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Memorandum

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Date	11 March 2021
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MITIGATION STRATEGY

PURPOSE OF DOCUMENT

This document is intended to inform discussion of mitigation strategies required to avoid impacts to protected species and habitats from the Cork Line Level Crossings Project. This includes the proposed translocation of habitats corresponding to Annex I habitat identified at two locations. The document presents information on the location, value, extent and potential mitigation for the loss of these habitats. The proposed receptor sites are identified and a draft method for translocation provided. With implementation of this mitigation there should be no residual impacts from the loss of these habitats. This document also presents mitigation measures for aquatic species, bird, amphibians and reptiles; providing details on protective measures for white-clawed crayfish and fish, habitat enhancement and installation of bird boxes including the proposed mitigation locations.

INTRODUCTION

Baseline surveys undertaken in July 2019 for the Cork Rail line project identified habitats with potential links to Annex I types at two locations; Ballycoskery and Buttevant (see **Figure 1**). These areas were not part of any Special Area of Conservation. A species list was generated for each site as per the Project scope and is provided below. A site condition assessment was not carried out however the number of positive and negative species indicators was identified during the desk based review and is detailed for each habitat type. This document sets out a preliminary method for translocating these two areas of habitat which will be permanently lost under the footprint of new roads that will facilitate level crossing closures.

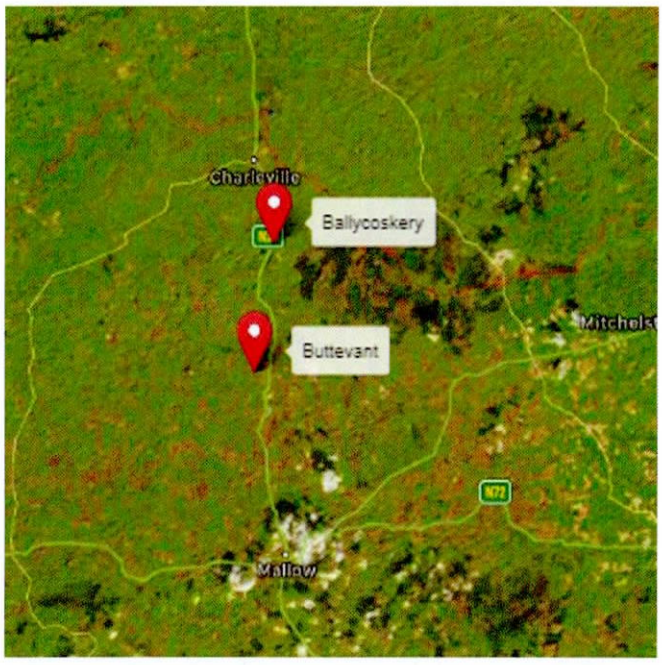


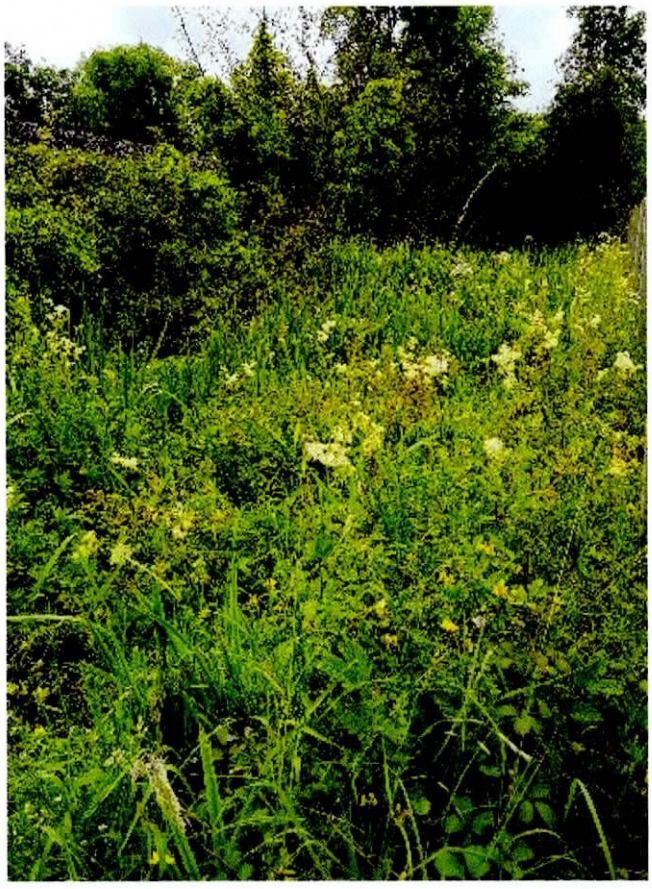
Figure 1: Two locations of habitat corresponding to Annex I types.

BASELINE

BALLYCOSKERY

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

This habitat was rare within the study area only being recorded at one location, namely Ballycoskery. 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 60m x 3m or around 200m^2 (**Photograph 1**). Tall-herb swamps are comparatively species-rich stands of herbaceous vegetation that often occur in wet areas where the water table is above the ground surface. However, this habitat is not necessarily wet all year round; the key condition for the development of this habitat is the lack of regular biomass removal.



Photograph 1: Tall herb swamp (FS2) links with with EU HD Annex I habitat 6430 Hydrophilous tall herb.

This habitat supported a variety of species and was dominated by tall herbs such as yellow iris (*Iris pseudacorus*), meadowsweet (*Filipendula ulmaria*), 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*). According to the community synopsis[1] 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.

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

Although a detailed conservation assessment was not undertaken this habitat type is considered to correspond to the Annex I habitat Hydrophilous tall herb (6430) based on the criteria set out in O'Neill et al. 2013). This habitat supported eight positive indicator species of this Annex I habitat i.e. *Angelica sylvestris, Epilobium hirsutum, Epilobium parviflorum, Filipendula ulmaria, Galium palustre, Iris pseudacorus, Mentha aquatica, Myosotis scorpioides*. One negative indicator species (*Phalaris arundinacea*) was recorded, although in low abundance.

Pressures on the habitat include invasive species; and agricultural intensification and drainage in the lowlands. Based on the latest Article 17 reporting[2] 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.

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

BUTTEVANT

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*).

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 with an approximately length of 50m and approximately 5m wide and covered an area of around 340m^2 (**Photograph 2**). 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 medick *(Medicago lupulina),* creeping cinquefoil (*Potentilla reptans*) and ox-eye daisy *(Leucanthemum vulgare).* Pyramidal orchid (*Anacamptis pyramidalis)* was also abundant within this area of grassland (**Photograph 3**). 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).* According to the community synopsis[3] 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

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2 https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2019_Vol1_Summary_Article17.pdf

3 http://www.biodiversityireland.ie/wordpress/wp-content/uploads/GL3C-.pdf (Accessed December 2019)

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).

Photograph 2: Area of species rich grassland (GS2) at Buttevant.

Photograph 3: Pyramidal orchid was abundant within the grassland at Buttevant.

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). Consequently, it is possible that over time there may be an increase in scrub encroachment into this habitat resulting in the reduction or loss of this habitat type.

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 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.

EXTENT OF HABITAT LOSS AND PROPOSED RECEPTOR SITES

The area of permanent FS2 habitat loss at Ballycoskery is approximately 40m^2 of the northern end of the existing 200m^2 strip (existing habitat (approximation) shown in yellow in **Figure 2** below for illustrative purposes only).

At Buttevant the majority of the existing GS2 habitat will be lost and this equates to an area of approximately 300m^2 of the existing 340m^2 area (existing habitat (approximation) shown in yellow in **Figure 3** below for illustrative purposes only).

Suitable areas have been identified as potential receptor sites that are contiguous with the existing habitats and these are identified in **Figures 2** and **3** below. The extent of the receptor site at Ballycoskery is based on a like for like area basis. The receptor site would increase the extent of the existing site westward (running east to west) into the adjacent field to mitigate for the loss of habitat at the northern end.

The extent of the receptor site at Buttevant includes an additional area that will be enhanced for invertebrates and birds. For each proposed location the pre- and post-construction methodology would be as described below.

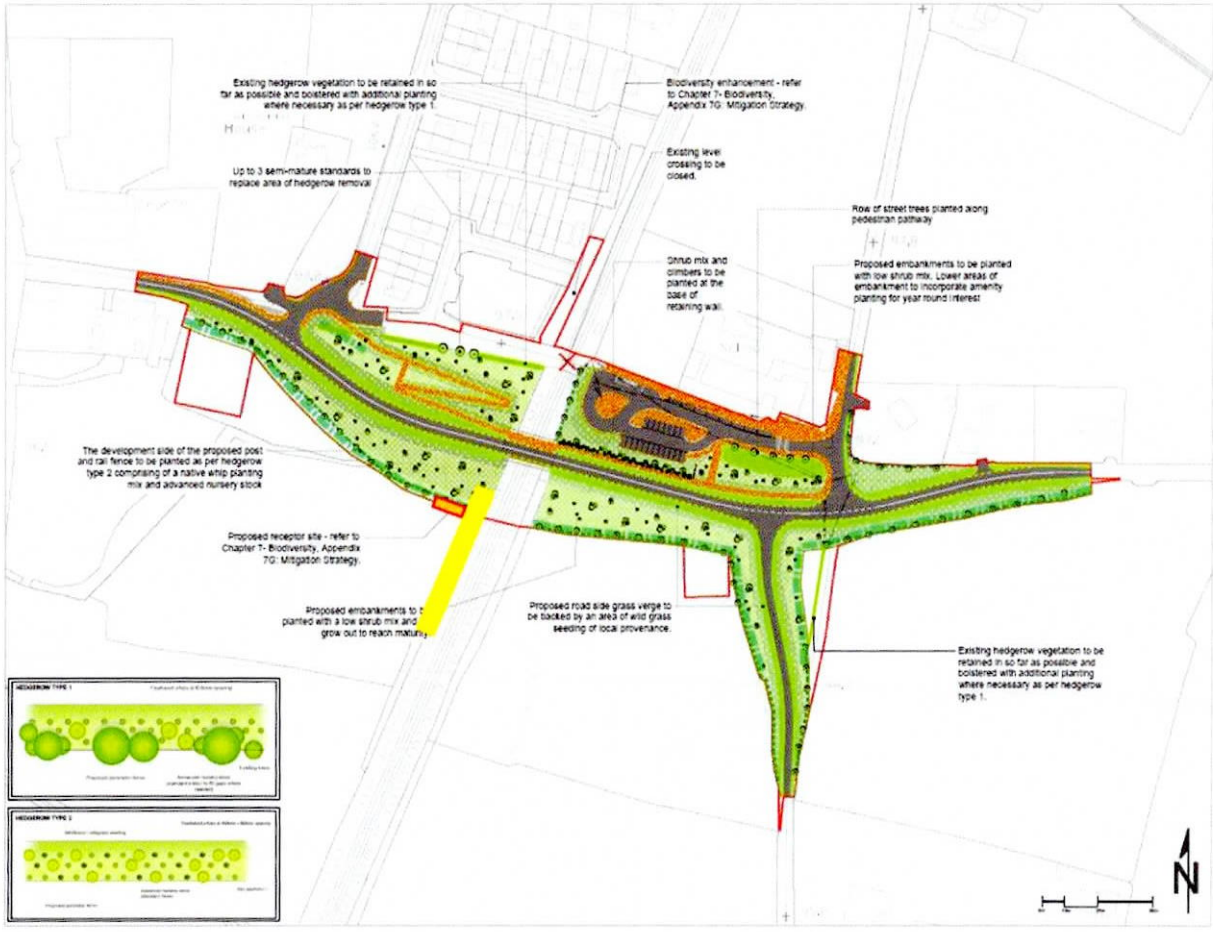

Figure 2: Ballycoskery design and proposed land-scaping. Annex I habitat in yellow and proposed receptor site in orange.

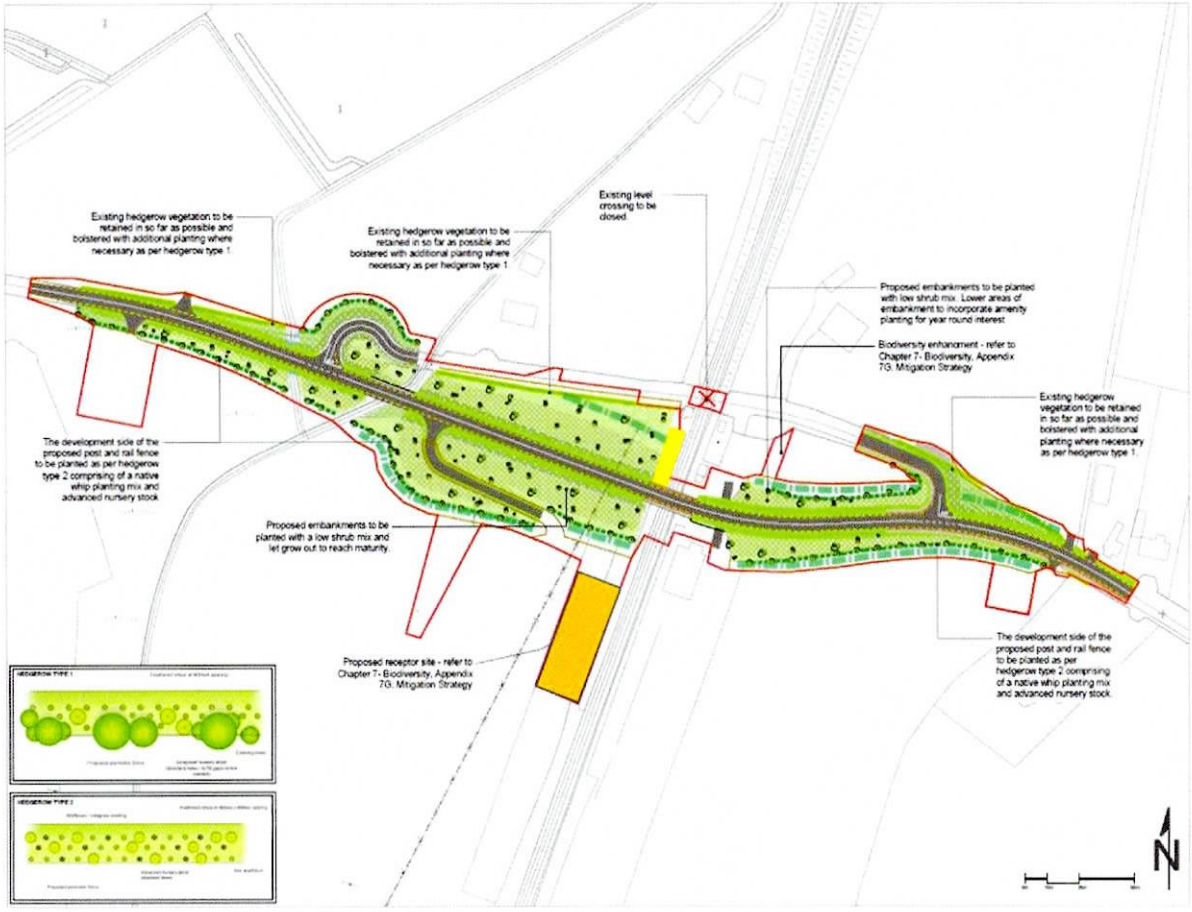

Figure 3: Buttevant design and proposed land-scaping. Annex I habitat in yellow and proposed receptor site area in orange.

PRE-CONSTRUCTION

A detailed site inspection, including condition assessment, at donor and receptor sties will be undertaken. Sites will be surveyed by an experienced botanist in June and the existing habitat mapped in detail. The substrate will be assessed by digging soil pits to determine rooting depth to aid the design of the translocation. Any constraints present at the donor and receptor sites will be identified, e.g. soil testing to identify soil pH along with nitrogen, phosphorus and potassium (NPK) values for the soils. Each site will be assessed for any issues such as nutrient seepage and any issues that may carry implications for further management of this habitat. If a site is determined though the above assessment as being not-suitable as a receptor site, an alternative site will be identified and consultation/agreement with NPWS obtained.

BALLYCOSKERY

At Ballycoskery an assessment by a hydrologist is also required to determine whether conditions at the receptor site would be suitable for habitat translocation. The drainage pattern will be assessed and whether alterations to drains may be required to support translocation at this site. Preparation of receptor site and translocation of turves (seed bank, above ground vegetation and below ground roots) should be undertaken in early autumn when vegetation is dying back and the ground is still dry enough to disturb. Turves will not be removed and stored prior to translocation to increase potential of success.

At Ballycoskery stock fencing will be installed to prevent grazing and poaching by livestock. Where present overhanging vegetation, scrub comprising small bushes and trees, will be trimmed back to reduce leaf litter. Depending on prevailing conditions, including extent of ground water, one of three options can be taken forward:

1. The fenced-off receptor site is left as is and allowed to generate naturally with no interventions. This will be the preferred option if the detailed site inspection results indicate that it is likely to develop into the target habitat without intervention.

2. The receptor site is enhanced through seeding using the existing seed bank at the donor site. This option will be advised by the site inspection and the findings of the botanist, given that seed banks can contain a high percentage of weeds and some target species may not have persistent seed banks.

3. The receptor site is cleared of all vegetation and turves (including seed bank) and replaced with all vegetation and turves (including seed bank) from the donor site.

For option 2 plugs or turves containing seed bank will be removed from the donor site and placed in pre-prepared plots within the receptor site. This will be advised by the findings of the site inspection. For option 3 the entire donor site area will be removed to an appropriate depth, to be determined by detailed site inspection and pre-construction survey, and moved to the cleared receptor site. Under the direction of an experienced Ecological Clerk of Works (EcoW), turves will be laid by hand or with the use of specialist plant on the pre-prepared bare ground and staked-in to prevent movement. Turves will not be translocated when the ground is water-logged or frozen. Translocation of the habitat at Ballcoskery will be completed within one day where possible.

BUTTEVANT

At Buttevant the existing wall between the adjacent field and the receptor site will be retained. An area corresponding to that which will be lost, or greater as directed by the experienced ECoW, will be cleared of dense vegetation using hand-tools. The receiving ground will be prepared by striping back and removing all vegetation to a suitable depth. This activity must be undertaken outside the breeding bird period. Where this is not possible checks for breeding birds will be carried out at within three days of commencement of clearance and by an experienced ornithologist or EcoW. Where nests are present, the ornithologist/EcoW 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.

The grassland should be mown when the plants become dormant (August/September) and the hay should be retained. Once the ground is prepared at the receptor site turves will be removed by hand or with the use of specialist plant and to an appropriate depth. The hay from the meadow will be scattered over the receptor site. Correct depth of turves and scattering of hay will ensure that the entire seed bank is removed and will reduce the impact to ground-living insects. Turves will not be removed when the ground is frozen or water-logged. Mowing, preparation of the receptor site and translocation of the grassland will be completed within three days where possible.

POST-CONSTRUCTION

Receptor sites will be monitored for a period of three years. Corrective measures such as vegetation trimming or annual mowing may be required to maintain conditions at receptor sites. At Buttevant the receptor site is currently dominated by scrub which will need to be managed for the translocation to succeed. Management should include the removal of scrub species fully through clearance of scrub to ground level and maintenance of scrub at this level. This site should be mowed yearly initially, and every second year once it has established and its condition has been assessed as good.

OTHER MITIGATION MEASURES

Aquatic species

To protect aquatic species, white-clawed crayfish and fish, specific mitigation measures as follow will be implemented at Buttevant:

- where culverts are to be installed the area will be dewatered to provide a dry working area. The Pepperhill River and the ditch at Buttevant will have culverts installed in succession so that flows can be maintained downstream during installation;
- 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;
- hand searches will be conducted by the licenced ECoW and any crayfish found will be removed 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; and
- once construction is completed the watercourse will be re-wetted under the direction of the 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.

Breeding birds

To mitigate for loss of nesting habitat trees, hedgerows and scrub will be incorporated into the landscape plan at Thomastown, Newtown and Ballycoskery, Shinanagh and Buttevant. This will ensure that there are no residual effects from the operational phase of the project. Nest boxes will also be provided to compensate for passerine habitat loss. In total, twenty-eight nest boxes to accommodate different species will be provided and these will be erected under supervision of a suitably qualified ecologist at appropriate locations. Suitable nest box locations have been proposed taking the following into consideration;

- Some of the bird boxes are designed for trees while others are designed for lower scrubby areas in order to target different species. Therefore, both trees and scrub areas have been proposed for installing nest boxes.

- There may be potential for boxes to be installed on Irish Rail properties however this should be avoided where swallows or house martins are already nesting as these species are territorial and will chase other birds away. Additionally, any boxes on buildings should be at a sufficient height, away from disturbance and unable to be accessed by predators from above or below. In general boxes should be placed on trees or in scrub as several species will not nest unless the box is within vegetation.

- Bird boxes should be placed on mature trees as they are approximately 15cm wide and may not be accommodated by all semi-mature trees.

- Birds boxes on poles would need to be between 3m and 5m in height. These can appear unusual/unsightly and there are issues with maintenance of such boxes,

- Boxes should be placed facing north and ideally only one box should be installed per tree.

Proposed locations for bird boxes at each site shown below in **Figures 4-8**.

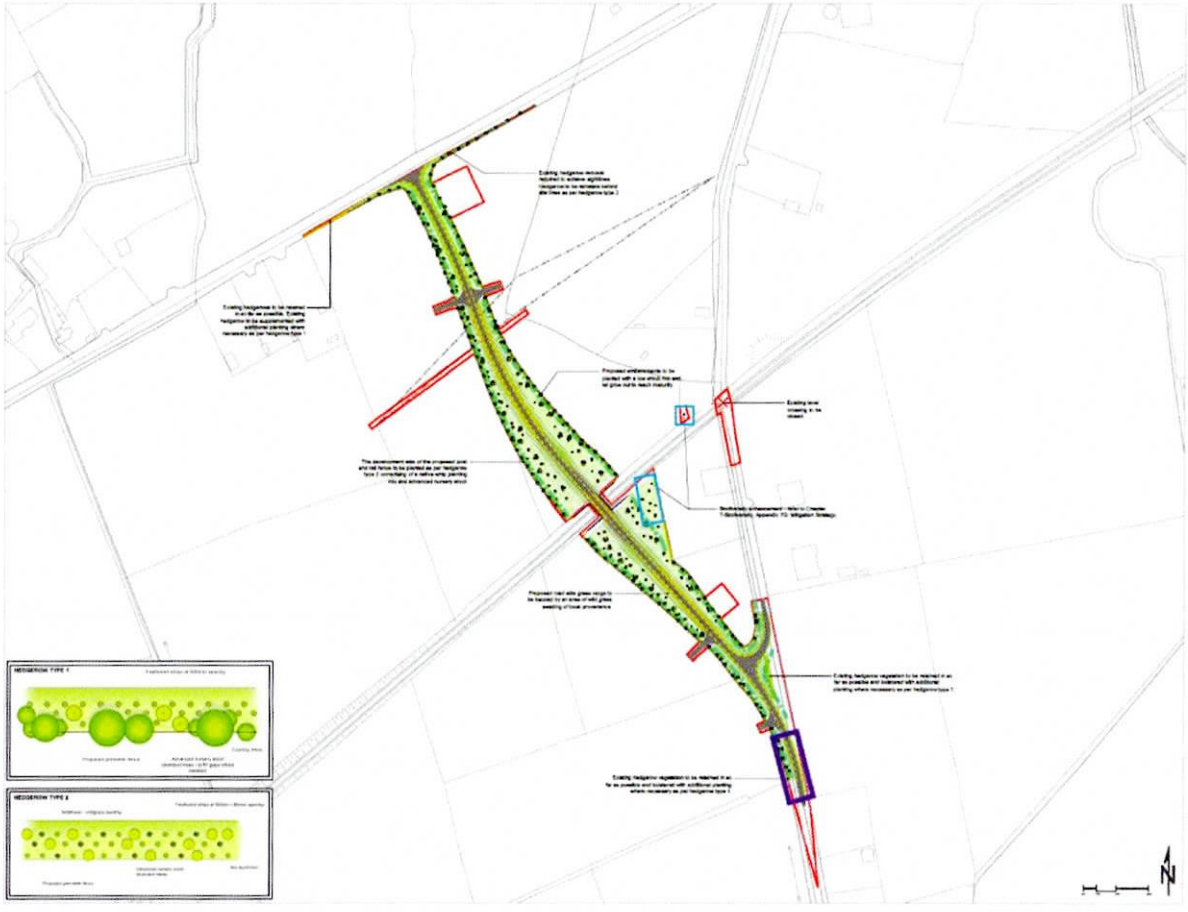

Figure 4: Proposed locations for four bird boxes at Thomastown. One area of scrub, along with one mature tree within Irish Rail owned lands (shown by blue boxes) are locations proposed for bird box installation. The purple box shows the location of one large mature tree which will be lost.

Figure 5: Proposed locations for two bird boxes at Newtown within an area of scrub within Irish Rail owned lands (shown by the blue box). The purple box shows the location of a small area of scrub which will be lost. The blue oval surrounded by green shows the location of an existing pond which will be discussed further below.

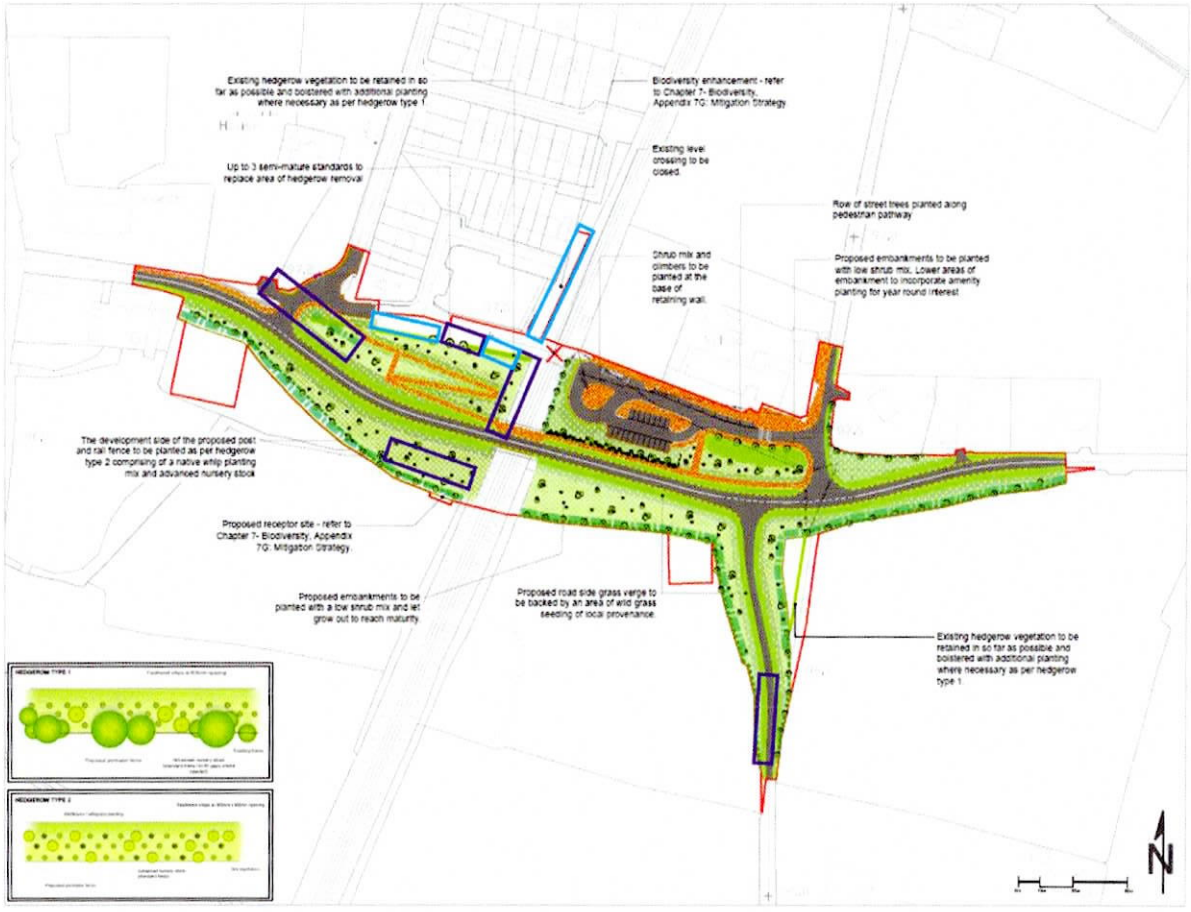

Figure 6: Proposed locations for fifteen bird boxes at Ballycoskery within several mature treelines (shown by blue boxes). The purple boxes indicate the locations of approximately fifteen large mature trees which will be lost.

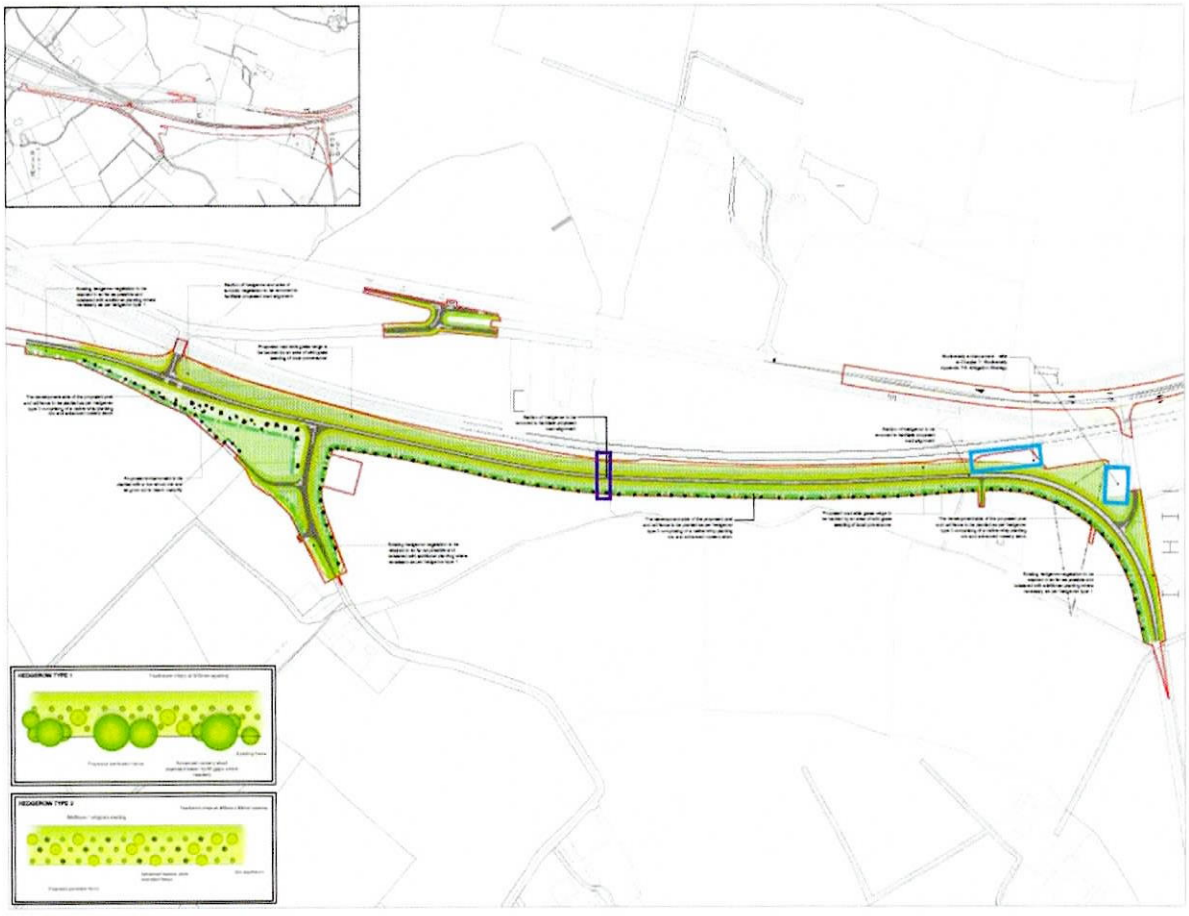

Figure 7: Proposed locations for four bird boxes at Shinanagh within two areas of scrub/hedgerow (shown by blue boxes). The purple box indicates the location of three large mature trees which will be lost.

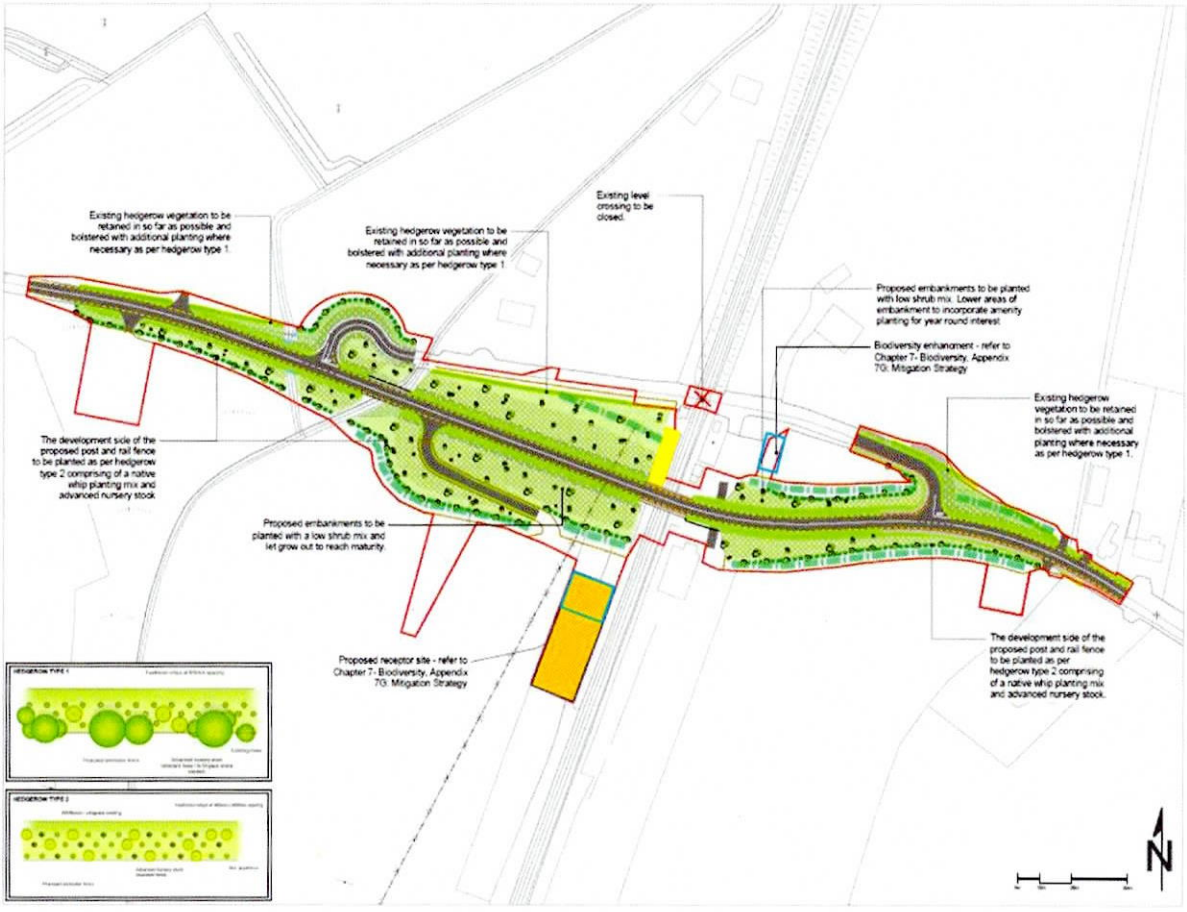

Figure 8: Proposed locations for three bird boxes at Buttevant within an area of scrub and mature trees (shown by blue boxes).

Amphibians and Reptiles

At Newton there is an existing pond where frogs have been recorded and which contains suitable habitat for newts (see **Figure 5**). Enhancement of this feature should be included as part of the landscape plan, including planting around the edges to enhance this feature. Plants to include emergent and floating vegetation to encourage frogs and newts. The existing stone wall at Buttevant will be retained where possible. One section will be removed however, the stones 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 licence may be required if reptiles are found to be present.

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