that this habitat is closely linked to the IVC community GL3C Red Fescue – Ribwort Plantain grassland (*Festuca rubra – Plantago lanceolata grassland),* see Volume 5, Appendix 7D. According to the community synopsis[11] it is considered to be a community of medium to high species richness to which belong some swards of two EU HD Annex I habitats, the priority habitat 6210 Orchid-rich calcareous grassland*, on the more base-rich soils, and 6510 Lowland hay meadows. Grasslands of these types are important for pollinators. A number of invertebrate species were recorded within this area of grassland including a population of the red-tailed bumblebee (*Bombus lapidarius*) as species which is has near threatened conservation status in Ireland (NBDC, 2016).

This habitat type is considered to correspond to the Annex I habitat Lowland Hay meadows (6510) although it is considered to be a degraded example due to lack of management (grazing or mowing). This habitat supported three high quality positive indicator species (O'Neill et al., 2013) namely *Leucanthemum vulgare, Lotus corniculatus* and *Anacamptis pyramidalis* (any orchid species present is considered a high-quality indicator) and

[10] http://www.biodiversityireland.ie/wordpress/wp-content/uploads/FW3F.pdf (Accessed December, 2019)
[11] http://www.biodiversityireland.ie/wordpress/wp-content/uploads/GL3C-.pdf (Accessed December 2019)

four positive indicator species including *Centaurea nigra, Daucus carota, Plantago lanceolate* and *Trifolium pratense.* However, three negative indicator species *Arrhenatherum elatius, Cirsium arvense and Trifolium repens* were also recorded although in low abundance. The presence of such species is likely a result of the lack of management at the site.

This habitat is valued as being of County to National Importance. It is a habitat of high conservation concern.

Wet grassland (WS4)

This habitat type was recorded at three locations within the study area generally forming in areas of sloping ground or low lying fields for example at XC209 Ballyhay and XC212 Ballycoskery. This habitat was considered to be relatively improved and species poor dominated by yellow iris within the fields at XC212 Ballycoskery, while hard rush (*Juncus inflexus*) and soft rush (*J.effusus*) dominated this habitat at Ballyhay.

This habitat category is valued at Local Importance (Lower Value) due to its species poor and improved nature.

Improved agricultural grassland (GA1)

Improved agricultural grassland was by far the most dominant habitat within the study area. Common grass species present comprised cock's-foot (*Dactylis glomerata*), annual meadow-grass (*Poa annua*), perennial rye-grass (*Lolium perenne*), creeping bent (*Agrostis stolonifera*), rough meadow-grass (*Poa trivialis*) and Yorkshire-fog (*Holcus lanatus*), while forb species present included white clover (*Trifolium repens*), red clover (*Trifolium repens)*, buttercup (*Ranunculus sp.*), creeping thistle (*Cirsium arvense*), dandelion (*Taraxacum spp.*), ribwort plantain (*Plantago lanceolate*) and broad-leaved dock (*Rumex obtusifolius)*. Butterbur (*Petasites hybridus*) and common nettle (*Urtica dioica*) were also recorded within this habitat type but only at Ballyhay in horse grazed field (see Volume 5, Appendix 7C, Photograph 12,).

This habitat category is valued at Local Importance (Lower Value) due to its species poor and improved nature

Amenity grassland (GA2)

This habitat type was infrequent within the study area recorded at two locations associated with mown grassy verges at XC187 Fantstown and an area of amenity grassland next to a housing estate at XC212 Ballycoskery. Grass species present included annual meadow-grass, creeping bent, perennial rye-grass and Yorkshire-fog, along with the following forb species at lesser abundances: broad-leaved dock, daisy, dandelion, ribwort plantain, red clover and white clover.

This habitat category is valued at Local Importance (Lower Value) due to its species poor and improved nature.

Building or Artificial (BL3)

This broad category encompasses roads and other artificial surfaces, farm buildings, houses and associated private gardens, schools etc.

This habitat category is valued at Local Importance (Lower Value).

Stone walls (BL1)

This habitat type was recorded at two locations within the study area including an old stone wall at XC209 Ballyhay on which a hedgerow was growing. Stone walls also formed the boundary between agricultural fields and an abandoned area of land immediately adjacent the railway embankment at XC219 Buttevant.

This habitat type is valued at Local Importance (Higher Value) as it is uncommon within the study area and can provide winter refuge for species such as common lizard.

7.4.3 XC187 Fantstown

As noted in Section 7.7.2 only habitat surveys were undertaken at XC187 Fantstown, no other field surveys were undertaken as part of the assessment.

Site Overview

The crossing point at XC187 Fantstown is located in Co. Limerick, approximately 11km east of Charleville, Co. Cork. The proposed crossing intersects a minor road off the R515. The study area is surrounded predominantly by improved agricultural grassland delineated by hedgerow and scrub. The Ahnagluggin Stream is located within the study area approximately 20m from the existing crossing.

Desk Survey Results

Records of Protected/Rare Flora and Fauna Species

Records of legally protected, rare and/or notable species within 5km are listed in Table 7.10 below.

Table 7.10: Records of Protected, Rare and other Notable Flora & Fauna (data from NPWS & NBDC)

Common Name	Scientific Name	Protection*	Conservation Status**,***
European Eel	*Anguilla*	OSPAR	Critically Endangered
White-Clawed Crayfish	*Austropotamobius pallipes*	HD II/V, WA	Endangered
Smooth Brome	*Bromus racemosus*	None	Rare
Fallow Deer	*Dama*	WA	Least Concern
West European Hedgehog	*Erinaceus europaeus*	WA	Least Concern
Irish Hare	*Lepus timidus hibernicus*	HD V, WA	Least Concern
Otter	*Lutra*	HD II/IV, WA	Near Threatened
Badger	*Meles meles*	WA	Least Concern
Common Pipistrelle	*Pipistrellus pipistrellus*	HD IV, WA	Least Concern
Soprano Pipistrelle	*Pipistrellus pygmaeus*	HD IV, WA	Least Concern
Leisler's Bat	*Nyctalus leisleri*	HD IV, WA	Near Threatened
Common Frog	*Rana temporaria*	HD V, WA	Least Concern
Atlantic Salmon	*Salmo salar*	HD II/V	Vulnerable
Peregrine Falcon	*Falco peregrinus*	BD I, WA	Least Concern (Green)

Notes
* HDII/IV/V = Habitats Directive Annexes II/IV/V; FPO = Flora Protection Order; WA = Wildlife Acts; BD I/II/II = Birds Directive Annexes I/II/III;
** Mammal red-list from Marnell *et al.* 2019; *Birds of Conservation Concern in Ireland* (Colhoun and Cummins 2013);
*** IUCN red list http://www.iucnredlist.org/ - accessed September 2019

7.4.4 XC201 Thomastown

Site Overview

The crossing point at XC201 Thomastown is located in Co. Limerick approximately 3km east of Charleville, Co. Cork. The study area supported a number of habitats of varying ecological value. The proposed crossing is surrounded predominantly by improved agricultural grassland delineated by hedgerows and field ditches.

Desk Survey Results

Records of Protected/Rare Flora and Fauna Species

Records of legally protected, rare and/or notable species within 5km are listed in Table 7.11 below.

Table 7.11: Records of Protected, Rare and other Notable Flora & Fauna (data from NPWS & NBDC)

Common Name	Scientific Name	Protection*	Conservation Status**,***
White-Clawed Crayfish	*Austropotamobius pallipes*	HD II/V, WA	Endangered
Fallow Deer	*Dama*	WA	Least Concern
West European Hedgehog	*Erinaceus europaeus*	WA	Least Concern
Irish Hare	*Lepus timidus hibernicus*	HD V, WA	Least Concern
Otter	*Lutra lutra*	HD II/IV, WA	Near Threatened
Badger	*Meles meles*	WA	Least Concern
Common Pipistrelle	*Pipistrellus pipistrellus*	HD IV, WA	Least Concern
Soprano Pipistrelle	*Pipistrellus pygmaeus*	HD IV, WA	Least Concern

Notes
* HDII/IV/V = Habitats Directive Annexes II/IV/V; FPO = Flora Protection Order; WA = Wildlife Acts; BD I/II/II = Birds Directive Annexes I/II/III;
** Mammal red-list from Marnell *et al.* 2019;
*** IUCN red list http://www.iucnredlist.org/ - accessed September 2019

Field Survey Results

The following section details the findings of the field surveys at Thomastown. All survey metadata is provided in Volume 5, Appendix 7F, Table F2. Species recorded during all surveys and their relevant conservation statuses are provided in Volume 5, Appendix 7F, Table F3.

Rare and protected plant species

No protected plant species listed on the Flora (Protection) Order, 2015 were recorded within the study area.

Invasive species

No non-native invasive plant species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011 were recorded within the study area.

Fauna (other than bats)

Mammals (otter and badger)

No signs of badger, otter or any other protected mammal were recorded during field surveys within the study area.

Mammals (other protected small mammals)

Other protected mammals such as Irish stoat and hedgehog are likely to be present within the study area within the areas of suitable habitat (i.e. agricultural fields bordered by hedgerows, treelines, etc.). Hedgehog have been recorded within 5km of the study area previously.

Small mammals are valued as being of Local Importance (Higher Value).

Amphibians

Juvenile common frog was observed in a section of wet ditch to the south of the study area (see Volume 4, Figure 7.6, Target Note 7 and Volume 5, Appendix 7C Photograph 5b). This species is likely to be widespread throughout the study area associated with wetter areas of fields and ditches. Ditches within the study area were heavily chocked with vegetation and not considered suitable to support breeding smooth newt.

Amphibians are valued as being of Local Importance (Higher Value).

Reptiles (Common Lizard)

Habitats within the study area are not considered suitable to support this species.

Bats

None of the trees (potentially at risk of removal) within the study area at Thomastown were considered to have potential to support roosting bats. However, hedgerows and treelines are considered to provided suitable foraging and commuting habitat for common bat species likely to be present within the study area i.e. common and soprano pipistrelle, Leisler bat. Both common and soprano pipistrelle have been recorded within 5km of the site.

Bats are valued as being of Local Importance (Higher Value).

Breeding Birds

All wild birds, and their nests and eggs, are protected under the Wildlife Acts. Some bird species are also listed on Annex I of the EU Birds Directive. Bird species recorded within the study area are listed in Table 7.12 below.

Birds are valued as being of Local Importance (Higher Value).

Table 7.12: Bird Species Recorded within the Study Area at Thomastown

Common Name/ BoCCI Code	Scientific Name	Conservation Importance		
		BoCCI (B – Breeding / W - Wintering)	Annex I	SCI
Robin (R)	*Erithacus rubecula*	Amber (B)	-	-
Wren (WR)	*Troglodytes troglodytes*	Green (B)	-	-
Swallow (SL)	*Hirundo rustica*	Amber (B)	-	-
Goldfinch (GO)	*Carduelis carduelis*	Green (B)	-	-

Wintering Birds

No wintering bird species were recorded at Thomastown during any of the field surveys. Habitats within the 500m survey buffer were considered suitable for foraging swans i.e. open grassland fields however at the time of surveying grass sward was high (>12cm) in several fields and dominated significantly by dock which may deter foraging swans. Several fields were also considered unsuitable for species such as whooper swan i.e. small in size and bounded by tall dense hedgerows which would potentially deter birds from entering the field.

7.4.5 XC209 Ballyhay

As noted in Section 7.2.4 only habitat surveys were undertaken at XC209 Ballyhay, no other field surveys were undertaken as part of the assessment.

Site Overview

The crossing point at XC209 Ballyhay is located in Co. Cork approximately 2.5km south of Charleville. The crossing is surrounded predominantly by improved agricultural grassland and wet grassland delineated by hedgerows and scrub. The nearest watercourse is the Awbeg (Buttevant East) River, which flows under the road into which new electricity cables will be installed for the CCTV. .

Desk Survey Results

Records of Protected/Rare Flora and Fauna Species

Records of legally protected, rare and/or notable species within 5km are listed in Table 7.13 below.

Table 7.13: Records of Protected, Rare and other Notable Flora & Fauna (data from NPWS & NBDC)

Common Name	Scientific Name	Protection*	Conservation Status**
White-Clawed Crayfish	*Austropotamobius pallipes*	HD II/V, WA	Endangered
Irish Hare	*Lepus timidus hibernicus*	HD V, WA	Least Concern
Otter	*Lutra lutra*	HD II/IV, WA	Near Threatened
Badger	*Meles meles*	WA	Least Concern
Hasselquist's Hyssop	*Entosthodon fascicularis*	None	Least Concern
Golden Dock	*Rumex maritimus*	None	Least Concern
Orange Foxtail	*Alopecurus aequalis*	FPO	Least Concern

Notes
* HDII/IV/V = Habitats Directive Annexes II/IV/V; FPO = Flora Protection Order; WA = Wildlife Acts; BD I/II/II = Birds Directive Annexes I/II/III;
** Mammal red-list from Marnell *et al.* 2019;
*** IUCN red list http://www.iucnredlist.org/ - accessed September 2019

7.4.6 XC211 Newtown & XC212 and Ballycoskery

Site Overview

The crossings at XC211 Newtown and XC212 Ballycoskery are located in Co. Cork approximately 4.3km south of Charleville. At XC212 Ballycoskery the rail line crosses the L1533 and at XC211 Newtown the line crosses a minor road off the L1533. The proposed crossing is surrounded predominantly by agricultural and amenity grassland delineated by hedgerow, scrub and treelines. There is a housing estate immediately north of the XC212 Ballycoskery crossing. The crossing at XC212 Ballycoskery is located 250m north of the Newton River which flows directly into the Awbeg (Buttevant East) River approximately 450m downstream and forms part of the Blackwater (Cork/Waterford) SAC. A ditch within the study area is hydrologically linked to the Newton River providing a direct link to the SAC.

Desk Survey Results

Records of Protected/Rare Flora and Fauna Species

Records of legally protected, rare and/or notable species within 5km are listed in Table 7.14 below.

Table 7.14: Records of Protected, Rare and other Notable Flora & Fauna (data from NPWS & NBDC)

Common Name	Scientific Name	Protection*	Conservation Status**
White-Clawed Crayfish	*Austropotamobius pallipes*	HD II/V, WA	Endangered
Irish Hare	*Lepus timidus hibernicus*	HD V, WA	Least Concern
Fallow Deer	*Dama dama*	WA	Least Concern
Otter	*Lutra lutra*	HD II/IV, WA	Near Threatened
Badger	*Meles meles*	WA	Least Concern
Stoat	*Mustela erminea*	WA	Least Concern
Common Frog	*Rana temporaria*	HD V, WA	Least Concern
Sea Lamprey	*Petromyzon marinus*	HD II, Bern III	Least Concern

Common Name	Scientific Name	Protection*	Conservation Status**
Curlew	*Numenius arquata*	BD II(II)	Near Threatened (Red)
Kingfisher	*Alcedo atthis*	BD I	Least Concern (Green)
Teal	*Anas crecca*	BD II/III	Least Concern (Amber)
Hasselquist's Hyssop	*Entosthodon fascicularis*	None	Least Concern
Golden Dock	*Rumex maritimus*	None	Least Concern
Orange Foxtail	*Alopecurus aequalis*	FPO	Least Concern

Notes
* HDII/IV/V = Habitats Directive Annexes II/IV/V; FPO = Flora Protection Order; WA = Wildlife Acts; BD I/II/II = Birds Directive Annexes I/II/III;
** Mammal red-list from Marnell *et al.* 2019; Bird red-list from *Birds of Conservation Concern in Ireland* (Colhoun and Cummins 2013);
*** IUCN red list http://www.iucnredlist.org/ - accessed September 2019

Field Survey Results

The following section details the findings of the field surveys at XC212 Ballycoskery and XC211 Newtown. All survey metadata is provided in Volume 5, Appendix 7F, Table F2. Species recorded during all surveys and their relevant conservation statuses are provided in Volume 5, Appendix 7F, Table F3. The Annex I habitat (6430) Hydrophilous tall herb swamp communities was recorded at Ballycoskery. Further detail on this habitat can be found in Section 7.4.2.

Rare and protected plant species

No protected plant species listed on the Flora (Protection) Order, 2015 were recorded within the study area.

Invasive species

No non-native invasive plant species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011 were recorded within the study area.

Fauna (other than bats)

Mammals (otter and badger)

No signs of badger, otter or any other protected mammal were recorded during field surveys within the study area.

Mammals (other protected small mammals)

Other protected mammals such as the Irish stoat and hedgehog are likely to be present within the study area within the areas of suitable habitat (i.e. agricultural fields bordered by hedgerows, treelines, etc.).

Small mammals are valued as being of Local Importance (Higher Value).

Amphibians

Frog spawn was recorded during nocturnal newt surveys within a pond at Newtown. Habitats within the study area are considered suitable to support common frog and smooth newt, in particular the wet fields west of the existing crossing point at XC212 Ballycoskery and within a pond at XC211 Newtown.

Amphibians are valued as being of Local Importance (Higher Value).

Reptiles (Common Lizard)

Habitats within the study area are not considered suitable to support this species.

Fish (Lamprey, Atlantic salmon, European eel) within the Awbeg River

The study area is hydrologically linked to the Blackwater (Cork/Waterford) SAC via the Newton River. The SAC is designated for a number of aquatic species including all three lamprey species and Atlantic salmon. European eel has also been recorded within the river and may be present in Newtown River. Newtown River is not likely support significant numbers of fish given its size.

Atlantic salmon

The freshwater stretch of the Blackwater is a designated salmonid river. Whilst the Awbeg River is not as well known for salmon fishing as the Blackwater, salmon ranging from 5cm to 13.6cm in length were caught on the Awbeg River in 2009 (Central and Regional Fisheries Board, 2009).

Lamprey spp.

Sea lamprey (*Petromyzon marinus*) is known to be present within the main Blackwater and to have spawning sites on the Blackwater at several locations downstream of the Awbeg-Blackwater confluence (NPWS, 2012). Sea lamprey redds were identified by King and Linnane (2004) at numerous locations within the main channel of the Blackwater with several of these downstream of the Awbeg-Blackwater confluence. River lamprey (*Lampetra fluviatilis)* were also recorded at four locations on the Awbeg during electrofishing surveys undertaken by King and Linnane (2004).

European eel

European eel has been recorded in the Awbeg River (Central and Regional Fisheries Board, 2009). This species can be found in all watercourses to which they have access and are therefore assumed to be present in the Newton River.

Fish within the River Awbeg are valued as being of International Importance.

Bats

One building and one tree were assessed as having PRFs within the study area (see Volume 4, Figure 7.1). The tree was assessed as having moderate potential to support a bat roost with one main feature identified on the tree limb (see Volume 5, Appendix 7B Target Note 20, Appendix 7C and Photograph 13,). The tree was a mature ash within a treeline assessed as suitable foraging and commuting habitat for bats. The building was assessed as having high bat roost potential see Volume 5, Appendix 7B, Target Note 22, and Appendix 7C, Photograph 15). Potential roost features providing potential exit/ingress points for bats within the building included raised lead flashing around the chimney breast (eastern side), gaps in soffit board and missing/lose tiles both south-eastern end of building. The building was well lit on the main roadside offering less potential for bats to roost on this side of building.

Bat Activity (Roost Surveys)

A summary of the bat survey results is presented in Volume 5, Appendix 7E. No bat roosts were identified within the building or the tree surveyed. However, three bat species were recorded within the study area during the surveys including:

- Common pipistrelle;
- Soprano pipistrelle; and
- Leisler's.

Bat foraging activity was relatively constant along the treeline. Common pipistrelle, soprano pipistrelle and Leisler's were all recorded commuting and/or foraging along the treeline. All three species were also recorded by the surveyors located at the building. However, there was more bat activity at the south-eastern corner of the building in comparison to the north-western corner. The southern/eastern side of the building was not lit while

the north-western corner of the building was well lit by streetlights. It is likely that these tree species are widespread within the study area.

All bat species are valued as being of Local Importance (Higher Value).

Breeding Birds

All wild birds, and their nests and eggs, are protected under the Wildlife Acts. Some bird species are also listed on Annex I of the EU Birds Directive. Bird species recorded within the study area are listed in Table 7.15 below.

Birds are valued as being of Local Importance (Higher Value).

Table 7.15: Bird Species Recorded within the Study Area at Ballycoskery and Newtown

Common Name/ BoCCI Code	Scientific Name	Conservation Importance		
		BoCCI (B – Breeding / W - Wintering)	Annex I	SCI
Wren (WR)	*Troglodytes troglodytes*	Green (B)	-	-
House Martin (HM)	*Delichon urbica*	Amber (B)	-	-
Swallow (SL)	*Hirundo rustica*	Amber (B)	-	-
Goldfinch (GO)	*Carduelis carduelis*	Green (B)	-	-
Jackdaw (JD)	*Coloeus monedula*	Green (B)	-	-
Willow Warbler (WW)	*Phylloscopus trochilus*	Green (B)	-	-

Invertebrates

Freshwater pearl mussel

Freshwater pearl mussel (*Margaritifera margaritifera*) is known to occur within the Blackwater (Cork/Waterford) SAC approximately 34km downstream of the study area (NPWS, 2012).

Freshwater pearl mussels are valued as being of International Importance.

White-clawed crayfish

White-clawed crayfish have been recorded approximately 2km downstream of the study area within the main channel of the Awbeg River.

White-clawed crayfish are valued as being of International Importance

Wintering Birds

No wintering bird species were recorded at XC211 Newtown or XC212 Ballycoskery during any of the field surveys. Habitats within the 500m survey buffer were considered sub-optimal for foraging swans i.e. small in size and bounded by treelines which would potentially deter birds from entering the fields. Five whooper swans were recorded approximately 600m from the XC212 Ballycoskery survey buffer foraging in grassland on 03.03.20. These birds may be associated with the disused mine located north of the field where swans were previously recorded. An incidental record of a moorhen (*Allinula chloropus*) and mallard (*Anas platyrhynchos*) was recorded within the pond at Newtown in February and March 2020 during nocturnal newt surveys. One pair of barn owl (*Tyto alba*) was also recorded at Newtown on 03.03.20 during a nocturnal newt survey flying north and territorial calling approximately 20m high.

7.4.7 XC215 Shinanagh

Site Overview

The site at XC215 Shinanagh (hereafter referred to as the proposed crossing) is located in Co. Cork approximately 7km south of Charleville. The proposed crossing is on the Dublin to Cork rail line where the line meets the crossroads of the N20 and the L1320. The proposed crossing is surrounded predominantly by agricultural and amenity grassland delineated by hedgerow and scrub. The closest watercourse is the Awbeg (Buttevant), located approximately 400m of the proposed crossing. Under the WFD this river is classified as of Poor status and at risk.

Desk Survey Results

Records of Protected/Rare Flora and Fauna Species

Records of legally protected, rare and/or notable species within 5km are listed in Table 7.16 below.

Table 7.16: Records of Protected, Rare and other Notable Flora & Fauna (data from NPWS & NBDC)

Common Name	Scientific Name	Protection*	Conservation Status**,***
White-Clawed Crayfish	*Austropotamobius pallipes*	HD II/V, WA	Endangered
Irish Hare	*Lepus timidus hibernicus*	HD V, WA	Least Concern
Fallow Deer	*Dama dama*	WA	Least Concern
Otter	*Lutra lutra*	HD II/IV, WA	Near Threatened
Badger	*Meles meles*	WA	Least Concern
Stoat	*Mustela erminea*	WA	Least Concern
Brown Long-Eared bat	*Plecotus auritus*	HD IV, WA	Least Concern
Common Frog	*Rana temporaria*	HD V, WA	Least Concern
Sea Lamprey	*Petromyzon marinus*	HD II, Bern III	Least Concern
Whooper Swan	*Cygnus cygnus*	BD I, WA	Least Concern (Amber)
Japanese Knotweed	*Reynoutria japonica*	None	Invasive Species
Hasselquist's Hyssop	*Entosthodon fascicularis*	None	Least Concern
Golden Dock	*Rumex maritimus*	None	Least Concern
Orange Foxtail	*Alopecurus aequalis*	FPO	Least Concern

Notes
* HDII/IV/V = Habitats Directive Annexes II/IV/V; FPO = Flora Protection Order; WA = Wildlife Acts; BD I/II/II = Birds Directive Annexes I/II/III;
** Mammal red-list from Marnell *et al.* 2019; *Birds of Conservation Concern in Ireland* (Colhoun and Cummins 2013);
*** IUCN red list http://www.iucnredlist.org/ - accessed September 2019

Field Survey Results

The following section details the findings of the field surveys at Shinanagh. All survey metadata is provided in Volume 5, Appendix 7F, Table F2. Species recorded during all surveys and their relevant conservation statuses are provided in Appendix 7F, Table F3.

Rare and protected plant species

No protected plant species listed on the Flora (Protection) Order, 2015 were recorded within the study area.

Invasive species

One non-native invasive plant species was recorded within the study area. This comprised a number of stands of Japanese knotweed (*Reynoutria japonica*) along a minor existing road off the N20 (see Volume 4, Figure 7.9 and Volume 5, Appendix 7B Target Note 31,). This was noted to be undergoing treatment at the time of survey. However, some areas of fresh growth (see Volume 5, Appendix 7C Photograph 17b,) were noted at the southern end of the road.

Fauna (other than bats)

Mammals (otter and badger)

No signs of otter were recorded within the study area. However, badger signs in the form of a badger latrine were recorded within the study area (see Volume 4, Figure 7.9 and Volume 5, Appendix 7B, Target Note 27,). Although this confirms that badgers are present within the study area no setts were identified.

Badger are valued as being of Local Importance (Higher Value).

Mammals (other protected small mammals)

Other protected mammals such as the Irish stoat and hedgehog are likely to be present within the study area within the areas of suitable habitat (i.e. agricultural fields bordered by hedgerows, treelines, etc.). Stoat have been recorded within 5km of the study area previously.

Small mammals are valued as being of Local Importance (Higher Value).

Amphibians

There are records of common frog within 5km of the study area. Although no amphibians were recorded during the field surveys habitats within the study area are considered suitable to support amphibians. Common frog in particular is likely to utilise seasonally wet ditches within the study area.

Amphibians are valued as being of Local Importance (Higher Value).

Reptiles (Common Lizard)

There are no records of common lizard within or in close proximity to the study area. Habitats within the study area are not considered suitable to support this species.

Bats

None of the trees (potentially ask risk of removal) within the study area at Shinanagh were considered to have potential to support roosting bats. However, hedgerows and treelines are considered to provided suitable foraging and commuting habitat for common bat species likely to be present within the study area i.e. common and soprano pipistrelle, Leisler bat. Brown long-eared bat (*Plecotus auratus*) have also been recorded within 5km of the study area.

A derelict building next to the existing crossing was considered to have high potential to support a bat roost (see Volume 5, Appendix 7B, Target Note 25. The building had numerous features providing potential entry/exit points for bats including gaps under facia board, raised lead flashing. Old bat droppings were recorded on the windowsill of this building. This building will not be affected as part of the proposals; therefore emergence/re-entry surveys were not undertaken on this building.

Bats are valued as being of Local Importance (Higher Value).

Breeding Birds

All wild birds, and their nests and eggs, are protected under the Wildlife Acts. Some bird species are also listed on Annex I of the EU Birds Directive. Bird species recorded within the study area are listed in Table 7.17 below.

Birds are valued as being of Local Importance (Higher Value).

Table 7.17: Bird Species Recorded within the Study Area at Shinanagh

Common Name/ BoCCI Code	Scientific Name	Conservation Importance		
		BoCCI (B – Breeding / W - Wintering)	Annex I	SCI
Wren (WR)	*Troglodytes troglodytes*	Green (B)	-	-
Willow Warbler (WW)	*Phylloscopus trochilus*	Green (B)	-	-
Robin (R)	*Erithacus rubecula*	Amber (B)	-	-
House Martin (HM)	*Delichon urbica*	Amber (B)	-	-
Blackbird (B.)	*Turdus merula*	Green (B)	-	-
Chaffinch (CH)	*Fringilla coelebs*	Green (B)	-	-
Goldcrest (GC)	*Regulus regulus*	Green (B)	-	-
Great Tit (GT)	*Parus major*	Green (B)	-	-
Starling (SG)	*Sturnus vulgaris*	Amber (B)	-	-
Song Thrush (ST)	*Turdus philomelos*	Green (B)	-	-
Hooded Crow (HC)	*Corvus cornix*	Green (B)	-	-
Woodpigeon (WP)	*Columba palumbus*	Green (B)	-	-

Wintering Birds

No wintering bird species were recorded at XC215 Shinanagh during any of the field surveys. Habitats within the 500m survey buffer were considered suitable for foraging swans i.e. large, flat open grassland fields.

7.4.8 XC219 Buttevant

Site Overview

The crossing is located 1km from the town of Buttevant in Co. Cork and approximately 12km south of Charleville. The proposed crossing intersects the R522 (Station Road). The proposed crossing is surrounded predominantly by agricultural grassland delineated by hedgerows and scrub. The nearest watercourse is the Pepperhill River located approximately 20m north of the existing crossing. The Pepperhill River flows directly into the Awbeg River (Buttevant) 240m downstream. The Awbeg River is within the Blackwater River (Cork/Waterford) SAC. XC219 Buttevant is located approximately 4.3km from Kilcolman Bog SPA.

Desk Survey Results

Records of Protected/Rare Flora and Fauna Species

Records of legally protected, rare and/or notable species within 5km are listed in Table 7.18 below.

Table 7.18: Records of Protected, Rare and other Notable Flora & Fauna (data from NPWS & NBDC)

Common Name	Scientific Name	Protection*	Conservation Status**,***
White-Clawed Crayfish	*Austropotamobius pallipes*	HD II/V, WA	Endangered
Irish Hare	*Lepus timidus hibernicus*	HD V, WA	Least Concern
Fallow Deer	*Dama dama*	WA	Least Concern
Otter	*Lutra lutra*	HD II/IV, WA	Near Threatened
Badger	*Meles meles*	WA	Least Concern
Hedgehog	*Erinaceus europaeus*	WA	Least Concern
Leisler's Bat	*Nyctalus leisleri*	HD IV, WA	Near Threatened
Common Frog	*Rana temporaria*	HD V, WA	Least Concern
Smooth Newt	*Lissotriton vulgaris*	WA	Least Concern
Kingfisher	*Alcedo atthis*	BD I, WA	Least Concern (Amber)
Barn Owl	*Tyto alba*	WA	Least Concern (Red)
Teal	*Anas crecca*	BD II/III, WA	Least Concern (Amber)
Northern Shoveler	*Anas clypeata*	BD II/III	Least Concern (Red)
Hasselquist's Hyssop	*Entosthodon fascicularis*	None	Least Concern
Golden Dock	*Rumex maritimus*	None	Least Concern
Orange Foxtail	*Alopecurus aequalis*	FPO	Least Concern
Killarney Fern	*Trichomanes speciosum*	HD II/IV FPO	Least Concern

Notes
* HDII/IV/V = Habitats Directive Annexes II/IV/V; FPO = Flora Protection Order; WA = Wildlife Acts; BD I/II/II = Birds Directive Annexes I/II/III;
** *Birds of Conservation Concern in Ireland* (Colhoun and Cummins 2013);
*** IUCN red list http://www.iucnredlist.org/ - accessed September 2019

Field Survey Results

The following section details the findings of the field surveys at XC219 Buttevant. All survey metadata is provided in Volume 5, Appendix 7F, Table F2. Species recorded during all surveys and their relevant conservation statuses are provided in Volume 5, Appendix 7F, Table F3. The Annex I habitat (6510) Lowland hay meadows was recorded at Buttevant. Further detail on this habitat can be habitat in Section 7.4.2.

Rare and protected plant species

No protected plant species listed on the Flora (Protection) Order, 2015 were recorded within the study area.

Invasive species

No non-native invasive plant species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011 were recorded within the study area.

Fauna (other than bats)

Mammals (otter and badger)

No signs of badger were recorded within the study area. However, otter signs in the form of footprints were recorded under the bridge west of the crossing point (see Volume 4, Figure 7.10 and Volume 5, Appendix 7B, Target Note 36, and Appendix 7C Photograph 20b,). Although this confirms that otters are present within the

study no resting sites (holts) were identified. Otter are a qualifying interest species of the SAC located 240m downstream of this point.

Otter are valued as being of International Importance.

Mammals (other protected small mammals)

Other protected mammals such as the Irish stoat and hedgehog are likely to be present within the study area within the areas of suitable habitat (i.e. agricultural fields bordered by hedgerows, treelines, etc.). Hedgehog have been recorded within 5km of the study area previously.

Small mammals are valued as being of Local Importance (Higher Value).

Amphibians

There are records of common frog and smooth newt within 5km of the study area. Although no amphibians were recorded during the field surveys habitats within the study area are considered suitable to support amphibians. Within the study area the Pepperhill River was heavily shaded making it unsuitable for smooth newt. However, immediately upstream of the of the study area this watercourse was considered suitable to support both common frog and smooth newt due to the slow flowing open nature of the watercourse at this point.

Amphibians are valued as being of Local Importance (Higher Value).

Reptiles (Common Lizard)

There are no records of common lizard within or in close proximity to the study area. However, suitable breeding (scrub) and hibernation (stonewalls) habitat for this species was identified within the study area.

Reptiles are valued as being of Local Importance (Higher Value).

Fish (Lamprey, Atlantic salmon) within the Awbeg River

The study area is hydrologically linked to the Blackwater (Cork/Waterford) SAC via the Pepperhill River at XC219 Buttevant. The SAC is designated for a number of aquatic species including lamprey, salmon and freshwater pearl mussel.

Atlantic salmon

The freshwater stretch of the Blackwater is a designated salmonid river. Whilst the Awbeg River is not as well known for salmon fishing as the Blackwater, salmon ranging from 5cm to 13.6cm in length were caught on the Awbeg in 2009 (Central and Regional Fisheries Board, 2009).

Lamprey spp.

Sea lamprey are known to be present within the main Blackwater and to have spawning sites on the Blackwater at several locations downstream of the Awbeg-Blackwater confluence (NPWS, 2012). Sea lamprey redds were identified by King and Linnane (2004) at numerous locations within the main channel of the Blackwater with several of these downstream of the Awbeg-Blackwater confluence. River lampreys were also recorded at four locations on the Awbeg River during electrofishing surveys undertaken by King and Linnane (2004).

Fish within the River Awbeg are valued as being of International Importance.

Bats

Two buildings within the study area were assessed as having PRFs (see Volume 4, Figure 7.2). A large stone building / shed was assessed as having high bat roost potential. There was partial roof collapse and the building was open on the southern end. However, the building supported numerous features that could be used by bats

including gaps under the windowsill within the building. There was also another small derelict building adjacent to the large stone shed with moderate potential to support bats (see Volume 5, Appendix 7B, Target Notes 33 and 34, and Appendix 7C Photographs 18a and 18b). Features with potential to support bats comprised broken and raised tiles, gaps under ridge tiles and gaps in chimney. The western face of building was well lit at night potentially making this side of the building less suitable for roosting bats.

Bat Activity (Roost Surveys)

A summary of the bat survey results is presented in Volume 5, Appendix 7E. No bat roosts were identified within the buildings surveyed. However, four bat species were recorded within the study area during the surveys including:

- Common pipistrelle;
- Soprano pipistrelle;
- Leisler; and
- Daubenton's (*Myotis daubentonii*).

Bat activity was relatively constant throughout the dusk and dawn emergence / re-entry surveys. At the large stone building (see Volume 4, Figure 7.2, Building 2) common pipistrelle and soprano pipistrelle were the most frequently recorded species, with occasional passes of Leisler's. One surveyor was located inside the building. Although bats were not recorded roosting in the building, they were recorded foraging inside the building; with bats seen entering and exiting through the open southern end. A soprano pipistrelle was recorded foraging inside the building for most of the night during one of the surveys. There was very little activity along the hedgerow to the east of this building. No bats were recorded roosting in the smaller building (see Volume 4, Figure 7.2, Building 1).

Both Leisler and Daubenton's bat were recorded during the surveys in addition to common and soprano pipistrelles. Suitable Daubenton's foraging habitat is provided by the Awvbeg River close to the crossing point.

Bats are valued as being of Local Importance (Higher Value).

Breeding Birds

All wild birds, and their nests and eggs, are protected under the Wildlife Acts. Some bird species are also listed on Annex I of the EU Birds Directive. Bird species recorded within the study area are listed in Table 7.19 below.

Birds are valued as being of Local Importance (Higher Value).

Table 7.19: Bird Species Recorded within the Study Area at Buttevant

Common Name/ BoCCI Code	Scientific Name	Conservation Importance		
		BoCCI (B – Breeding / W - Wintering)	Annex I	SCI
Wren (WR)	*Troglodytes troglodytes*	Green (B)	-	-
Swallow (SL)	Hirundo rustica	Amber (B)	-	-
Robin (R)	*Erithacus rubecula*	Amber (B)	-	-
House Sparrow (HS)	*Passer domesticus*	Amber (B)	-	-
Swift (SI)	*Apus apus*	Amber (B)	-	-
Blackbird (B)	*Turdus merula*	Green (B)	-	-

Wintering Birds

Sixteen whooper swans representing 12% of Kilcolman Bog SPA population (based on the I-WeBS baseline population) were recorded approximately 300m north of the proposed crossing alignment at XC219 Buttevant on 3 and 4 of March. All birds were recorded foraging in a flooded grassland field north of the Awbeg River. This was the only record of whooper swan in close proximity to any of the proposed level crossings sites. Three mute swans (*Cygnus olor*) recorded foraging within the 500m buffer at XC219 Buttevant approximately 350m from the proposed Project on 03.03.20. Little egret (*Egretta garzetta*), grey heron (*Ardea cinerea*) and mallard were recorded foraging in flooded fields within the 500m study area. Bird species recorded within the study area during the wintering bird surveys are listed in Table 7.20 below

Whooper swan are valued as being of International Importance, little egret is considered of county importance whilst grey heron, mallard and mute swan are considered of local importance (Higher value).

Table 7.20: Bird Species Recorded within the Study Area at XC219 Buttevant during the wintering bird surveys

Common Name/ BoCCI Code	Scientific Name	Conservation Importance		
		BoCCI (B – Breeding / W - Wintering)	Annex I	SCI
Little egret (ET)	*Egretta garzetta*	Green (W)	Yes	-
Grey Heron (H.)	*Ardea cinerea*	Green (B/W)	-	-
Mallard (MA)	*Anas platyrhynchos*	Green (W)	-	-
Mute Swan (MS)	*Cygnus olor*	Amber (B/W)	-	-
Whooper Swan (WS)	*Cygnus cygnus*	Amber (W)	Yes	Yes

Invertebrates

Freshwater pearl mussel

Freshwater pearl mussels are known to occur within the Blackwater (Cork/Waterford) SAC approximately 24km downstream of the study area (NPWS, 2012).

Freshwater pearl mussels are valued as being of International Importance.

White-clawed crayfish

White-clawed crayfish have been recorded approximately 2km downstream of the study area within the main channel of the Awbeg River. They are a qualifying interest species of the Blackwater (Cork/Waterford) SAC. The Pepperhill River is considered to provide suitable habitat for this species (see Volume 5, Appendix 7B, Target Note 36, and Appendix 7C, Photograph 21,).

White-clawed crayfish are valued as being of International Importance.

7.5 Summary Ecological Valuation and Identification of Key Ecological Receptors

Table 7.20 below summarises the ecological evaluation of all receptors taking into consideration legal protection, conservation status and local abundance. Species, habitats and features not qualifying as Key Ecological Receptors (KERs) are not subjected to impact assessment. This is in line with current best practice of assessing the impacts on what are determined to be important ecological or biodiversity features. These features are highlighted in grey in the table. All KERs are subject to impact assessment.

All designated areas for nature conservation that lie within the ZoI of the proposed Project are considered to be KERs given that they are sites selected specifically for biodiversity conservation and are potentially at risk of

impacts from the proposed Project. Those designated areas for nature conservation that lie beyond the ZoI of the proposed Project are not considered to be at risk of impact and are therefore, not considered to be KERs.

In all cases, habitat and species valued as being of Local Importance (Higher Value), or higher, are considered to be KERs as they are important contributors to the local biodiversity resource and are of conservation concern, at least locally. Habitats valued as being of a Local Importance (Lower Value) are not considered to be KERs in this assessment. This is not to say that they are of no biodiversity value, but that impacts on these habitat types in their local context are not likely to result in a significant effect on biodiversity. It should be noted that this relates to the impact on the habitat itself as distinct from considering the role these habitat types play in supporting KER fauna species – impacts of the proposed Project in that sense are captured and assessed under the relevant species' headings in Section 7.7.

These lower biodiversity value habitats tend to comprise built, heavily modified or artificially created habitats (*e.g.* WS4, GA1, GA2, BL3, WD1). These habitat types tend to be associated with residential, commercial or industrial development, roads and highly managed amenity areas. It also includes grassland habitats that are relatively species poor and improved. Plantation woodland is also included (WD1) as this habitat forms a monoculture of single age, immature trees which are considered to be of low ecological value.

Non-native invasive plant species are not considered as KERs, as they can result in negative effects on biodiversity and it is in that context they are included within the impact assessment.Table 7.21: Ecological Evaluation and Identification of KERs

Ecological Receptor	Ecological Valuation	KER
Designated Areas for Nature Conservation		
Blackwater River (Cork/Waterford) SAC	International Importance	Yes
Kilcolman Bog SPA	International Importance	Yes
Eagle Lough pNHA	National Importance	No
Ballyhoura Mountains pNHA	National Importance	No
Ballinvonear Pond pNHA	National Importance	No
Kilcolman Bog pNHA	National Importance	Yes
Mountrussell Wood pNHA	National Importance	No
Awbeg Valley (Above Doneraile) pNHA	National Importance	No
Ballyroe Hill & Mortlestown Hill pNHA	National Importance	No
Castleoliver Woods pNHA	National Importance	No
Glen Bog pNHA	National Importance	No
Ballynacourty Wood pNHA	National Importance	No
Lough Gur pNHA	National Importance	No
Herbertstown Fen pNHA	National Importance	No
Carrigeenamronety Hill pNHA	National Importance	No
Habitats (outside of designated areas)		
Hedgerows (Wl1)	Local Importance (Higher Value)	Yes
Broadleaved woodland (WD1) - Ash-Sycamore woodland (WL2C)	Local Importance (Higher Value)	Yes
Broadleaved woodland (WD1) – Alder plantation woodland	Local Importance (Lower Value)	No
Scrub (WS1)	Local Importance (Higher Value)	Yes
Treeline (WL2)	Local Importance (Higher Value)	Yes
Depositing lowland rivers (FW2)	International Importance – connection to the River Blackwater (Cork/Waterford) SAC	Yes
Drainage ditches (FW4)	Local Importance (Higher Value)	Yes
Drainage ditches (FW4) – supporting tall herb swamps (FS2).	National Importance (only those supporting Tall Herb Swamps, see below)	Yes

Ecological Receptor	Ecological Valuation	KER
Tall Herb Swamps (FS2) - including the Annex I habitat 6430 Hydrophilous tall herb swap	National Importance	Yes
Dry meadows and grassy verges (GS2) - including 6510 lowland hay meadows	County to National Importance	Yes
Dry meadows and grassy verges (GS2)	Local Importance (Higher Value)	Yes
Wet grassland (WS4)	Local Importance (Lower Value)	No
Improved agricultural grassland (GA1)	Local Importance (Lower Value)	No
Amenity grassland (GA2)	Local Importance (Lower Value)	No
Building or Artificial (BL3)	Local Importance (Lower Value)	No
Stone walls (Bl1)	Local Importance (Higher Value)	Yes
Flora Species		
Non-native invasive plant species	N/A	No
Fauna Species		
Otter	International Importance	Yes
Bats	Local Importance (Higher Value)	Yes
Badger	Local Importance (Higher Value)	Yes
Other small mammal species protected under the Wildlife Acts	Local Importance (Higher Value)	Yes
White-clawed crayfish	International Importance	Yes
SCI bird species	International Importance	Yes
All other Red, Amber or Green listed bird species (non-SCI breeding populations)	Local Importance (Higher Value)	Yes
Smooth newt	Local Importance (Higher Value)	Yes
Common frog	Local Importance (Higher Value)	Yes
Common lizard	Local Importance (Higher Value)	Yes
Atlantic salmon	International Importance	Yes
Freshwater pearl mussel	International Importance	Yes
Lamprey spp.	International Importance	Yes

7.6 Potential Effects of the proposed Project

A full description of the proposed Project is presented in Volume 2, Chapter 3: Project Description. Potential impacts associated with the proposed Project are likely to include;

- Direct habitat loss - vegetation removal associated with land take including earth banks, removal of mature trees and scrub;
- Mortality – of protected species associated with vegetation removal and construction activities;
- Disturbance – associated with works in the vicinity of retained habitats, for example impacting foraging/roosting SCI birds; and
- Pollution of watercourses – associated with contaminated surface water run-off and sediment during site clearance/construction works impact on sensitive aquatic receptors.

The predicted impacts on KERs during the Construction Phase and Operational Phase are discussed below. As per the relevant guidelines, likely significant effects have only been assessed for KER as listed in Table 7.20 above. An impact is considered to be ecologically significant if it is predicted to affect the integrity or conservation status of a KER at a specified geographical scale. All impacts are described in the absence of mitigation.

7.6.1 Impacts to Designated Sites

The Natura Impact Statement (NIS), included in Volume 5, Appendix 7H, has identified two European sites for which there is a potential source-pathway-receptor between it and the proposed Project (see Table 7.7): River Blackwater (Cork/Waterford) SAC and Kilcolman Bog SPA. These two sites have also been highlighted as KERs in Table 7.10above. In addition to these European sites, there is one nationally designated site considered to be a KER: Kilcolman Bog pNHA. The potential for effects to the other designated sites have been ruled out due to the lack of a viable source-pathway-receptor.

Although the proposed Project as a whole has the potential to impact on designated sites only certain elements of the proposed Project (e.g. works at certain crossing points) are linked to these designated sites via a source-pathway-receptor, this is discussed further under each crossing point below.

7.6.2 XC187 Fantstown

Do Nothing

No land is proposed for development at this location. Where the road is to be closed the land is within the extent of Irish Rail ownership. If the proposed Project was not progressed it is likely that there would be little change to the existing environment. **Construction Phase**

Option is for closure of the public right of way across the level crossing. Road users would be diverted to the east to an existing road-over-rail bridge. No effects predicted.

Operational Phase

Option is for closure of the public right of way across the level crossing. Road users would be diverted to the east to an existing road-over-rail bridge. No effects predicted.

7.6.3 XC201 Thomastown

Do Nothing

The majority of land proposed for development is currently managed as agricultural land. If the proposed Project was not progressed it is likely that there would be little change to the existing environment, and it is likely it would continue to be used for agricultural purposes and remain in this current managed state.

Construction Phase

Designated Sites

The proposed Project at XC201 Thomastown are not hydrologically linked to any designed site, while the closest designated site is located over 4.5km away. No SCI species of Kilcolman Bog SPA were recorded within XC201 Thomastown. Therefore, there are no predicted effects for designated sites in relation to works proposed at this crossing point.

Fauna (other than bats)

Small mammals

Site clearance during construction works is unlikely to result in any significant level of mortality to the larger and more mobile species such as stoat (if present). However, it is probable that vegetation clearance may result in mortality to the smaller mammals such as pygmy shrew if present. The potential effect would be expected to be greater during the breeding season when juveniles would be present in burrows (April-October), or in the case of hedgehog, impacts may be greater during their hibernation period which is November – March (inclusive). Impacts on these mammal species will be short-term during construction works.

Site clearance works proposed at this crossing point would likely result in a significant effect on the small mammal population at a local geographic scale.

Amphibians

Common frog is the only amphibian species that was recorded within the study area, associated with wet ditches to the south of the study area. It is possible that any of the ditches within the study area could be used by this species at the time of construction. If site clearance is undertaken during a period when the breeding season coincides with the drainage ditches holding water, there is a chance that frogs and/or frog spawn would be present.

Site clearance works proposed at this crossing point would likely result in a significant effect on breeding amphibians at a local geographic scale.

Breeding Birds

BoCCI Amber and Green List Species

All amber and green-listed bird species present within the study area will be negatively affected by site clearance works associated with the construction phase, both potential and existing nesting habitat. If site/vegetation clearance coincided with the bird nesting season it would likely result in the mortality/disturbance of green and amber listed birds, particularly those species associated with grassland, scrub and hedgerow habitats.

Works proposed at this crossing point would likely result in a significant effect to green and amber listed nesting bird species at a local geographic scale.

Wintering birds

No wintering birds were recorded at XC201 Thomastown and the habitat present is noted as marginal for foraging/roosting wintering bird potential. Therefore, there are no predicted effects for wintering birds in relation to works proposed at this crossing point.

Operational Phase

Habitats

Operational phase of the proposed Project will result in the permanent loss of KER habitats at Thomastown as shown in Table 7.22 below. These habitats are common and widespread in the wider landscape but are important features in terms of supporting other ecological receptors as outlined below (bats, birds etc.). Hedgerows in particular provide important corridors for wildlife.

Permanent loss of habitat as a result of the works proposed at this crossing would likely result in a significant effect at a local geographic scale.

Table 7.22: Permanent Habitat Loss

Habitat Type	Extent of habitat loss within footprint (ha)[12] / m^2	Ecological Importance of receptor within field survey area	Potential Impact Significance
WL1 Hedgerow	350.5m	Local (higher value)	Local
WL2 Treeline	0.73m	Local (higher value)	Local
FW4 Drainage ditches	0.017ha (170m^2)	Local (higher value)	Local

[12] Habitat areas based on habitat maps Thomastown – See Volume 4, Figure 7.6

GS2 Dry meadows and grassy verges	0.014ha (140 m^2)	Local (higher value)	Local

Fauna (other than bats)

Amphibians

Operation of the proposed Project will result in the permanent loss of a small area of suitable common frog habitat at Thomastown (i.e. loss of ditch habitat under the footprint of the new road, comprising a total area of 170m^2). This habitat is common and widespread in the wider landscape and the area to be lost is small and is not considered to have a significant impact on the local amphibian population.

Permanent loss of amphibian habitat as a result of works at this crossing point is considered not significant.

Bats

Operation of the project will result in the permanent loss of bat commuting and foraging habitat. A total of 350.5m of hedgerow and 0.73m of treelines will be permanently lost under the footprint of the proposed road. However, there is suitable alternative habitat available in the immediate vicinity.

The loss of available foraging habitat and hedgerows/treelines used by commuting bats would likely result in a significant impact at the local geographic scale.

Breeding Birds

BoCCI Amber and Green List Species

All of the amber and green-listed bird species present will be negatively impacted by habitat loss, to both potential and existing nesting habitat and foraging habitat. If site/vegetation clearance coincided with the bird nesting season it would likely result in the mortality/disturbance of green and amber listed birds, particularly those species associated with grassland, scrub and hedgerow habitats.

The loss of potential bird breeding habitat would likely result in a significant impact on green and amber listed bird species at the local geographic scale.

Wintering birds

There are no predicted effects for wintering birds during operation.

7.6.4 XC209 Ballyhay

Do Nothing

The majority of land proposed for development is within the existing railway line or on the public road. If the proposed Project was not progressed it is likely that there would be little change to the existing environment, and it is likely it would remain in its current state.

Construction Phase

Designated Sites

The proposed Project at XC209 Ballyhay is adjacent to the Awbeg (Buttevant East) River, which is designated as the River Blackwater (Cork/Waterford) SAC approximately 1.5km downstream. There is potential for the proposed works and method of installation of the CCTV to have an impact on the Awbeg (Buttevant East) River as a result of dewatering of the trenches required to lay cable ducts. The SAC is highly sensitive as it supports qualifying interest species including important lamprey, salmon and freshwater pearl mussel populations. Due to this direct

hydrological link a pollution event (release of contaminated surface water runoff and sediments) could affect the Awbeg River during the Construction phase of the works. Although the river is valued as of international importance due to its designation as an SAC a pollution event through the release of contaminated surface water runoff and sediments is likely to be significant at local to county geographic scale as a pollution event at a catastrophic scale would need to occur to have an significant impact at the population level which is considered highly unlikely.

A pollution event (release of contaminated surface water runoff and sediments) into the River Blackwater SAC during construction will likely result in a significant effect on this European site at a local to county geographic scale.

Operational Phase

Option is for CCTV. No effects predicted.

7.6.5 XC211 & XC212 Newtown and Ballycoskery

Do Nothing

The majority of land proposed for development is currently managed as agricultural land. If the proposed Project was not progressed it is likely that there would be little change to the existing environment, and it is likely it would continue to be used for agricultural purposes and remain in this current managed state. Tall-herb swamps (including vegetation likely to correspond with EU HD Annex I habitat 6430 Hydrophilous tall herb) are comparatively species-rich stands of herbaceous vegetation that occur in wet areas where the water table is above the ground surface for most of the year. Pressures on the habitat include invasive species; and agricultural intensification and drainage in the lowlands. Based on the latest Article 17 reporting[13] the Overall Status is assessed as Bad with a deteriorating trend. This change in trend since the 2013 report represents a genuine decline due to range contraction and a decline in structure and functions. At Ballycoskery no invasive species were recorded on site during field surveys. If the project were not to progress it is unlikely then that there would be any change to this habitat given its location fenced off from grazing, and topography of the site water draining from the field to the north and from the railway embankment.

Construction Phase

Designated Sites

The proposed Project at XC212 Ballycoskery is hydrologically linked to the River Blackwater (Cork/Waterford) SAC via a ditch that flows into the Newton River. The Newton River flows directly into the Awbeg (Buttevant East) River approximately 450m downstream which forms part of the SAC. The SAC is highly sensitive as it supports qualifying interest species including important lamprey, salmon and freshwater pearl mussel populations. Due to this direct hydrological link a pollution event (release of contaminated surface water runoff and/ or sediments during the installation of a culvert for example) could affect the Awbeg River during the Construction phase of the works. Although the river is valued as of international importance due to its designation as an SAC a pollution event through the release of contaminated surface water runoff and sediments is likely to be significant at local to county geographic scale as a pollution event at a catastrophic scale would need to occur to have an significant impact at the population level which is considered highly unlikely.

A pollution event (release of contaminated surface water runoff and sediments) into the River Blackwater SAC during construction will likely result in a significant effect on this European site at a local to county geographic scale.

No SCI species of Kilcolman Bog SPA was recorded at XC211 Newtown or XC212 Ballycoskery therefore there are no predicted effects for the SPA in relation to works proposed at this crossing point.

[13] https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2019_Vol1_Summary_Article17.pdf

Fauna (other than bats)

Small mammals

Site clearance during construction works is unlikely to result in any significant mortality to the larger and more mobile species such as stoat (if present). However, it is probable that vegetation clearance may result in mortality to the smaller mammals such as pygmy shrew if present. The potential effect would be expected to be greater during the breeding season when juveniles would be present in burrows (April-October), or in the case of hedgehog impacts may be greater during their hibernation period which is November – March (inclusive). Impacts on these mammal species will be short-term during construction works.

Site clearance works proposed at this crossing point would likely result in a significant effect on the small mammal population at a local geographic scale.

Fish (Lamprey, Atlantic salmon, European eel) within the River Awbeg

Fish species including lamprey spp. and Atlantic salmon are known to be present in the Awbeg River in close proximity to the works proposed at this crossing point. The connecting Newtown River is not likely to support significant numbers of fish given its size. It is possible that release of contaminated surface water runoff and sediments (pollution event) could affect these species within the River Awbeg during the Construction phase of the works. Although these species are valued as of international importance due to their status as qualifying interest species of the River Blackwater (Cork/Waterford) SAC a pollution event through the release of contaminated surface water runoff and sediments is likely to be significant at local to county geographic scale. It is considered that a pollution event would have to be catastrophic to have a significant impact on these species at the population level which is considered highly unlikely.

A pollution event (release of contaminated surface water runoff and sediments) into the River Awbeg during construction will likely result in a significant effect on qualifying interest fish species at a local to county geographic scale.

Invertebrates (freshwater pearl mussel)

Freshwater pearl mussel is known to occur within the Blackwater (Cork/Waterford) SAC approximately 34km downstream of the study area (NPWS, 2012). The release of contaminated surface water runoff and sediments (pollution event) would be unlikely to impact on this species due to the distance of the population downstream of the works. Any pollutants introduced to the SAC due to the works would likely dissipate long before reaching the freshwater pearl mussel population downstream.

A pollution event (release of contaminated surface water runoff and sediments) into the Blackwater SAC during construction will likely result in a non-significant effect on freshwater pearl mussel.

Invertebrates (white-clawed crayfish)

White-clawed crayfish are known to be present in the Awbeg River in close proximity to the works proposed at this crossing point. Release of contaminated surface water runoff and sediments (pollution event) could affect this species within the River Awbeg during the Construction phase of the works. Although this species is valued as of international importance due to it being a qualifying interest species of the River Blackwater (Cork/Waterford) SAC a pollution event through the release of contaminated surface water runoff and sediments is likely to be significant at local to county geographic scale as a pollution event would have to be catastrophic to have an significant impact on this species at the population level which is considered highly unlikely.

A pollution event (release of contaminated surface water runoff and sediments) into the River Awbeg during construction will likely result in a significant effect on white-clawed crayfish at a local to county geographic scale.

Amphibians

There are records of common frog within 5km of the study area. Frog spawn was recorded during nocturnal newt surveys within a pond at Newtown. Suitable habitat for common frog and smooth newt exists within the wet fields to the west of the existing crossing point at Ballycoskery and within a pond at Newtown. It is possible that this habitat could be used by these species at the time of construction. If site clearance is undertaken during a period when the breeding season coincides with a time when the fields are wet, there is a chance that frogs, newts and/or frog/newt spawn would be present.

The loss of potential breeding amphibian habitat would likely result in a significant impact on amphibian species at a local geographic scale.

Breeding Birds

BoCCI Amber and Green List Species

All amber and green-listed bird species present within the study area will be negatively affected by site clearance works associated with the construction phase, both potential and existing nesting habitat. If site/vegetation clearance coincided with the bird nesting season it would likely result in the mortality/disturbance of green and amber listed birds, particularly those species associated with grassland, tree, scrub and hedgerow habitats.

Works proposed at this crossing point would likely result in a significant effect to green and amber listed nesting bird species at a local geographic scale.

Wintering Birds

An incidental record of mallard and moorhen was recorded in the pond at Newtown during nocturnal newt surveys. If the pond is impacted during construction works i.e. through infilling or a pollution event, it would potentially result in disturbance/ habitat loss for the bird species present.

Works proposed at this crossing point would likely result in a significant effect to the green listed bird species at a local geographic scale.

Operational Phase

Habitats

Operational phase of the proposed Project will result in the permanent loss of KER habitats at Newtown and XC212 Ballycoskery as shown in Table 7.23 below. Most of these habitats are common and widespread in the wider landscape but are important features in terms of supporting other ecological receptors as outlined below (bats, birds etc.). Hedgerows and treelines in particular provide important corridors for wildlife. The habitat 'dry meadows and grassy verges' is uncommon in the wider area and provides for a range of invertebrate and pollinator species. A small area of tall herb swamps will be lost, and this habitat is of high conservation concern. The habitat supports a variety of species and was dominated by tall herb and is considered to correspond with EU HD Annex I habitat 6430 Hydrophilous tall herb.

Permanent loss of habitat as a result of the works proposed at this crossing would likely result in a significant effect at a local scale for all habitats with the exception of tall herb swamps, where loss would likely result in a significant effect at a local to county scale.

Table 7.23: Permanent Habitat Loss

Habitat Type	Extent of habitat loss within footprint (ha)[14] / m^2	Ecological Importance of receptor within field survey area	Potential Impact Significance
WL1 Hedgerow	103.1m	Local (higher value)	Local
WL2 Treeline	349.1m	Local (higher value)	Local
WS1 Scrub	0.01ha (100m^2)	Local (higher value)	Local
FW4 Drainage ditches	0.032ha (320 m^2)	Local (higher value)	Local
FS2 Tall Herb Swamps – including the Annex I habitat 6430 Hydrophilous tall herb swamp	0.004ha (40 m^2)	National	Local to county
GS2 Dry Meadows and Grassy Verges	0.028ha (280 m^2)	Local (higher value)	Local

Bats

Operation of the project will result in the permanent loss of bat commuting and foraging habitat. A total of 349.1m of treeline and 103.1m of hedgerow will be permanently lost under the footprint of the proposed road. However, there is suitable alternative habitat available in the immediate vicinity.

The loss of available foraging habitat and hedgerows/treelines used by commuting bats would likely result in a significant impact at the local geographic scale.

Breeding Birds

BoCCI Amber and Green List Species

All of the amber and green-listed bird species present will be negatively impacted by habitat loss, to both potential and existing nesting habitat and foraging habitat. If site/vegetation clearance coincided with the bird nesting season it would likely result in the mortality/disturbance of green and amber listed birds, particularly those species associated with grassland, tree, scrub and hedgerow habitats.

The loss of potential bird breeding habitat would likely result in a significant impact on green and amber listed bird species at the local geographic scale.

Wintering birds

The green listed species recorded at the pond at XC211 Newtown will be negatively impacted by habitat loss/ disturbance during operation.

The loss of this foraging/ roosting habitat would likely result in a significant impact at the local geographic scale.

7.6.6 XC215 Shinanagh

Do Nothing

[14] Habitat areas based on habitat maps Newtown and Ballycoskery – See Volume 4, Figure 7.8

The majority of land proposed for development is currently managed as agricultural land. If the proposed Project was not progressed it is likely that there would be little change to the existing environment, and it is likely it would continue to be used for agricultural purposes and remain in this current managed state.

Construction Phase

Designated Sites

The proposed Project at XC215 Shinanagh is not hydrologically linked to any designed site, while the closest designated site is located over 400m away. No SCI species of Kilcolman Bog SPA was recorded at Shinanagh during the field surveys or in recent years. Therefore, there are no predicted effects for designated sites in relation to works proposed at this crossing point.

Invasive species

Construction works during the proposed Project are likely to result in the spread of Japanese knotweed within the study area. This would likely result in loss of KER habitat as Japanese knotweed forms dense stands that can outcompete native plant species. This would also likely compromise the ability of these habitats to support other ecological receptors.

The spread of Japanese knotweed during construction would likely result in a significant effect to habitats and species at a local geographic scale.

Fauna (other than bats)

Badger

No badger setts were confirmed within the study area, however badgers are known to be present within the study area. Construction works are unlikely to result in mortality to badger, however there is potential for individual badgers to be injured due to construction works, for example if excavated ground is left uncovered and badger were to fall or become trapped.

Construction works proposed at this crossing point would likely result in a significant effect on the badger population at a local geographic scale.

Small mammals

Site clearance during construction works is unlikely to result in any significant mortality to the larger and more mobile species such as stoat (if present). However, it is probable that vegetation clearance may result in mortality to the smaller mammals such as pygmy shrew if present. The potential effect would be expected to be greater during the breeding season when juveniles would be present in burrows (April-October), or in the case of hedgehog impacts may be greater during their hibernation period which is November – March (inclusive). Impacts on these mammal species will be short-term during construction works.

Site clearance works proposed at this crossing point would likely result in a significant effect on the small mammal population at a local geographic scale.

Amphibians

Common frog is the only amphibian species that was recorded within the study area, associated with wet ditches within the study area. It is possible that any of the ditches within the study area could be used by this species at the time of construction. If site clearance is undertaken during a period when the breeding season coincides with the drainage ditches holding water, there is a chance that frogs and/or frog spawn would be present.

Site clearance works proposed at this crossing point would likely result in a significant effect on breeding amphibians at a local geographic scale.

Breeding Birds

BoCCI Amber and Green List Species

All amber and green-listed bird species present within the study area will be negatively affected by site clearance works associated with the construction phase, both potential and existing nesting habitat. If site/vegetation clearance coincided with the bird nesting season it would likely result in the mortality/disturbance of green and amber listed birds, particularly those species associated with grassland, tree, scrub and hedgerow habitats.

Works proposed at this crossing point would likely result in a significant effect to green and amber listed nesting bird species at a local geographic scale.

Wintering birds

No wintering birds were recorded at XC215 Shinanagh during the field surveys. There are no predicted effects for wintering birds in relation to works proposed at this crossing point.

Operational Phase

Habitats

Operational phase of the proposed Project will result in the permanent loss of KER habitats at XC215 Shinanagh as shown in Table 7.24 below. These habitats are common and widespread in the wider landscape but are important features in terms of supporting other ecological receptors as outlined below (bats, birds etc.). Hedgerows and treelines in particular provide important corridors for wildlife.

Permanent loss of habitat as a result of the works proposed at this crossing would likely result in a significant effect at a local geographic scale.

Table 7.24: Permanent Habitat Loss

Habitat Type	Extent of habitat loss within footprint (ha)[15] / m^2	Ecological Importance of receptor within field survey area	Potential Impact Significance
WL1 Hedgerow	905.5m	Local (higher value)	Local
WL2 Treeline	32.6m	Local (higher value)	Local
WS1 Scrub	0.235ha (2350m^2)	Local (higher value)	Local

Fauna (other than bats)

Badger

No badger setts were confirmed within the study area, however badgers are known to be present within the study area. Operation of the project will result in the permanent loss of foraging and commuting habitat for badger. However, there is suitable alternative habitat available in the immediate vicinity.

The loss of available foraging habitat would likely result in a significant effect on the badger population at a local geographic scale.

[15] Habitat areas based on habitat maps Newtown and Ballycoskery – See Volume 4, Figure 7.8

Bats

Operation of the project will result in the permanent loss of bat commuting and foraging habitat. A total of 32.6m of treeline and 905.5m of hedgerow will be permanently lost under the footprint of the proposed road. However, there is suitable alternative habitat available in the immediate vicinity.

The loss of available foraging habitat and hedgerows/treelines used by commuting bats would likely result in a significant impact at the local geographic scale.

Breeding Birds

BoCCI Amber and Green List Species

All of the amber and green-listed bird species present will be negatively impacted by habitat loss, to both potential and existing nesting habitat and foraging habitat. If site/vegetation clearance coincided with the bird nesting season it would likely result in the mortality/disturbance of green and amber listed birds, particularly those species associated with grassland, tree, scrub and hedgerow habitats.

The loss of potential bird breeding habitat would likely result in a significant impact on green and amber listed bird species at the local geographic scale.

Wintering birds

There are no predicted effects for wintering birds during operation.

7.6.7 XC219 Buttevant

Do Nothing

The majority of land proposed for development is currently managed as agricultural land. If the proposed Project was not progressed it is likely that there would be little change to the existing environment, and it is likely it would continue to be used for agricultural purposes and remain in this current managed state. It is possible that there may be an increase in scrub encroachment into the habitat corresponding to Annex I habitat Lowland Hay meadows resulting in the reduction or loss of this habitat.

Construction Phase

Designated Sites

The proposed Project at XC219 Buttevant is hydrologically linked to the River Blackwater (Cork/Waterford) SAC by the Pepperhill River and an unnamed ditch immediately north of this river, both of which will be crossed as part of the proposed Project. The Pepperhill River flows directly into the Awbeg River (Buttevant) 240m downstream, which forms part of the SAC. The SAC is highly sensitive as it supports qualifying interest species including important lamprey, salmon and freshwater pearl mussel populations. Due to this direct hydrological link a pollution event (release of contaminated surface water runoff and/or sediments during the installation of a culvert for example) could affect the River Awbeg during the Construction phase of the works. Although the river is valued as of international importance due to its designation as a SAC a pollution event through the release of contaminated surface water runoff and sediments is likely to be significant at local to county geographic scale as a pollution event would have to be catastrophic to have a significant impact at the population level which is considered highly unlikely.

A pollution event (release of contaminated surface water runoff and sediments) into the River Blackwater SAC during construction will likely result in a significant effect on this European site at a local to county geographic scale.

XC219 Buttevant is located approximately 4.3km from Kilcolman Bog SPA. Kilcolman Bog is noted for its population of Annex I whooper swans. The mean population for the site (based on the most recent five-year period

2010/11 – 2014/15 for site 0L020) is 56 birds (Birdwatch Ireland, 2019). There has been a varying although predominantly downward trend in site populations since 2006. Whooper swan can utilise non-wetland sites inland and suitable supporting habitat i.e. flooded fields and inundated flood plains. Sixteen whooper swans representing 12% of Kilcolman Bog SPA population (based on the I-WeBS baseline population) were recorded approximately 300m north of the proposed crossing alignment at XC219 Buttevant. There is potential for disturbance to whooper swan during construction. As such disturbance from the construction of the proposed project has potential to undermine the conservation objective targets for this species (i.e. distribution – no significant decrease in the range, timing or intensity of use of areas by whooper swan). Although this species is valued as of international importance a disturbance event is likely to be significant at a national geographic scale given the small flock of 16 birds recorded.

A disturbance event resulting in displacement of whooper swan during construction will likely result in a significant effect on this European site at a national geographic scale.

Fauna (other than bats)

Otter

Otter are known to be present within the study area of this crossing location. No otter resting (couches or holts) or breeding sites (natal dens) were identified during the initial surveys. However, there is suitable, although suboptimal, habitat at this location to provide suitable resting habitat for otter. Site clearance, vegetation removal and creation of a dry works area at this crossing location could affect this species during the Construction phase of the project through disturbance and/or a pollution event which may impact on water quality and reduce otter prey availability. Although these species are valued as of international importance due to their status as qualifying interest species of the River Blackwater (Cork/Waterford) SAC it is considered that disturbance to otter or a pollution event is likely to be significant at local scale.

Site works at this crossing point would likely result in a significant effect on otter at a local geographic scale.

Small mammals

Site clearance during construction works is unlikely to result in any significant mortality to the larger and more mobile species such as stoat (if present). However, it is probable that vegetation clearance may result in mortality to the smaller mammals such as pygmy shrew if present. The potential effect would be expected to be greater during the breeding season when juveniles would be present in burrows (April-October), or in the case of hedgehog impacts may be greater during their hibernation period which is November – March (inclusive). Impacts on these mammal species will be short-term during construction works.

Site clearance works proposed at this crossing point would likely result in a significant effect on the small mammal population at a local geographic scale.

Fish (Lamprey, Atlantic salmon, European eel) within the River Awbeg

Fish including lamprey spp. and Atlantic salmon are known to be present in the Awbeg River in close proximity to the works proposed at this crossing point. Release of contaminated surface water runoff and sediments (pollution event) could affect these species within the River Awbeg during the Construction phase of the works. Although these species are valued as of international importance due to their status as qualifying interest species of the River Blackwater (Cork/Waterford) SAC a pollution event through the release of contaminated surface water runoff and sediments is likely to be significant at local to county geographic scale. It is considered that a pollution event would have to be catastrophic to have a significant impact on these species at the population level which is considered highly unlikely.

A pollution event (release of contaminated surface water runoff and sediments) into the River Awbeg during construction will likely result in a significant effect on qualifying interest fish species at a local to county geographic scale.

Invertebrates (freshwater pearl mussel)

Freshwater pearl mussel is known to occur within the Blackwater (Cork/Waterford) SAC approximately 34km downstream of the study area (NPWS, 2012). The release of contaminated surface water runoff and sediments (pollution event) would be unlikely to impact on this species due to the distance of the population downstream of the works. Any pollutants introduced to the SAC due to the works would likely dissipate long before reaching the freshwater pearl mussel population downstream.

A pollution event (release of contaminated surface water runoff and sediments) into the Blackwater SAC during construction will likely result in a non-significant effect on freshwater pearl mussel.

Invertebrates (white-clawed crayfish)

White-clawed crayfish are known to be present in the Awbeg River in close proximity to the works proposed at this crossing point. Release of contaminated surface water runoff and sediments (pollution event) could affect this species within the River Awbeg during the Construction phase of the works. Although this species is valued as of international importance due to it being a qualifying interest species of the River Blackwater (Cork/Waterford) SAC a pollution event through the release of contaminated surface water runoff and sediments is likely to be significant at local to county geographic scale as a pollution event would have to be catastrophic to have an significant impact on this species at the population level which is considered highly unlikely.

A pollution event (release of contaminated surface water runoff and sediments) into the River Awbeg during construction will likely result in a significant effect on white-clawed crayfish at a local to county geographic scale.

Amphibians

There are records of common frog and smooth newt within 5km of the study area. Suitable habitat exists within the study area for amphibians. It is possible that these habitats could be used by this species at the time of construction. Immediately upstream of the of the study area the Pepperhill River was considered suitable to support both common frog and smooth newt due to the slow flowing open nature of the watercourse at this point. If site clearance is undertaken during the breeding season there is a possibility that frogs, newts and/or frog/newt spawn would be present.

The loss of potential breeding amphibian habitat would likely result in a significant impact on amphibians at a local geographic scale.

Breeding Birds

BoCCI Amber and Green List Species

All amber and green-listed bird species present within the study area will be negatively affected by site clearance works associated with the construction phase, both potential and existing nesting habitat. If site/vegetation clearance coincided with the bird nesting season it would likely result in the mortality/disturbance of green and amber listed birds, particularly those species associated with grassland, tree, scrub and hedgerow habitats.

Works proposed at this crossing point would likely result in a significant effect to green and amber listed nesting bird species at a local geographic scale.

Wintering birds

Sixteen whooper swans were recorded approximately 300m north of the proposed crossing alignment at XC219 Buttevant. Little egret, grey heron and mallard were recorded foraging in flooded fields in close proximity to the level crossing. XC219 Buttevant is located approximately 4.3km from Kilcolman Bog SPA. Kilcolman Bog is noted for its population of Annex I whooper swans. The mean population for the site (based on the most recent five-year period 2010/11 – 2014/15 for site 0L020) is 56 birds (Birdwatch Ireland, 2019). There has been a varying although predominantly downward trend in site populations since 2006. Whooper swan can utilise non-wetland sites inland and suitable supporting habitat i.e. flooded fields and inundated flood plains.

There is potential for disturbance to the bird species during construction. In addition, disturbance from the construction of the proposed Project has potential to undermine the conservation objective targets for whooper swan (i.e. distribution – no significant decrease in the range, timing or intensity of use of areas by whooper swan). Although a survey buffer of 500m was used, this can be regarded as a precautionary distance depending on the disturbance activity. Waterbird responses to disturbances from a range of activities, including construction work, have been collated and summarised over time by the Institute of Estuarine and Coastal Studies (IECS) and are based on a range of research papers, but in particular those included in Davidson and Rothwell (1993). A generic threshold response to a visual disturbance of c.300m to waterbird roost/foraging sites has been derived around the approach distance for sensitive bird species (Cutts et al., 2013). Therefore, as the whooper swan were recorded approximately 300m from the edge of the proposed project it is likely that birds are within the outermost limit of their zone of influence given the topography and existing environmental conditions.

Construction works at XC219 Buttevant would generate disturbance as a result of machinery operation/ operator movement. Although studies have shown that bird species have the ability to habituate quickly to regular noise and visual disturbances (Smit and Visser, 1993), potential long-term effects of disrupted foraging behaviour can lead to decreased body condition and a reduction in reproductive success and individual survival (NPWS, 2014a). In terms of foraging habitat, displacement from feeding opportunities not only reduces a bird's energy intake but also leads to an increase in stress and energy expenditure as a result of the energetic costs of flying to alternative foraging areas (Johnson et. al., 2014). Displacement also has knock-on ecological effects such as increased competition (within and/or between different species) for a common food source. In areas subject to heavy or on-going disturbance, waterbirds may be disturbed so frequently that their displacement is equivalent to habitat loss (NPWS, 2014b). When disturbance effects reduce species fitness (reduced survival or reproductive success) consequences at population level may result. At certain times of year (i.e. during cold spells in the winter) the effect of this could be particularly severe, potentially resulting in bird mortality.

Background levels of disturbance already exist in the vicinity of the foraging site including vehicular and pedestrian traffic on the R522 road, operational noise from the level crossing (although of low level) and irregular excessive noise from passing trains on the main Dublin to Cork line including warning horns for safety purposes whilst passing through the level crossing. At 300m from a noise source noise levels required to create high level disturbance would need to be 117-122dB at source (Cutts et al., 2013). Noise levels from the proposed Project will not exceed permissible levels for construction works (70dB(A) at source resulting in 18dB(A) at 300m) therefore noise impacts on whooper swan are not predicted to be significant.

It is unlikely that works will cause visual disturbance impacts to the birds given the rolling topography of the land and vegetative buffer either side of the existing road acting as a natural screen along with the infrequent use of the site by whooper swan potentially influenced by recent flooding. The field boundary along the south of the R522 road comprises a dense, tall (5m) treeline dominated by hawthorn and ash (Volume 5, Appendix 7C, Photograph 23,). Therefore, given the distance (300m across the Awbeg River), the existing natural screening alongside the proposed Project acting as a visual screen and the existing noisy environment, impacts to whooper swan as a result of disturbance leading to displacement are considered low. However, it is considered that the works associated with the proposed project could result in the displacement (visual disturbance) of foraging whooper swan if the treeline/scrub field boundary is removed and works are undertaken within the critical period (October – March). Therefore, in the absence of mitigation these works are at risk of displacing birds.

Although whooper swan is valued as of international importance a disturbance event is likely to be significant at a national geographic scale given the small flock of 16 birds recorded. Although less susceptible to disturbance impacts little egret, mallard and grey heron are likely to be impacted at a local to county geographic scale from loss of foraging habitat during construction.

A disturbance event from the works proposed at the crossing point could result in displacement of whooper swan during construction and could result in a significant effect at a national geographic scale and likely to result in a significant effect at a local to county geographic scale for little egret, mallard and grey heron.

Operational Phase

Habitats

Operational phase of the proposed Project will result in the permanent loss of KER habitats at Buttevant as shown in Table 7.25 below. Most of these habitats are common and widespread in the wider landscape but are important features in terms of supporting other ecological receptors as outlined below (bats, birds etc.). Hedgerows and treelines provide important corridors for wildlife. An area of high conservation value corresponding to Annex I habitat 'Lowland Hay meadows' will be lost. This habitat type is important for pollinators and support a number of invertebrate species including a population of the red-tailed bumblebee (*Bombus lapidarius*) as species which is has near threatened conservation status in Ireland.

Permanent loss of habitat as a result of the works proposed at this crossing would likely result in a significant effect at a local to county scale.

Table 7.25: Permanent Habitat Loss

Habitat Type	Extent of habitat loss within footprint (ha)[16] / m^2	Ecological Importance of receptor within field survey area	Potential Impact Significance
WL1 Hedgerow	332.6m	Local (higher value)	Local
WS1 Scrub	0.029ha (290 m^2)	Local (higher value)	Local
FW4 Drainage ditches	0.011ha (110 m^2)	Local (higher value)	Local
BL1 Stone walls	59.8m	Local (higher value)	Local
GS2 Dry Meadows and Grassy Verges – including the Annex I habitat 6510 Lowland Hay Meadows	0.030ha (300 m^2)	National	Local to country

Bats

Operation of the project will result in the permanent loss of bat commuting and foraging habitat. A total of 332.6m of hedgerow will be permanently lost under the footprint of the proposed road. However, there is suitable alternative habitat available in the immediate vicinity.

The loss of available foraging habitat and hedgerows used by commuting bats would likely result in a significant impact at the local geographic scale.

Breeding Birds

<u>BoCCI Amber and Green List Species</u>

All of the amber and green-listed bird species present will be negatively impacted by habitat loss, to both potential and existing nesting habitat and foraging habitat. If site/vegetation clearance coincided with the bird nesting season it would likely result in the mortality/disturbance of green and amber listed birds, particularly those species associated with grassland, tree, scrub and hedgerow habitats.

The loss of potential bird breeding habitat would likely result in a significant impact on green and amber listed bird species at the local geographic scale.

[16] Habitat areas based on habitat maps Buttevant – See Volume 4, Figure 7.10

Wintering Birds

No operational impacts are predicted from the proposed Project on whooper swan given the existing background noise/visual effects from the existing road (R522)/ level crossing. Impacts from loss of foraging opportunities within fields for little egret, mallard and grey heron is likely to be negligible given the significant amount of available foraging habitat in the area including floodplain lands surrounding the River Awbeg.

7.7 Mitigation Measures

This sets out measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, identify any proposed monitoring arrangements. This explains the extent to which significant adverse effects on the environment are avoided, prevented, reduced or offset, and covers both the Construction and Operational Phases.

7.7.1 Construction Phase

Generic Mitigation Measures

A number of generic mitigation measures have been identified which will be applied across the proposed Project to avoid the impacts associated with pollution of watercourses and impacts to small mammal species, amphibians and breeding bird species. In addition to this, there are mitigation measures specific to the various proposed Project elements.

There will be a toolbox talk given to all site personnel to highlight any environmental sensitivities and the boundaries of sensitive habitats. During sensitive works e.g. instream works, an Ecological Clerk of Works (ECoW) will supervise the works. No sensitive works will be permitted until the ECoW has approved.

Pollution Control

Measures set-out herein will be implemented to ensure that there will be no pollution of surface water during the Construction Phase of the proposed Project. These measures have been designed with reference to the following guidelines:

- Construction Industry Research and Information Association (CIRIA) C648 Control of Water Pollution from Linear Construction Projects: Technical Guide (Murnane et al., 2006a);
- CIRIA C649 Control of Water Pollution from Linear Construction Projects: Site Guide (Murnane et al., 2006b);
- CIRIA C532: Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (Masters-Williams et al., 2001); and
- Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters (Inland Fisheries Ireland, 2016).

Control of Silt Laden Runoff

Specific measures to control silt are planned to be implemented at each of the proposed Project infrastructure sites. Surface water runoff at the construction sites will be managed to prevent flow of silt laden surface water flowing into surface water receptors;

The contractor shall be obliged to ensure no deleterious discharges are released from then sites to the nearby waterbodies during construction. If a discharge to a watercourse is necessary, the water will pass through a swale or silt buster prior to discharge. Levels of suspended solids in any discharge will be not greater than 25mg/l as per IFI guidance (2016) and flows will be controlled to levels appropriate to the receiving water. It is possible that such a discharge may require a licence under the Water Pollution Acts 1977 & 1990, as amended and the Arterial Drainage Act 1945 & 1995, as amended. The Contractor will liaise with the regulatory authorities at an early stage

to determine the necessity for licences and include the appropriate application time required in any construction programme.

Silt fences will be erected along the boundary of water bodies to prevent any silt laden runoff from impermeable surfaces, temporary or permanent, as well as spoil heaps within the construction working width.

Reinstatement of any banks affected as a result of silt laden run off during construction will be reinstated back to pre-development conditions.

Stockpiling of Materials

During site set up, sites would be either cleared in stages to prevent bare earth being exposed for prolonged periods, or the bare earth would be immediately covered in a gravel/plastic covering to reduce the likelihood of sediment laden run-off following rainfall events. Stripped soil will be stockpiled more than 10m away from the surface interceptor drain described above. Stockpiles will be in a dry zone that is not subject to flooding. The following measures will be put in place by the Contractor with regard to stockpiling of material:

- temporary stockpiles will be located away from drains and watercourses. Stockpiles will not be located within 10m of a watercourse;
- for watercourse crossings, stockpiles will not be located anywhere within the crossing working area;
- management of stockpiles to prevent siltation of watercourse systems through runoff during rainstorms will be required with the final measures to be determined by the Contractor. These will include the following measures or equivalent measures:
- allowing the establishment of vegetation on the exposed soil;
- providing silt fences or straw barriers at the toe of the stockpile to mitigate runoff during rain events;
- surrounding stockpiles with cut-off ditches to contain runoff;
- directing any runoff to the site drainage system or filter drains along the Construction Working Width and to the settlement pond (or other) treatment systems; and
- providing bunds or another form of diversion to keep runoff from entering the stockpile area.

Storage of Materials

The following measures will be implemented across the site for the storage of materials:

- all oil and diesel storage facilities will be at least 30m from any watercourse including surface water drains;
- spill kits and drip trays will be provided for all equipment and at locations where any liquids are stored and dispensed;
- storage areas for solid materials, including waste soils, will be designed and managed to prevent deterioration of the materials and their escape (via surface runoff or wind blow);
- storage areas will be kept secure to prevent acts of vandalism that could result in leaks or spills; and
- all containers of any size will be correctly labelled indicating their contents and any hazard warning signs.

Fuel Tanks, Drums, Mobile Bowsers and Bunds

The following measures will be implemented across the site for the prevention of spills:

- Fuel tanks, drums and mobile bowsers (and any other equipment that contains oil and other fuels) will have a secondary containment, for example, double skinned tanks;
- all tanks, drums and mobile bowsers will be located in a sealed impervious bund with sufficient capacity to contain at least 25% of the total volume of the containers or 110% of the largest container, whichever is the greatest;
- storage areas will be covered, wherever possible, to prevent rainwater filling the bunded areas;
- fuel fill pipes will not extend beyond the bund wall and will have a lockable cap secured with a chain;
- where fuel is delivered through a pipe permanently attached to a tank or bowser:
- the pipe will be fitted with a manually operated pump or a valve at the delivery end which closes automatically when not in use;
- the pump or valve will be fitted with a lock;
- the pipe will be fitted with a lockable valve at the end where it leaves the tank or bowser;
- the pipework will pass over and not through bund walls;
- tanks and bunds will be protected from vehicle impact damage;
- tanks will be labelled with contents; capacity information and hazard warnings; and
- all valves, pumps and trigger guns will be turned off and locked when not in use. All caps on fill pipes will be locked when not in use.
- suitable precautions will be taken to prevent spillages from equipment containing small quantities of hazardous substances (for example, chainsaws and jerry cans) including:
- each container or piece of equipment will be stored in its own drip tray made of a material suitable for the substance being handled; and
- containers and equipment will be stored on a firm, level surface.

For deliveries and dispensing activities, the Contractor will ensure that:

- site-specific procedures are in place for bulk deliveries;
- delivery points and vehicle routes are clearly marked; and
- emergency procedures are displayed, and a suitably sized spill kit is available at all delivery points, and staff are trained in these procedures and the use of spill kits.

Vehicles and Plant

The use of vehicles and plant poses similar risks to those posed by storage of liquids. Fuel and oil may leak from such equipment which may enter drains and/or watercourses, as well as contaminating the ground itself. The following measures will be implemented to reduce this risk:

- vehicles and plant provided for use on the site will be in good working order to ensure optimum fuel efficiency, and will be regularly inspected to ensure they are free from leaks;
- sufficient spill kits will be carried on all vehicles;

- vehicles and plant will be regularly maintained to ensure that they are working at optimum efficiency and are promptly repaired when not in good working order;
- vehicles and plant will not park near or over drains; and
- refuelling of vehicles and plant will be carried out on hard standing, using drip trays to ensure no fuel can contaminate the ground outside of the bunded areas.

Working in or Near Watercourses

The following control measures will be implemented during the construction of the proposed Project in or adjacent to a watercourse:

- works within and adjacent to watercourses will be conducted during forecast low flow periods where possible;
- in-stream works will not be carried out in watercourses frequented by salmon or trout during the Annual Close Season. The duration of the season varies regionally within the period from the beginning of October to the end of February inclusive (IFI, 2016). River and brook lamprey spawn during the period March-April; translocation and instream works should be undertaken outside of the spawning season. The timing of works will be considered on a site-specific basis and in agreement with the IFI;
- operation of machinery in-stream will be kept to an absolute minimum. All construction machinery operating in-stream will be mechanically sound to avoid leaks of oils, hydraulic fluid, etc. Machinery will be cleaned and checked prior to commencement of in-stream works;
- the design of temporary settlement ponds, the outfalls from these temporary ponds and the construction method statements for their installation will be agreed with IFI prior to construction;
- the area of disturbance of the watercourse bed and bank will be the absolute minimum required for the installation of outfalls/ culverts;
- any dewatering flows will be directed to the construction drainage system and to the settlement pond (or other) treatment system;
- sediment mats/ silt traps or similar will be located immediately downstream of the works within and adjacent to the watercourses. These will be inspected daily, maintained and cleaned regularly during the course of site works. Diversion of water to and from a temporary diversion channel will only take place during the period March to September (IFI, 2016) or as agreed with the IFI;
- small check dams will be constructed in the cut-off watercourse to trap any sediment, and a sediment trap will be provided immediately downstream of the diversion to the existing watercourse; and
- where in-stream bed material is to be removed, coarse aggregates, if present, will be stockpiled at least 10m away from the watercourse for replacement following reinstatement of a watercourse channel.

Reinstatement of any banks affected during construction works near a watercourse will be reinstated back to pre-development conditions.

Use of Concrete

The use and management of concrete in or close to watercourses shall be carefully controlled to avoid spillage. Where the use of concrete near water cannot be avoided, the following control measures will be employed:

- when working in or near the surface water and the application of in-situ materials cannot be avoided, the use of alternative materials such as biodegradable oils shall be used;

- placing of concrete in or near watercourses will be carried out only under the supervision of the Ecological Clerk of Works (ECoW);
- there will be no hosing of concrete, cement, grout or similar material spills into surface water drains. Such spills shall be contained immediately, and runoff prevented from entering the watercourse;
- concrete waste and wash-down water will be contained and managed on-site to prevent pollution of all surface watercourses; and
- washout from concrete lorries will not be permitted on-site and will only take place at the batching plant (or other appropriate facility designated by the manufacturer).

Small Mammals

Removal and clearance of vegetation may affect small mammal species if present in these habitats. The following measures will be adhered to in order to avoid impacts to small mammal species:

- any excavations will be covered at night to prevent small mammals from falling in or becoming trapped;
- working at night will be prohibited;
- any lights will be turned off after working hours;
- noise levels will not exceed permissible levels for construction works (70dB(A)) based on Guidelines for the Treatment of Noise and Vibration in National Road Schemes (NRA, 2004); and
- post construction, the site will be revegetated.

Amphibians

Removal and clearance of vegetation may affect amphibians if present in these habitats. The following measures will be adhered to in order to avoid impacts to amphibians:

- a pre-construction survey will identify whether amphibians are present, including frog/newt spawn during the breeding season (February – May) within the study area and if translocation is required then a suitable receptor habitat will be identified;
- a toolbox talk will be carried out to ensure all site personnel are aware of these protected species and their mitigation requirements;
- if found to be present during pre-construction surveys or during works, amphibians and/or spawn will be cleared by a suitably qualified and experienced ecologist under licence to displace any animals present within the works area prior to construction. In particular areas where soil heaps are to be placed will be checked. Any amphibians removed will be placed into alternative suitable receptor habitat in the locality;
- where practical in the context of construction, water levels will be maintained in any watercourses potentially used by amphibians; and
- habitat reinstatement will re-create, as far as is practicable, the former channels so that amphibians may use these post-construction.

Breeding Birds

<u>BoCCI Amber and Green List Species</u>

Vegetation (e.g. hedgerows, trees and scrub) will not be removed between the 1 March and 31 August, to avoid impacts on nesting birds. Where this seasonal restriction cannot be adhered to, then these areas will be inspected by a suitably qualified ecologist for the presence of breeding birds prior to clearance. Where nests are present, an

ecologist will make a decision as to whether a licence is required for vegetation removal. Alternatively, the ecologist can demarcate a suitable buffer around an active nest and clearance within this area will be postponed until the chicks have fledged. A suitable exclusion zone will be established dependant on the species identified. Areas found not to contain nests must be cleared within three days of the inspection; otherwise repeat inspections will be required. If vegetation is to be cleared in the breeding season (under supervision of an ecologist) it will be chipped, removed or covered (ideally) on the same day to prevent birds from nesting.

XC201 Thomastown

All impacts associated with construction activities at XC201 Thomastown will be avoided through the adoption of generic mitigation measures, as above.

XC209 Ballyhay

It is not anticipated that a significant volume of water will be dewatered from the trenches, however as part of the additional Ground Investigation proposed for prior to construction, groundwater samples will be taken. The groundwater quality samples will identify if there is any issue with groundwater quality. Based on the results, it may be possible to dewater and discharge to the Awbeg (Buttevant East) River following settlement; alternatively, if other contamination such as metals or hydrocarbons are detected, additional measures will be needed which could include additional treatment or disposal off site.

XC211 Newtown and XC212 Ballycoskery

Designated Sites

Mitigation measures to protect European sites have been set out in the NIS, included in Volume 5, Appendix 7H. These measures have been developed to protect the River Blackwater (Cork/Waterford) SAC and Kilcolman Bog SPA. Kilcolman Bog pNHA has also been identified as a KER; this site is concurrent with the boundaries of, and is designated for the same QI as, Kilcolman Bog SPA and will therefore be protected by the mitigation measures set out in the NIS.

Fish

Mitigation measures regarding pollution control have been detailed in **Section 7.7.1.1**. These measures have been developed to protect watercourses and the habitats and species that they support and will avoid a reduction in water quality during construction.

Specific control measures are required for the installation of the proposed culvert to the west of the railway at Ballycoskery. The culvert will be pre-fabricated and clean, so as to avoid concrete washings contamination. If the ditch is flowing, it will be dammed and pumped over the installation area to avoid the transportation sediment downstream. Additional in-stream measures will also be deployed, such as straw bales and oil booms to ensure there is no downstream impact as a result of the installation process.

Fish species present in the River Awbeg, downstream of the Newton River, will be protected by these mitigation measures.

Invertebrates (white-clawed crayfish)

Mitigation measures regarding pollution control have been detailed in **Section 7.7.1.1**. These measures have been developed to protect watercourses and the habitats and species that they support and will avoid a reduction in water quality during construction.

Specific control measures are required for the installation of the proposed culvert to the west of the railway at Ballycoskery. The culvert will be pre-fabricated and clean, so as to avoid concrete washings contamination. If the ditch is flowing, it will be dammed and pumped over the installation area to avoid the transportation sediment downstream. Additional in-stream measures will also be deployed, such as straw bales and oil booms to ensure there is no downstream impact as a result of the installation process.

White-clawed crayfish present in the River Awbeg, downstream of the Newton River, will be protected by these mitigation measures.

Wintering Birds

No infilling or direct discharge of pollutants will occur to the pond at Newton, which is used by several species of wintering birds. Pollution control measures are detailed in **Section 7.7.1.1**. These measures will ensure no disturbance or loss of habitat for wintering birds at Newtown.

XC215 Shinanagh

Invasive Species

The mitigation measures described below follow the recommendations set out in the *Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads* (National Roads Authority, 2010).

- a pre-construction survey will be carried to inform a change in the baseline;
- all staff will be informed of the presence of Japanese knotweed and any other invasive species through toolbox talks;
- exclusion zones will be established where necessary to prevent spread of invasive species;
- no machinery will be allowed within exclusion zones other than where necessary to undertake treatment measures;
- any plant material and soil containing plant material must be disposed of in accordance with the NRA (2010) guidelines; and
- care will be taken near watercourses to ensure that material that contains flower heads, seeds or cuttings of any invasive species will be disposed of correctly and not enter watercourses.

Badger

The mitigation measures described below follow the recommendations set out in the *Guidelines for the Treatment of Badgers during the Construction of National Road Schemes* (National Roads Authority, 2006).

The following lists mitigation measures which are to be undertaken during works:

- a pre-construction survey will be carried out to inform a change in the baseline;
- if badgers are found to be present any works within 30m of a sett will be supervised on-site and fulltime by a suitably qualified ecologist (extended to 50m during the breeding season);
- night-time working will be restricted as far as possible within 100m of a sett;
- the use of noisy plant and machinery in the vicinity of badger setts will cease before sunset;
- any excavations will be covered at night to prevent badger from falling in or becoming trapped;
- any borrow pits or spoil heaps will be sited at a minimum distance of 30m from setts; and
- chemicals shall not be used within 20m of a badger sett.

XC219 Buttevant

Designated Sites

Mitigation measures to protect European sites have been set out in the NIS, included in Volume 5, Appendix 7H. These measures have been developed to protect the River Blackwater (Cork/Waterford) SAC and Kilcolman Bog SPA. Kilcolman Bog pNHA has also been identified as a KER; this site is concurrent with the boundaries of, and is designated for the same QI as, Kilcolman Bog SPA and will be protected by the mitigation measures set out in the NIS.

Otter

The mitigation measures described below follow the recommendations set out in the *Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes* (National Roads Authority, 2008).

The following list of mitigation measures which are to be undertaken during works:

- a pre-construction survey will be carried out to inform a change in the baseline;
- if otters are found to be present no works should be undertaken within 150m of any holts at breeding females or cubs are present;
- no wheeled or tracked vehicles should be used with 20m of active, but non-breeding, holts;
- light work, such as digging by hand or scrub clearance should not take place within 15m of such holts, except under licence;
- any excavations will be covered at night to prevent otter from falling in or becoming trapped;
- working at night will be prohibited;
- any lights will be turned off after working hours or angled away from watercourses;
- noise levels will not exceed permissible levels for construction works (70dB(A)) based on Guidelines for the Treatment of Noise and Vibration in National Road Schemes (NRA, 2004);
- post construction, the site will be revegetated; and
- pollution control measures are detailed in **Section 7.7.1.1**. Implementation of these measures will avoid a reduction in water quality that could impact otter through reduced prey availability.

Fish

Mitigation measures regarding pollution control have been detailed in **Section 7.7.1.1**. These measures have been developed to protect watercourses and the habitats and species that they support and will avoid a reduction in water quality during construction.

Additional measures that will be undertaken at XC219 Buttevant to protect fish species:

- where culverts are to be installed the area will be dewatered to provide a dry working area. The Pepperhill River and the ditch at XC219 Buttevant will have culverts installed at separate times so that flows can be maintained downstream during the installation;
- the culverts will be pre-fabricated and clean, so as to avoid concrete washings contamination;
- netting, sandbags and/or dumpy-bags filled with rock will be installed upstream to prevent fish travelling downstream into the working area;

- fish will be removed from the working area through electrofishing and moved upstream of the dammed area;
- water will then be over pumped continually to ensure a dry working area. This must be pumped through a silt buster or onto the field to avoid sediment from becoming suspended within the watercourse;

additional in-stream measures will also be deployed, such as straw bales and oil booms to ensure there is no downstream impact as a result of the installation process; and once construction is completed the watercourse will be re-wetted under the direction of an Ecological Clerk of Works (EcoW). Water will be released slowly and silt mats, sediment traps and haybales will be used to avoid a sudden influx of sediment to the system. A silt buster will be used where required.

Invertebrates (white-clawed crayfish)

Mitigation measures regarding pollution control have been detailed in **Section 7.7.1.1**. These measures have been developed to protect watercourses and the habitats and species that they support and will avoid a reduction in water quality during construction.

Additional measures that will be undertaken at X219 Buttevant to protect white-clawed crayfish:

- prior to dewatering of the Pepperhill River and ditch at XC219 Buttevant, hand searches will be conducted and any crayfish found will be removed and moved upstream of the dammed area. This will be carried out by the EcoW under licence; and
- mitigation measures listed above for fish species at XC219 Buttevant will also avoid impacts to white-clawed crayfish.

Wintering birds

Where timing of works cannot be completed outside the critical period (October – March) measures must be implemented to mitigate the disturbance impacts to whooper swan foraging in the vicinity of XC219 Buttevant level crossing. The following measures would be required:

- the existing treeline along the R522 road at Buttevant must be retained in order to act as natural visual screen along the works area (**Photograph 23**);
- if this treeline cannot be retained, then artificial screening must be in place. Non-transparent visual screening will be erected along the north of the works area to hide the construction works and the movement of machinery/ workforce to minimise disturbance to whooper swan;
- screening must be installed in early September to ensure the site/works are screened before the main migration period (October). Erection of fencing later than this could potentially cause further disturbance to the birds;
- the fencing should be of adequate height to screen the works area (2 – 3m) or as advised by an ecologist;
- this screening will remain in place for the duration of the works; and
- an EcoW will supervise the erection of the screening (if natural screening cannot be retained) and provide guidance to the appointed contractor(s) through a toolbox talk ensuring these measures are effective. The ECoW will make regular checks of the screening throughout the works to ensure it is maintained in good condition and working order.

7.7.2 Operational Phase

Pollution Control

No drainage works are proposed at XC187 Fantstown as limited works within the railway line boundary only are proposed; none is required either at XC209 Ballyhay as limited construction is proposed to take place there and the CCTV infrastructure does not require drainage or any alterations to existing drainage systems. For the remaining sites, in keeping with *NRA TB 13 – Revised Road Drainage Standards,* over the edge drainage is proposed in the design for all locations, supplemented with additional features to accommodate the presence of structures or site constraints where necessary (see Table 7.26). New swale ditches are proposed, located at the toe of the road embankment, that will then drain back to the low points to maximise attenuation and pollution control as part of a SuDS management chain.

The swale features will be grassed, with shallow side slopes and a long-wetted perimeter to reduce flow rates and velocities. Typically, they will be underlain by a filter material and perforated pipe to provide a second stage of treatment. The width of the swale varies between 3 and 7 metres depending on the site, and the depth (including 0.15 metres freeboard) is up to 0.75 metres and typically less than 0.5 metres. See TII Publication Number CC-SCD-00525 for typical details. Where agricultural or local access must be maintained, a short section of culvert will be constructed beneath the respective junction to ensure connectivity of the swale ditches either side of the access.

The swale ditches will outfall directly or indirectly into water bodies within the River Maigue (the Fantstown and Thomastown crossings are located within this sub-catchment) or River Awbeg (all other crossings are located within this sub-catchment) sub-catchments respectively. The maximum outflow of the swales will be capped at greenfield runoff rates.

Table 7.26: Drainage strategy and control measures at each of the crossing locations. XC187 Fantstown is not included as no construction is proposed there and XC209 Ballyhay is not included as only limited construction is proposed to take place there that does not require drainage or any alterations to existing drainage systems.

Level Crossing	Drainage Strategy & Control Measures
XC201 Thomastown	There will be no new outfall to the stream; swales will discharge into the existing open ditch at the point of tie-in on the R515 at existing runoff rates. The open ditch at the tie-in will be culverted.
XC211 Newtown	Swales will discharge into the existing road drainage at existing runoff rates. There will be no pathway to the pond from the road.
XC212 Ballycoskery	Swales will discharge into the existing road drainage at existing runoff rates.
XC215 Shinanagh	Swales will discharge to an outfall into the existing road drainage at existing runoff rates. There will be no discharge to the ditches and no proposed construction works to the ditches. There is no new outfall proposed.
XC219 Buttevant	Swales will discharge to the existing road drainage to the west of the bridge at existing runoff rates. There will be no discharges to ditches and no works to the ditches which outfall to the SAC. To the east, swales will discharge to a ditch which flows north to the SAC but no works are required to clear this ditch as runoff rates are set to existing.

Designated Sites

There are no predicted effects to European sites during operation.

XC201 Thomastown

Habitats

Areas of existing vegetation will be retained and enhanced insofar as possible. Hedgerows will be retained or reinstated where possible. Where hedgerows will need to be removed to facilitate the footprint of the proposed Project, these will be replaced with areas of planting throughout the site. Mitigation measures for the loss of habitat

at XC201 Thomastown, planting of native scrub and trees, will be incorporated into the landscape plan (see Volume 3, Chapter 13: Landscape and Visual). Plant species will be selected to complement the existing broadleaf hedgerow species mix around the site and will be of local provenance. Any residual space between the landscape measures will be planted with a wild grass seeding mix of local provenance.

Bats

Mitigation measures for the loss of habitat at Thomastown have been detailed above. These measures will also protect bat species from loss of foraging and commuting habitat.

Breeding Birds

BoCCI Amber and Green List Species

To mitigate for loss of nesting habitat trees, hedgerows and scrub will be incorporated into the landscape plan at Thomastown. Whilst no significant impacts are anticipated during the operational phase, this will provide compensatory habitat for some bird species. Nest boxes will also be provided to compensate for passerine habitat loss. One large mature tree will be lost at XC201 Thomastown. Four nest boxes to accommodate different species will be provided and these will be erected under supervision of a suitably qualified ecologist at appropriate locations.

XC211 Newtown and XC212 Ballycoskery

Habitats

An indicative Mitigation Strategy has been developed (see Appendix 7H) which details the method for translocating the area of tall herb swamps (FS2), including the Annex I habitat (6430) Hydrophilous tall herb swap communities, which will be lost under the footprint of the proposed Project. The extent of the receptor site for this habitat will be based on a like for like area basis.

Areas of existing vegetation will be retained and enhanced insofar as possible. Hedgerows will be retained or reinstated where possible. Where hedgerows will need to be removed to facilitate the footprint of the proposed Project, these will be replaced with areas of planting throughout the site. Mitigation measures for the loss of habitat at Newtown and Ballycoskery, planting of native scrub and trees will be incorporated into the landscape plan (see Volume 3, Chapter 13: Landscape and Visual). Plant species will be selected to complement the existing broadleaf hedgerow species mix around the site and will be of local provenance. Any residual space between the landscape measures will be planted with a wild grass seeding mix of local provenance.

Bats

Mitigation measures for the loss of habitat at XC211 Newtown and XC212 Ballycoskery have been detailed above. These measures will also protect bat species from loss of foraging and commuting habitat.

Breeding Birds

BoCCI Amber and Green List Species

To mitigate for loss of nesting habitat trees, hedgerows and scrub will be incorporated into the landscape plan at XC211 Newtown and XC212 Ballycoskery. Whilst no significant impacts are anticipated during the operational phase, this will provide compensatory habitat for some bird species. Nest boxes will also be provided to compensate for passerine habitat loss. A small area of scrub will be lost at XC211 Newtown and around 15 large mature trees will be lost at XC212 Ballycoskery. Two nest boxes at XC211 Newtown and fifteen boxes at XC212 Ballycoskery to accommodate different species will be provided and these will be erected under supervision of a suitably qualified ecologist at appropriate locations.

Wintering Birds

No infilling or direct discharge of pollutants will occur to the pond at XC211 Newton, which is used by several species of wintering birds. Pollution control measures are detailed in Section 7.7.1.1. These measures will ensure no disturbance or loss of habitat for wintering birds at XC211 Newtown.

XC215 Shinanagh

Habitats

Areas of existing vegetation will be retained and enhanced insofar as possible. Hedgerows will be retained or reinstated where possible. Where hedgerows will need to be removed to facilitate the footprint of the proposed Project, these will be replaced with areas of additional planting throughout the site. Mitigation measures for the loss of habitat at XC215 Shinanagh, planting of native scrub and trees will be incorporated into the landscape plan (see Volume 3, Chapter 13: Landscape and Visual). Plant species will be selected to complement the existing broadleaf hedgerow species mix around the site and will be of local provenance. Any residual space between the landscape measures will be planted with a wild grass seeding mix of local provenance.

Badger

No large areas of badger habitat will be lost. Mitigation measures for the loss of habitat at XC215 Shinanagh have been detailed above. These measures will also protect badgers from loss of foraging and commuting habitat.

Bats

Mitigation measures for the loss of habitat at XC215 Shinanagh have been detailed above. These measures will also protect bat species from loss of foraging and commuting habitat.

Breeding Birds

BoCCI Amber and Green List Species

To mitigate for loss of nesting habitat trees, hedgerows and scrub will be incorporated into the landscape plan at XC215 Shinanagh. Whilst no significant impacts are anticipated during the operational phase, this will provide compensatory habitat for some bird species. Nest boxes will also be provided to compensate for passerine habitat loss. Three large mature trees will be lost at XC215 Shinanagh. Four nest boxes to accommodate different species will be provided and these will be erected under supervision of a suitably qualified ecologist at appropriate locations.

XC219 Buttevant

Habitats

An indicative Mitigation Strategy has been developed (see Appendix 7G) which details the method for translocating the area of dry meadows and grassy verges (GS2), including the habitat corresponding to Annex I habitat (6510) Lowland hay meadows, which will be lost under the footprint of the proposed Project. The extent of the receptor site will be greater than a like for like area to include an area that will be enhanced for invertebrates, reptiles and birds.

Areas of existing vegetation will be retained and enhanced insofar as possible. Hedgerows will be retained or reinstated where possible. Where hedgerows will need to be removed to facilitate the footprint of the proposed Project, these will be replaced with areas of planting throughout the site. Mitigation measures for the loss of habitat at Buttevant, planting of native scrub and trees will be incorporated into the landscape plan (see Volume 3, Chapter 13: Landscape and Visual). Plant species will be selected to complement the existing broadleaf hedgerow species mix around the site and will be of local provenance. Any residual space between the landscape measures will be planted with a wild grass seeding mix of local provenance.

A section of a stone wall will be removed at this site. The stones from this wall will be retained and moved to the lowland hay meadow receptor site to create refugia for reptiles. An EcoW will be present during these works to check for reptiles and a license may be required if reptiles are found to be present.

Bats

Mitigation measures for the loss of habitat at XC219 Buttevant have been detailed above. These measures will also protect bat species from loss of foraging and commuting habitat.

Breeding Birds

BoCCI Amber and Green List Species

To mitigate for loss of nesting habitat trees, hedgerows and scrub will be incorporated into the landscape plan at Buttevant. Whilst no significant impacts are anticipated during the operational phase, this will provide compensatory habitat for some bird species. Nest boxes will also be provided to compensate for passerine habitat loss. Three nest boxes to accommodate different species will be provided and these will be erected under supervision of a suitably qualified ecologist at appropriate locations at the proposed project.

Wintering Birds

As no significant impacts to wintering birds are predicted as a result of the operation of the proposed Project, no mitigation measures are required.

7.8 Residual Effects

Residual significance is defined as the level of significance of a potential impact following the implementation of mitigation. A summary of impacts before and after proposed mitigation measures is provided in Table 7.27.

Through the implementation of well-established approaches to mitigation, which will be implemented in accordance with best practice guidance, it will be possible to reduce the impacts to at least not significant for the KERs.

Table 7.27: Summary of Impacts

Ecological Feature	Conservation Value of Study Area for Feature	Impact Type	Significance	Mitigation Measures	Residual Significance
Construction					
Designated Sites					
River Blackwater (Cork/Waterford) SAC	International	Mortality, Disturbance and Pollution of watercourses	Significant Adverse (Local to County)	Mitigation measures as outlined in Section 7.7.1.	Not significant
Kilcolman Bog SPA	International	Disturbance	Significant Adverse (National)	Mitigation measures as outlined in Section 7.7.1.	Not significant
Kilcolma Bog pNHA	National	Disturbance	Significant Adverse (National)	Mitigation measures as outlined in Section 7.7.1.	Not significant

Ecological Feature	Conservation Value of Study Area for Feature	Impact Type	Significance	Mitigation Measures	Residual Significance
Fauna					
Otter	International	Disturbance and Pollution of watercourses	Significant Adverse (Local)	Mitigation measures as outlined in Section 7.7.1.	Not significant
Badger	Local Importance (Higher Value)	Injury and Disturbance	Significant Adverse (Local)	Mitigation measures as outlined in Section 7.7.1.	Not significant
Small mammals	Local Importance (Higher Value)	Mortality and Disturbance	Significant Adverse (Local)	Mitigation measures as outlined in Section 7.7.1.	Not significant
Amphibians	Local Importance (Higher Value)	Mortality and Disturbance	Significant Adverse (Local)	Mitigation measures as outlined in Section 7.7.1.	Not significant
Fish (including salmon, lamprey spp. and European eel)	International	Mortality and Pollution of watercourses	Significant Adverse (Local to County)	Mitigation measures as outlined in Section 7.7.1.	Not significant
White-clawed crayfish	International	Mortality and Pollution of watercourses	Significant Adverse (Local to County)	Mitigation measures as outlined in Section 7.7.1.	Not significant
Breeding birds	Local Importance (Higher Value)	Mortality and Disturbance	Significant Adverse (Local)	Mitigation measures as outlined in Section 7.7.1.	Not significant
Wintering birds (including SCI species)	International	Disturbance	Significant Adverse (National)	Mitigation measures as outlined in Section 7.7.1.	Not significant
Operational					
Habitat					
Hedgerow	Local Importance (Higher Value)	Habitat loss	Significant Adverse (Local)	Mitigation measures as outlined in Section 7.7.2.	Not significant
Treeline	Local Importance (Higher Value)	Habitat loss	Significant Adverse (Local)	Mitigation measures as outlined in Section 7.7.2.	Not significant

Ecological Feature	Conservation Value of Study Area for Feature	Impact Type	Significance	Mitigation Measures	Residual Significance
Scrub	Local Importance (Higher Value)	Habitat loss	Significant Adverse (Local)	Mitigation measures as outlined in Section 7.7.2.	Not significant
Drainage ditches	Local Importance (Higher Value)	Habitat loss	Significant Adverse (Local)	Mitigation measures as outlined in Section 7.7.2.	Not significant
Tall herb swamps - including the Annex I habitat 6430 Hydrophilous tall herb swap	National Importance	Habitat loss	Significant Adverse (Local to County)	Mitigation measures as outlined in Section 7.7.2.	Not significant
Dry meadows and grassy verges - including 6510 lowland hay meadows	County to National Importance	Habitat loss	Significant Adverse (Local to County)	Mitigation measures as outlined in Section 7.7.2.	Not significant
Dry meadows and grassy verges	Local Importance (Higher Value)	Habitat loss	Significant Adverse (Local)	Mitigation measures as outlined in Section 7.7.2.	Not significant
Stone walls	Local Importance (Higher Value)	Habitat loss	Significant Adverse (Local)	Mitigation measures as outlined in Section 7.7.2.	Not significant
Fauna					
Badger	Local Importance (Higher Value)	Habitat loss	Significant Adverse (Local)	Mitigation measures as outlined in Section 7.7.2.	Not significant
Bats	Local Importance (Higher Value)	Habitat loss	Significant Adverse (Local)	Mitigation measures as outlined in Section 7.7.2.	Not significant
Breeding birds	Local Importance (Higher Value)	Habitat loss	Significant Adverse (Local)	Mitigation measures as outlined in Section 7.7.2.	Not significant

7.9 Interactions

Interactions are addressed in Volume 3, Chapter 17: Interactions and Cumulative Impacts.

In summary, the interactions between the seven sites was addressed during the primary assessment. Were the construction phases at each existing crossing within the proposed Project to overlap, they are far enough apart to

not have a significant impact on each other; except for proposed crossings XC211 Newtown and XC212 Ballycoskery which have been considered together within this chapter as a result. It is, however, not anticipated that there will be any significant construction or operational changes.

7.10 Cumulative Effects

Cumulative effects are addressed in Volume 3, Chapter 17: Interactions and Cumulative Impacts.

In summary: there is potential for cumulative effects between hydrologically linked sites through a deterioration in water quality should a construction related pollution event occur. However, with the full implementation of mitigation measures detailed in this chapter, it is not anticipated that there will be any significant cumulative effects.

The risk of cumulative impacts from other local schemes is considered not significant due to the scale and location of the proposed Project. Residual impacts from the proposed Project are not significant following extensive mitigation discussed in this chapter. The N20, running north to south from Limerick to Cork, is proposed to be upgraded to the M20 motorway in its entirety. The N20 is close to some of the crossings, namely XC211 Newtown, XC212 Ballycoskery and XC215 Shinanagh. This scheme is currently within the design stage with construction anticipated to commence in 2023 with completion in 2027. As the proposed Project is projected for completion in October 2022 it is anticipated that there will be no overlap with the M20 construction programme.

Other major schemes within the local area will be subject to the EIA process and Appropriate Assessment process where appliable, with the intention to ensure that there are no significant impacts on biodiversity; therefore, the risk of cumulative impacts is considered not significant.

7.11 Difficulties Encountered in Compiling Information

Ecological surveys are limited by a variety of factors which affect the presence of flora and fauna; for example, climatic variation, season and species behaviour. Evidence of protected species is not always recorded during a survey. This does not mean that a species is absent; hence the surveys also record and assess the ability of habitats to support species. Ecological surveys provide evidence of ecological activity for a snapshot of time. No major limitations were encountered in gathering data. It is considered that the baseline data collected is sufficient to inform a robust and thorough assessment of potential impacts. White-clawed crayfish sampling was undertaken outside the optimal survey window. However, although crayfish are less active in winter their presence should still be detected at this time of year. Although a small number of fields at XC219 Buttevant and XC201 Thomastown were out of the viewshed during the whooper swan surveys this was not deemed a limitation as all were assessed as being unsuitable to support foraging/roosting swans. Nocturnal newt surveys were undertaken in January 2020 outside of the optimal survey period (March – May), however a precautionary approach was taken and where suitable supporting habitat was present it was assumed that newts were present if none were found during field survey.

7.12 References

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