# Proposed Bridge Rehabilitation Programme 2021
# Mohernagh Bridge,
# Co. Limerick

# NATURA IMPACT STATEMENT

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## EXECUTIVE SUMMARY

The current document provides the relevant information to allow the Competent Authority to undertake an Appropriate Assessment of the proposed rehabilitation works at Mohernagh Bridge, Co. Limerick. A 'Screening for Appropriate Assessment' determined that significant impacts on the conservation objectives of the Lower River Shannon SAC and the River Shannon and River Fergus Estuaries SPA were likely. Mitigation to reduce / avoid these impacts is required and is set out here in this NIS. A letter from the Development Applications Unit of the Department of Tourism, Culture, Arts, Gaeltacht, Sport and Media was received by Punches Consulting on the 15th of March 2021, provided in Appendix 2. The letter outlined recommendations / observations for Nature Conservation and are summarised in the current report, in addition to a summary of how these comments are addressed by Ecofact for the proposed works at Mohernagh Bridge.

Mohernagh Bridge is located c. 7.2rkm upstream of both the Lower River Shannon SAC and the River Shannon and River Fergus Estuaries SPA. Although upstream of the SAC boundary, salmonid habitat is present at the site and there is potential for Salmon to be present here. There is also the potential for Brook / River lamprey and Otters to be present at the site. None of the habitats of the SAC or SPA are present at the site but are located downstream with a hydrological connection. The bird species of the SPA are unlikely to be present at the site but again are located downstream, with some previously recorded at the mouth of the River Owvane (Limerick) near the SPA boundary at Loghill. Impacts on the affected Qualifying Interests were identified as water quality, disturbance and invasive species.

The proposed works at Mohernagh Bridge mainly comprise replacing the bridge deck, slab and beams with a new precast concrete culvert as well as constructing new reinforced concrete wing walls and foundations. The proposed works will involve instream work and excavation of the riverbed to a depth of up to 1.7m. Water quality impacts could arise from increased suspended solids, contaminants entering the watercourse, spillages of oils / fuels, cement / concrete and / or root herbicide. Dewatering of areas also poses risks to water quality. Disturbance may arise through increased noise and human activity on site. Invasive species could also be introduced on site through vectors such as machinery.

The mitigation measures include a Detailed Method Statement and CEMP following listed guidelines, limiting the footprint of the works, using silt fences and sandbags, the site compound not located within 5m of river and will be on dry land, for instream works required access will be limited to a single route, impacts to riparian habitats will be minimised and with natural re-vegetation, timing of works outside lamprey and salmon spawning season, access maintained at all times under the bridge for Otter, any oiling / refuelling will be undertaken away from watercourse, oils / fuels will be in bunded tanks in site compound, machinery will be well maintained and checked for leaks, spill kits will be provided, security provided at site compound to deter vandalism, tool washing / grey water will be stored securely until removed off site, portaloos provided and regularly maintained by licensed facility, no vegetation debris allowed instream, silt fences on outside of works areas, sand bags placed inside de-watered works areas, works area fenced off, no concrete / cement mixing at river bank area, precast concrete used where possible, tarp or similar material placed underneath bridge to catch potential debris, no waste stored on site, the chosen ecologically safe herbicide will be named in the method statement and stored securely in site compound, site ecologist to agree 5 day weather window of low flow conditions, pumping out water from dewatered area, silt bags will be installed at the end of pipes, NRA guidelines followed for biosecurity, sterilise all equipment / work gear that comes into contact with river, all equipment steam cleaned before arriving on site, site ecologist will be employed and will give site induction and oversee the set-up of dry works areas, any lamprey species potentially caught behind sand bags will be translocated upstream with section 14 licence by the site ecologist.

Mitigation measures proposed ensure that there are no residual impacts on the Lower River Shannon SAC or the River Shannon and River Fergus Estuaries SPA. The potential impacts identified will be successfully reduced to imperceptible in scale following the implementation of the mitigation measures in this NIS. It has therefore been concluded that the proposed works do not pose a risk adversely affecting the integrity of any Natura 2000 site, either alone or in-combination with other plans or projects.

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# 1. INTRODUCTION

The current document provides the relevant information to allow the Competent Authority to undertake an Appropriate Assessment of the proposed rehabilitation works at Mohernagh Bridge, Co. Limerick. The location of the proposed development is provided in Figure 1 below. A 'Screening for Appropriate Assessment' determined that significant impacts on the conservation objectives of the Lower River Shannon SAC and the River Shannon and River Fergus Estuaries SPA were likely in the absence of mitigation measures. This report is included in Appendix 1 of the current report. Mitigation to reduce or avoid the identified impacts is required and is set out here in this Natura Impact Statement.

The preparation of this NIS for Appropriate Assessment is as required under the Habitats Directive (92/43/EEC) in instances where a plan or project may give rise to significant effects upon a Natura 2000 site. Natura 2000 sites are of European Importance and have been designated in accordance with the requirements of the EC Habitats Directive (1992) and EC Birds Directive (2009/147/EC); transposed into Irish legislation as the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011). The Habitats Directive, in combination with the Birds Directive (2009), establishes a network of internationally important sites designated for their ecological status; identified as Special Areas of Conservation (SACs) designated under the Habitats Directive for the protection of flora, fauna and habitats and as Special Protection Areas (SPAs) designated under the Birds Directive to protect rare, vulnerable and migratory birds. These sites together form a Europe-wide 'Natura 2000' network of designated sites, referred to in this report as Natura 2000 sites.

This assessment follows the Habitats Directive 92/43/EEC, Article 6(3) and the guidance published by the National Parks and Wildlife Service (DoEHLG, 2010) '*Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities*'. The current Natura Impact Statement (NIS) assesses the impact of the proposed bridge rehabilitation works at construction and operation stages in relation to direct, indirect and cumulative effects on the Integrity of the Natura 2000 network.

## 1.1 Consultation

The following statutory bodies provided information via publicly available sources for this report:

- National Parks and Wildlife Service (NPWS);
- Environmental Protection Agency (EPA);
- National Biodiversity Data Centre (NBDC).

A letter from the Development Applications Unit of the Department of Tourism, Culture, Arts, Gaeltacht, Sport and Media was received by Punches Consulting on the 15th of March 2021. This letter is provided in Appendix 2 of the current report. The letter outlined heritage-related observations / recommendations for the 2021 Bridge Rehabilitation Programme in Co. Limerick. The recommendations / observations for Nature Conservation are summarised below, in addition to a summary of how these comments are addressed by Ecofact for the proposed works at Mohernagh Bridge.

The Development Applications Unit highlighted the need for the issue of invasive alien plant and animal species, as well as Crayfish plague, to be assessed and detail methods required to ensure such species and diseases are not accidentally introduced or spread during construction. Invasive species risk has been assessed in the current report and potential impacts noted. Mitigation for biosecurity has also been provided in section 7.4.

The potential for bats roosting in bridges, as well as derogation licence requirements for bats and the impacts and guidelines are highlighted in the letter from the DAU. A daytime bat inspection was carried out and is detailed in the 'Other Ecological Interests' section 7 of the Screening for Appropriate Assessment Report for Mohernagh Bridge. No potential for bats was identified, the bridge was found to be generally unsuitable due to the flat and smooth structure. Furthermore, lighting is not included as part of the proposed bridge rehabilitation works at Mohernagh.

Protected watercourse / wetland species are noted in the DAU letter, with specific reference to Otters, Salmon, lampreys, Freshwater Pearl Mussels, White-clawed Crayfish, Frogs, Newts, and Kingfishers. Furthermore, water quality, riparian habitat and consultations with IFI are specifically mentioned, as well as potential impacts on vascular, bryophyte and lichen species. Some of the above mentioned species are qualifying interests of the Lower River Shannon SAC and have been assessed in the current NIS. Other species not listed as Q.I.s were assessed in the 'Other Ecological Interests' section of the Screening for Appropriate Assessment Report. Specific mitigation has been provided for the protection of water quality, disturbance reduction and invasive species impacts in the current NIS. IFI have also been consulted by Punches Consulting for specific bridge sites in the 2021 rehabilitation programme. NRA Guidelines are specifically mentioned and only lime mortar should be used for repointing, grouting etc.

Finally, the letter from the DAU regarding Nature conservation notes the potential requirements for licenses where impacts on protected species and their habitats, resting or breeding places may occur. No works during the bird nesting season, as well as appropriate surveys and survey methodology are also noted in the letter, included in Appendix 2. As mentioned, section 7 of the Screening for Appropriate Assessment report details surveys and results for Other Ecological Interests. The recommendations for the species covered in the 'Other Ecological Interests' section of the Screening included no works in the bird nesting season and water quality protection measures. Based on the desk studies and surveys at the site, assessment of impacts in the current NIS and the Other Ecological Interests section of the Screening, no derogation licenses were deemed to be required for the proposed works at Mohernagh bridge.

## 1.2 Legislative context

The current assessment takes account of Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora - '*The Habitats Directive'* which was transposed into Irish law by the '*European Community (Natural Habitats) Regulations 1997*' (S.I. No. 94/1997). The most recent transposition of this legislation in Ireland is the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011). The Birds Directive (2009/147/EC) which is now included in the former Regulations seeks to protect birds of special importance by the designation of Special Protection Areas (SPAs) whereas the Habitats Directive does the same for habitats and other species groups within Special Areas of Conservation (SACs), which are designated or proposed as candidate Special Areas of Conservation (cSACs). It is the responsibility of each member state to designate SPAs and SACs, both of which will form part of Natura 2000, a network of protected areas throughout the European Community. Article 6, paragraphs 3 and 4 of the EC 'Habitats' Directive (1992) state that:

*6(3) 'Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan*

*or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.'*

*6(4) 'If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted. Where the site concerned hosts a priority natural habitat type and / or a priority species, the only considerations which may be raised are those relating to human health or public safety, to beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest.'*

In addition, the European Court of Justice in Case C-127/02 (the "Waddenzee Ruling") has made a relevant ruling in relation to Appropriate Assessment and this is reflected in the current assessment:

*'Any plan or project not directly connected with or necessary to the management of the site is to be subject to an appropriate assessment of its implications for the site in view of the site's conservation objectives if it cannot be excluded, on the basis of objective information, that it will have a significant effect on that site, either individually or in combination with other plans or projects" and that the plan or project may only be authorised "where no reasonable scientific doubt remains as to the absence of such effects.'*

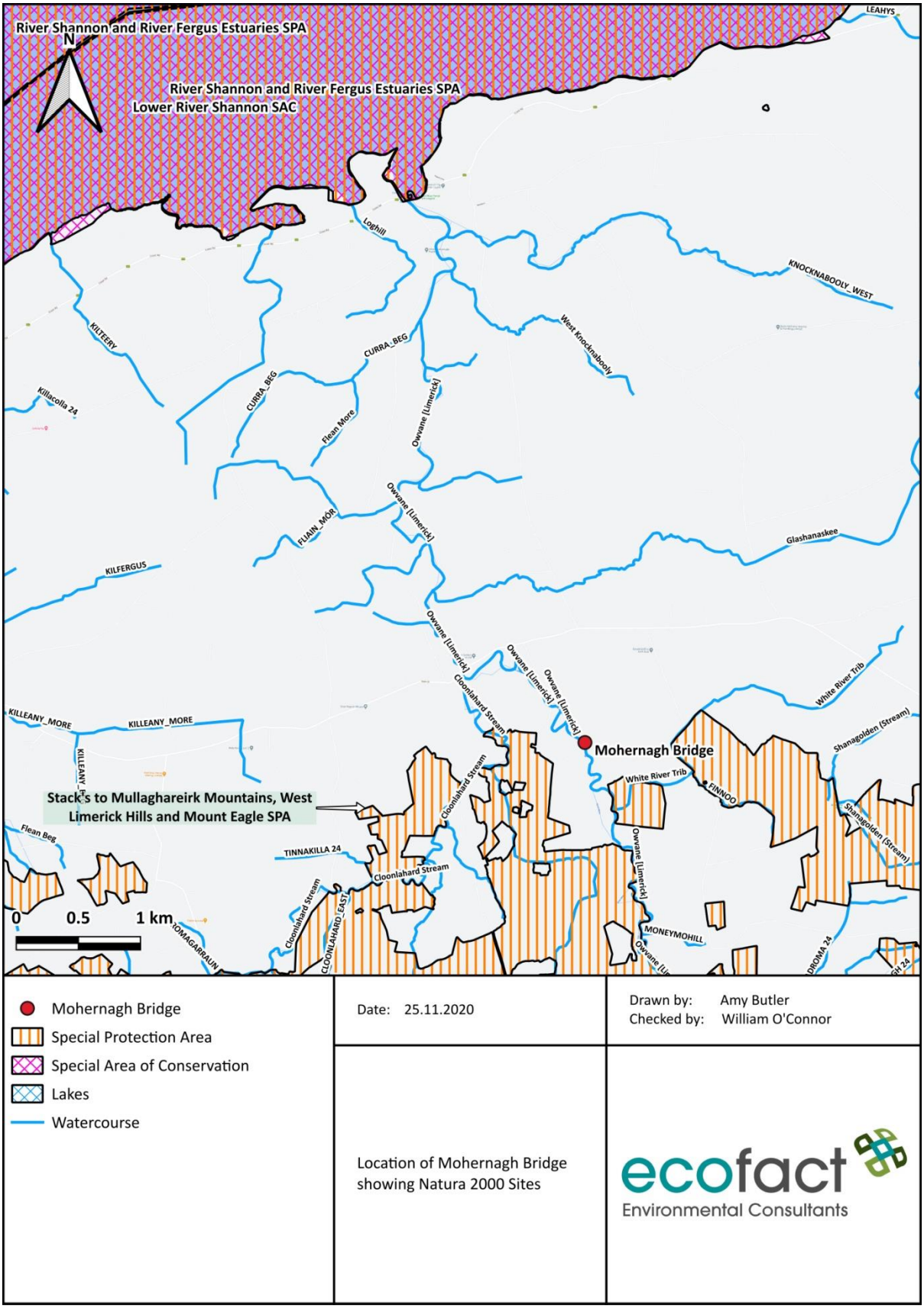


**Figure 1** Natura 2000 Sites within 15km of Mohernagh Bridge in County Limerick.

# 2. METHODOLOGY

## 2.1 Desktop Review

A desktop study was undertaken to identify the extent and scope of the potentially affected Natura 2000 sites within the current study area, in relation to the proposed bridge rehabilitation works at Mohernagh Bridge, Co. Limerick. The desktop study identified the conservation interests of the designated sites with respect to the qualifying interests (species and habitats) relevant to the designated sites within the area.

A review of published literature was undertaken in order to collate data on the receiving environment; a range of additional sources of information including scientific reports produced by, and information on the websites of the EPA and NPWS were also reviewed. Information sources reviewed included the NPWS site synopses for the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA, as well as protected species data held on the NPWS online database. The National Biodiversity Data Centre website was accessed for previous records of protected species in the area. A full bibliography of information sources reviewed is given in the reference section.

## 2.2 Site Survey

The site of the proposed bridge rehabilitation works was visited in March 2020. The proposed bridge rehabilitation works area and environs were inspected via a walkover survey for evidence of ecological features of high conservation concern such as those occurring in the closest Natura 2000 sites. The flora and fauna at the site of the proposed bridge works were identified and evaluated for ecological importance.

## 2.3 Appropriate Assessment Methodology

The preparation of this NIS for Appropriate Assessment follows the guidance published by DoEHLG (2010) '*Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities'*. According to these guidelines, assessing the impacts of a project or plan on a Natura 2000 site is a four staged approach, as described below:

- ***Stage One: Screening / Test of Significance*** - The process which identifies the likely impacts upon a Natura 2000 site of a project or plan, either alone or in combination with other projects or plans, and considers whether these impacts are likely to be significant;
- ***Stage Two: Appropriate Assessment*** - The consideration of the impact of the project or plan on the integrity of the Natura 2000 site, either alone or in combination with other projects or plans, with respect to the site's structure and function and its conservation objectives. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts;
- ***Stage Three: Assessment of Alternative Solutions*** - The process which examines alternative ways of achieving the objectives of the project or plan that avoid adverse impacts on the integrity of the Natura 2000 site; and
- ***Stage Four: Assessment Where Adverse Impacts Remain*** - An assessment of compensatory measures where, in the light of an assessment of Imperative Reasons of Overriding Public Interest (IROPI), it is deemed that the project or plan should proceed.

The safeguards set out in Article 6(3) and (4) of the Habitats Directive are triggered not by certainty but by the possibility of significant effects. Thus, in line with the precautionary principle, it is unacceptable to fail to undertake an appropriate assessment on the basis that it is not certain that there are significant effects.

### *2.3.1 Natura Impact Assessment*

A Natura Impact Statement (NIS) considers whether the plan or project, alone or in combination with other projects or plans, will have adverse effects on the integrity of a Natura 2000 site, and includes any mitigation measures necessary to avoid, reduce or offset negative effects. The current report is set out in the format of a NIS and comprises a scientific examination of the plan / project and the relevant Natura 2000 sites; to identify and characterize any possible implications for the site in view of the site's conservation objectives, structure and function, taking account of in combination effects. The requirements for Appropriate Assessment derive directly from Article 6(3) of the EU Habitats Directive (1992).

Direct and indirect impacts in isolation or in combination with other plans and projects on the identified Natura 2000 sites in view of the sites' conservation objectives have been examined. Case law of the European Court of Justice (ECJ) has established that Appropriate Assessment must be based on best scientific knowledge in the field. These are the qualifying interests i.e. Annex I habitats, Annex I bird species (EU Birds Directive, incorporated into the EU Habitats Directive) and Annex II species hosted by a site and for which that site has been selected. The conservation objectives for Natura sites (SACs and SPAs) are determined under Article 4 of the Habitats Directive and are intended to ensure that the relevant qualifying interests i.e. Annex I habitats, Annex I bird species and Annex II species present within the designated sites are maintained in a favourable condition. The current assessment of the proposed bridge rehabilitation works at Mohernagh Bridge in County Limerick provides a description of the project and the receiving environment. The conservation objectives of the Natura 2000 site potentially affected by the proposal are listed and potential impacts outlined with respect to the integrity of the Natura 2000 site. Mitigation measures have been proposed for the protection of the conservation interests and the avoidance of impacts to Natura 2000 sites occurring within the study area.

# 3. DESCRIPTION OF THE PROJECT

Limerick City & County Council proposed to undertake rehabilitation works at several bridges as part of the Rehabilitation Programme for 2021. Mohernagh Bridge is noted as a white river bridge crossing. The existing Mohernagh Bridge consists of reinforced concrete slab on composite steel and concrete beams supported on mass concrete abutment walls. The proposed works involves the removal of the existing bridge deck and replacing it with a precast concrete culvert construction. The abutments will be retained in position but will be redundant structures.

The proposed works for Mohernagh Bridge are summarised as follow (Punch Consulting Engineers, 2021):

- The river will be diverted and/or over pumped to allow the construction to proceed. The road is on a cul-de-sac serving few houses. A temporary pedestrian bridge and car-park will be constructed.
- All vegetation including trees, shrubs and the like will be removed for 10 m upstream and downstream of the bridge over a width of 30 m approximately. All efforts will be made to preserve mature and semi-mature trees, where possible.
- The bridge deck, slab and beams, will be removed. The riverbed will be excavated to a depth of up to 1.7 m below the existing riverbed. A subbase shall be formed at the new formation level consisting of a 500 mm subbase of graded granular material underlaid with a 300 mm thick lean-mix concrete base.
- The precast concrete culvert will be lowered into place in segments to form the core of the new bridge. The invert level of the culvert will be a minimum of 500 mm below the existing riverbed level and shall be laid to a gradient not steeper than 5%. The culvert bed will be backfilled with clean gravel to match the existing river profile and to initiate simulation of the riverbed. This will allow for the regeneration of a natural riverbed in the culvert. Reference shall be made to Inland Fisheries Ireland publication “Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters”.
- Cast insitu reinforced concrete wing walls and foundations will be constructed at both ends of the culvert to retain the embankment backfill.
- The remaining excavations, above the riverbed and outside the watercourse, will be backfilled with acceptable fill material to road formation level. The roadway will be reinstated using a surface course and binder (base), course of Dense Bitumen Macadam on a granular sub-base.
- Insitu reinforced concrete upstands for the parapet rails and raised plinths will be cast at the road edges on the bridge structure.
- Other ancillary items associated include; proprietary galvanised steel parapets; road side drainage; traffic signs; etc.

# 4. RECEIVING ENVIRONMENT

## 4.1 Introduction

Figure 2 shows the location of the proposed Mohernagh Bridge Rehabilitation works. Mohernagh Bridge in Co. Limerick is located over the River Owvane (Limerick) which eventually flows into the Lower River Shannon SAC and the River Shannon and River Fergus Estuaries SPA, both c. 7.2rkm downstream. The subject bridge is on a local access road c. 1.1km to the south-east of Ballyhahill Village and c. 5.2km west of Shanagolden Village. There are some broadleaved trees in the vicinity of the bridge site and there are some farm and residential buildings adjacent to the site. The main land use in the surrounding area is agriculture however, consisting of improved agricultural grassland and hedgerows.

## 4.2 River Owvane

Mohernagh bridge is situated over the 3rd order River Owvane (Limerick) (EPA Segment Code: 24_857). The River Owvane (Limerick) is located in west County Limerick. Approximately 2rkm downstream, the River Owvane is joined by the 3rd order Cloonlahard Stream (EPA Code: 24C06). The River Owvane then continues in a northerly direction for c. 7.2rkm before flowing into the Shannon estuary near the village of Loghill.

The River Owvane at Mohernagh Bridge has a 'Good' River Waterbody WFD Status (2013-2018) at the subject bridge site. It has a WFD River Waterbodies Risk status of 'At risk'. The nearest recent Q-rating on the watercourse was recorded in 2017 just c. 750rm downstream of Mohernagh Bridge, at the Bridge upstream of Ballyhahill Bridge (Station: 24O02 0090). A rating of Q4 was recorded here. This is equivalent to 'Good' water quality. Downstream of this monitoring point, the River Waterbody WFD Status 2013-2018 declines to 'Poor'. A Q-rating of Q4 was also obtained at the nearest upstream monitoring station to Mohernagh Bridge in 2017. This was at the Bridge South of Gortadroma (Station: 24O02 0075) which is located c. 2.2rkm upstream of Mohernagh Bridge.

The Ballynahill WwTP discharges into the River Owvane c. 2rkm downstream of the Mohernagh bridge site. There is no Annual Environmental Report or Inspectors report available for this WwTP (Reg No.: A0206-01). The application form notes that the WwTP has primary and secondary treatment and is serving an agglomeration of 221 p.e. (in 2010) (Limerick County Council, 2010a). It is unclear what the design capacity of the plant is. There is also the Loghill WwTP (Reg No.: A0217-01) which discharges into the lower reaches of the River Owvane where it is a transitional waterbody and enters the Shannon estuary. Again, there is no AER for this plant or Inspectors Report available online. The application form from 2010 notes that the WwTP does serve a p.e. of 200 but it is unclear what the design capacity of the plant is (Limerick County Council, 2010b).

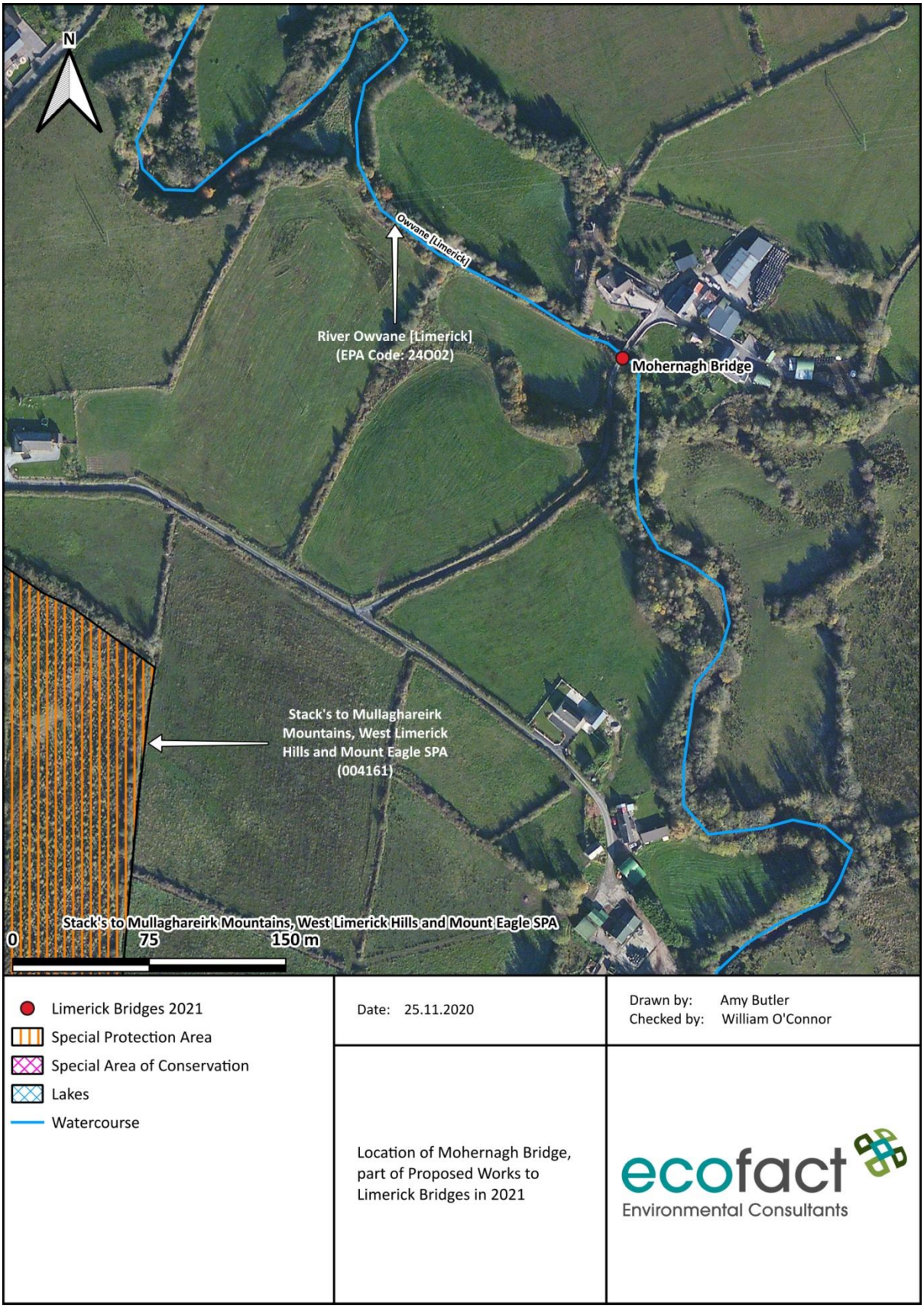


**Figure 2** Location of Mohernagh Bridge, Co. Limerick, showing Natura 2000 sites in the vicinity.

## 4.3 Description of the Natura 2000 Sites affected

### *4.3.1 Lower River Shannon SAC*

Lower River Shannon SAC stretches from Killaloe, Co. Clare to Loop Head/Kerry head. It is designated for a wide range of habitats and species including Alluvial Forests, Molinia Meadows, Atlantic Salmon (*Salmo salar*) and Otter (*Lutra lutra*). The freshwater part of this SAC includes the main River Shannon channel and several tributaries. Molinia meadows dominated by rushes (*Juncus* spp.) and sedges (*Carex* spp.) with a high biodiversity of vegetation and important species like Blue-eyed Grass (*Sisyrinchium bermudiana*) and Pale Sedge (*C. pallescens*) are present. Alluvial woodlands are present around the University of Limerick. All three Irish Lamprey species occur in this SAC as do Twaite Shad (*Allosa fallax fallax*) and Salmon (*Salmo salar*). Other notable fish species include Smelt (*Osmerus eperlanus*) and Pollan (*Coregonus autumnalis pollan*). Much of the land has been improved or reclaimed and flood protection is common. Domestic and industrial waste in Limerick is an ongoing threat. In the Shannon estuary part of the SAC there are several species protected under Annex I of the E.U. Birds Directive.

#### 4.3.1.1 Annex I Habitats

*4.3.1.1.1 Sandbanks which are slightly covered by sea water all the time [1110]*

This habitat is located c. 31rkm downstream in the Shannon estuary according to the conservation objectives map 3 (NPWS, 2012a). There is no potential for impacts on this habitat in the SAC at this large hydrological distance due to dilution factors. This habitat does not occur in the vicinity of the bridge site.

*4.3.1.1.2 Estuaries [1130]*

The estuarine habitat of the Lower River Shannon SAC occurs approximately 7.2rkm downstream of Mohernagh Bridge. The habitat covers the entire coastal portion of the SAC as far as Kilrush, Co. Clare as shown in map 4 of the SAC conservation objectives supporting documents (NPWS, 2012a). This habitat does not occur in the vicinity of the proposed project.

*4.3.1.1.3 Mudflats and sandflats not covered by seawater at low tide [1140]*

This habitat occurs approximately 7.2km downstream of the bridge site at its closest point, according to the conservation objectives map 5 (NPWS, 2012a). This habitat does not occur in the vicinity of the proposed project but is located downstream.

*4.3.1.1.4 Coastal lagoons [1150]*

There are four areas of coastal lagoon in the SAC. The closest example of this habitat downstream of the bridge site is located c. 32.2rkm downstream, according to the conservation objectives map 6 (NPWS, 2012a). This habitat does not occur in the vicinity of the proposed project but is located downstream.

*4.3.1.1.5 Large shallow inlets and bays [1160]*

This habitat is located c. 31rkm downstream in the Shannon estuary according to the conservation objectives map 7 (NPWS, 2012a). There is no potential for impacts on this habitat in the SAC at this

large hydrological distance due to dilution factors. This habitat does not occur in the vicinity of the bridge site.

#### *4.3.1.1.6 Reefs [1170]*

According to the conservation objectives map 8; this habitat is located c. 7.3rkm downstream in the Shannon estuary, just west of the mouth of the River Owvane at Loghill (NPWS, 2012a). This habitat does not occur in the vicinity of the proposed project but is located downstream.

#### *4.3.1.1.7 Perennial vegetation of stony banks [1220]*

This habitat is a terrestrial habitat that occurs at the edges of the estuary. The closest example of this habitat in the SAC is located in Ballymacrinan Bay c. 21km north-west of the bridge site according to the conservation objectives map 10 (NPWS, 2012a). This is a terrestrial habitat and there is no potential for impacts at this distance.

#### *4.3.1.1.8 Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]*

This habitat is a terrestrial habitat that occurs at the edges of the estuary. The closest example of this habitat in the SAC is located in Burrane c. 20km north-west of the bridge site according to the conservation objectives map 11 (NPWS, 2012a). This is a terrestrial habitat and there is no potential for impacts at this distance.

#### *4.3.1.1.9 Salicornia and other annuals colonising mud and sand [1310]*

This habitat is located c. 38rkm downstream in the Shannon estuary, according to the conservation objectives map 12 (NPWS, 2012a). There is no potential for impacts on this habitat in the SAC at this large hydrological distance due to dilution factors. This habitat does not occur in the vicinity of the bridge site.

#### *4.3.1.1.10 Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]*

According to the conservation objectives map 12 there is potential Atlantic Salt Meadows located c. 7.2rkm downstream of the bridge site at Loghill (NPWS, 2012a). This habitat does not occur in the vicinity of the proposed project but is located downstream.

#### *4.3.1.1.11 Mediterranean salt meadows (Juncetalia maritimi) [1410]*

According to the conservation objectives map 12 the closest example of this habitat downstream of the bridge site is located c. 21.3rkm downstream in the Shannon estuary (NPWS, 2012a). There is no potential for impacts on this habitat in the SAC at this large hydrological distance due to dilution factors. This habitat does not occur in the vicinity of the bridge site.

#### *4.3.1.1.12 Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260]*

The habitat in the SAC is mapped as being located in Limerick City and the Maigue Estuary, according to the conservation objectives map 13 for the SAC (NPWS, 2012a). There is no known record of this habitat downstream of the bridge site.

*4.3.1.1.13 Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) [6410]*

The full extent of this habitat in the SAC is unknown but this is a terrestrial habitat, and the proposed works will not affect the water table (NPWS, 2012a). This habitat was not found to be present at the site or in the immediate surrounds.

*4.3.1.1.14 Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) [91E0]*

The terrestrial habitat in the SAC is mapped as being located in Castleconnell and along the Allaughaun River near Tournafulla, according to the conservation objectives map 14 for the SAC (NPWS, 2012a). There is no known example of this habitat in the vicinity of the bridge site.

**Table 1** Habitats listed as qualifying interests of the Lower River Shannon SAC.

| Natura Code | Qualifying Interest | Occurrence in the study area |
|---|---|---|
| 1110 | Sandbanks which are slightly covered by seawater all the time | ✗ |
| 1130 | Estuaries | ✓ |
| 1140 | Mudflats and sandflats not covered by seawater at low tide | ✓ |
| 1150 | Coastal Lagoons | ✗ |
| 1160 | Large Shallow Inlets and Bays | ✗ |
| 1170 | Reefs | ✓ |
| 1220 | Perennial Vegetation of Stony Banks | ✗ |
| 1230 | Vegetated sea cliffs of the Atlantic and Baltic Coasts | ✗ |
| 1310 | Salicornia and other annuals colonising mud and sand | ✗ |
| 1330 | Atlantic salt meadows (*Glauco-Puccinellietalia maritimae)* | ✓ |
| 1410 | Mediterranean Salt Meadows (*Juncetalia maritimi)* | ✗ |
| 3260 | Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation | ✗ |
| 6410 | Molinia meadows on calcareous, peaty or clayey-silt-laden soils *(Molinion caeruleae)* | ✗ |
| 91E0 | Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae)* | ✗ |

## 4.3.1.2 Annex II Species

Species listed as qualifying interests of the Lower River Shannon SAC and listed on Annex II of the E.U. Habitats Directive include: Freshwater Pearl Mussel *Margaritifera margaritifera,* Sea Lamprey *Petromyzon marinus,* Brook Lamprey *Lampetra planeri*, River lamprey *Lampetra fluviatilis*, Atlantic salmon *Salmo salar*, Otter *Lutra lutra* and Common Bottlenose Dolphin *Tursiops truncatus*

*4.3.1.2.1 Freshwater Pearl Mussel [1029]*

This species is only located in the River Cloon within the Lower River Shannon SAC, according to the conservation objectives map 15 (NPWS, 2012). There is no known record of this species downstream of the bridge site.

*4.3.1.2.2 Sea Lamprey [1095]*

Sea lamprey is likely to be present downstream and would be found in the Shannon estuary. This species is unlikely to be present at the site as it is in the higher reaches of the river, but the precautionary approach is taken, and this species could be present at the site. No lampreys were recorded however during the Sampling Fish for the Water Framework Directive surveys in 2009 (Central and Regional Fisheries Boards, 2009).

*4.3.1.2.3 Brook Lamprey [1096]*

Brook lamprey are likely to be present in the River Owvane at the site and suitable habitat is present. No lampreys were recorded however during the Sampling Fish for the Water Framework Directive surveys in 2009 (Central and Regional Fisheries Boards, 2009).

*4.3.1.2.4 River Lamprey [1099]*

Brook lamprey are likely to be present in the River Owvane at the site and suitable habitat is present. No lampreys were recorded however during the Sampling Fish for the Water Framework Directive surveys in 2009 (Central and Regional Fisheries Boards, 2009).

*4.3.1.2.5 Atlantic Salmon [1106]*

Salmon are noted to be present in this river but have declined in recent years and have struggled to replenish themselves (O'Reilly, 2009). Salmon were recorded in the lower Owvane near Loghill as part of the Sampling Fish for the Water Framework Directive (Central and Regional Fisheries Boards, 2009). European Eel were found to be the most abundant at this site during these surveys but are not designated as part of the Lower River Shannon SAC. It is likely that Salmon are present at the Mohernagh bridge site and are known to be present downstream. There is suitable salmonid habitat at the site but no spawning habitat.

*4.3.1.2.6 Common Bottlenose Dolphin [1349]*

Common bottle nose dolphins are present downstream in the estuary. Dolphins occurs in the outer estuary beyond Foynes. The surveys in summer – autumn 2018 yielded a total abundance estimate of 139 ± 15.23 (Rogan *et al* 2018). They also have been shown to prefer deeper areas with high benthic slopes (Ingram & Rogan 2002). The 2018 study showed that dolphins were more often found in the inner estuary and upriver potentially due to drought conditions that year effecting prey availability (Rogan *et al*. 2018).

The species habitat is located c. 8rkm downstream in the River Shannon Estuary according to the conservation objectives map 16 (NPWS, 2012a). This species' critical habitat is mapped as being c. 17rkm downstream of the site (NPWS, 2012a). This species is not present at the site.

*4.3.1.2.7 Otter [1355]*

The National Biodiversity Data Centres maps show an old record of Otter on the River Owvane c. 650rm downstream of Mohernagh Bridge. The records consisted of droppings found during the Otter Survey of Ireland and dates back to 1981. There was also a record further downstream just before the SAC boundary and upstream of the Shannon Estuary at Loghill.

Otter are present throughout the Lower River Shannon SAC, c. 7.2rkm downstream of the subject bridge site. It is considered likely that Otters use the bridge site for foraging and commuting.

**Table 2** Species listed as qualifying interests of the Lower River Shannon SAC.

| Natura Code | Qualifying Interest | Occurrence in the study area |
|---|---|---|
| 1029 | Freshwater Pearl Mussel | ✗ |
| 1096 | Sea lamprey | ✓ |
| 1096 | Brook lamprey | ✓ |
| 1099 | River lamprey | ✓ |
| 1106 | Salmon | ✓ |
| 1349 | Common Bottlenose Dolphin | ✗ |
| 1355 | Otter | ✓ |

### *4.3.2 River Shannon and River Fergus Estuaries SPA*

The River Fergus is part of the Lower River Shannon SAC and the estuarine section of the River from Clarecastle to its confluence with the River Shannon is also part of the River Shannon and River Fergus SPA. The Shannon and Fergus Estuary complex is the largest estuarine complex in the country. The estuary features vast expanses of intertidal mudflats which are often fringed with saltmarsh vegetation. One of the most important estuarine saltmarshes of the Lower River Shannon SAC is in the vicinity of the Fergus Estuary. There are two scarce flora species which occur in this area, *Puccinellia foucaudii* and *Parapholis strigosa.* Golden dock *Rumex maritimus,* a 'Near Threatened' species listed in the Irish Red Data Book, also occurs in the Fergus Estuary (Nelson *et al.* 2019). The lower reaches of the River Fergus is important for spring salmon (NPWS, 2013). The Estuary supports a significant number of wintering waterfowl too. The Shannon and Fergus Estuary complex is an internationally important site supporting an assemblage of over 20,000 wintering waterbirds and the largest numbers of wintering waterfowl in the country. This assemblage includes several Annex I EU Birds Directive species; such as, Great Northern Diver *Gavia immer*, Whooper Swan *Cygnus cygnus*, Light-bellied Brent Goose *Branta bernicla hrota*, Golden Plover *Pluvialis apricaria* and Bar-tailed Godwit *Limosa lapponica* (NPWS, 2013). There are four of species which occur in internationally important numbers at the site: Light-bellied Brent Goose *Branta bernicla hrota*, Dunlin *Calidris alpina*, Black-tailed Godwit *Limosa limosa* and Redshank *Tringa totanus* (NPWS, 2015).

#### *4.3.2.1 Annex I Habitats*

##### *4.3.2.1.1 Wetland and Waterbirds [A999]*

The River Shannon and River Fergus Estuaries SPA is an important site for wintering waterfowl. The site supports important national numbers of several species. The Wetland and Waterbirds Annex I habitat is the habitat that these birds utilise within the boundary of the SPA. This habitat is therefore present c. 7.2rkm downstream from the bridge site at its closest point. This habitat does not occur at the proposed development site.

#### *4.3.2.2 Annex II Species*

##### *4.3.2.2.1 Cormorant Phalacrocorax carbo [A017]*

The River Shannon and River Fergus SPA holds c. 1% of the Irish population of Cormorants. They occur year-round and breed on rocky cliffs and offshore islands (NPWS 2012). They are most common

in coastal bays in Ireland and on large waterbodies inland with high fish densities. This SPA was once a site of national important for the species (Lewis, 2019).

The conservation objectives supporting documents also have waterbird distribution dot density diagrams for the 2010/11 period low tide counts which does not show that Cormorant use the area c. 7.2rkm downstream of the site and instead use areas elsewhere in the Shannon estuary (NPWS 2011a). This species is unlikely to be present at the site.

#### *4.3.2.2.2 Whooper Swan Cygnus cygnus [A038]*

The River Shannon and River Fergus SPA holds c. 1% of the Irish population during winter. The site is of national importance for the species. Their habitat within the SPA includes lagoon and associated habitats, intertidal mudflats and shallow subtidal areas (NPWS, 2012). The site supports nationally important numbers (Lewis *et al*. 2019).

The conservation objectives supporting documents also have waterbird distribution dot density diagrams for the 2010/11 period low tide counts, but it is noted that maps have not been produced for Whooper Swans due to insufficient data (NPWS, 2011a). This species is unlikely to be present at the site, due to the presence of residential housing and farm buildings adjacent.

#### *4.3.2.2.3 Light-bellied Brent Goose Branta bernicla hrota [A046]*

The site once held internationally important numbers of light-bellied geese (NPWS, 2012) but no longer does (Lewis *et al.* 2019). Their habitat within the site includes intertidal mud and sand flats (NPWS, 2012b).The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 118 individuals (NPWS, 2012).

The conservation objectives supporting documents also have waterbird distribution dot density diagrams for the 2010/11 period low tide counts which did not record Light-bellied Brent Goose in the area c. 7.2rkm downstream of the site (NPWS, 2011a). This species is present elsewhere in the estuary and is unlikely to be present at the site due to the habitats present.

#### *4.3.2.2.4 Shelduck Tadorna tadorna [A048]*

This species habitat in the SPA includes intertidal mudflats and shallow subtidal areas (NPWS, 2012). The site holds a nationally important population of the species (Lewis *et al.* 2019). During winter the site regularly supports 1% or more of the all-Ireland population of Shelduck. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 1,025 individuals (NPWS, 2011a)

The conservation objectives supporting documents also have waterbird distribution dot density diagrams for the 2010/11 period low tide counts which show that this species does forage in the area of the mouth of the River Owvane c. 7.2rkm downstream of the bridge site (NPWS, 2011a).

#### *4.3.2.2.5 Wigeon Anas penelope [A050]*

This species habitat within the SPA includes intertidal mud and sand flats and sheltered and shallow subtidal areas (NPWS, 2012). The site holds a nationally important population (Lewis *et al.* 2019). During winter the site regularly supports 1% or more of the all-Ireland population of Wigeon. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 3,761 individuals (NPWS, 2011a).

The conservation objectives supporting documents also have waterbird distribution dot density diagrams for the 2010/11 period low tide counts which shows that Wigeon do roost and forage in the area of the mouth of the River Owvane within the SPA, which is c. 7.2rkm downstream of the bridge site (NPWS, 2011a).

#### *4.3.2.2.6 Teal Anas crecca [A052]*

This species habitat within the SPA includes intertidal mud and sand flats and sheltered and shallow subtidal areas (NPWS, 2012b). The site holds a nationally important population (Lewis *et al.* 2019). During winter the site regularly supports 1% or more of the all-Ireland population of Teal. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 2,260 individuals (NPWS, 2011a).

The conservation objectives supporting documents also have waterbird distribution dot density diagrams for the 2010/11 period low tide counts which shows that Teal do roost and forage in the area of the mouth of the River Owvane within the SPA, which is c. 7.2rkm downstream of the bridge site (NPWS, 2011a).

#### *4.3.2.2.7 Pintail Anas acuta [A054]*

This species habitat within the SPA includes intertidal mud and sand flats and sheltered and shallow subtidal areas (NPWS, 2012). The baseline data for 1999/00 for Pintail in the SPA is given as 62 individuals, with 94 individuals recorded for the 2010/11 surveys, indicating numbers of all-Ireland importance (NPWS, 2011a).

The conservation objectives supporting documents also have waterbird distribution dot density diagrams for the 2010/11 period low tide counts which show that Pintail were not recorded roosting or foraging in the area of the SPA c. 7.2rkm downstream of the site (NPWS, 2011a).

#### *4.3.2.2.8 Shoveler Anas clypeata [A056]*

This species habitat in the SPA includes lagoon, brackish and freshwater lakes plus intertidal mud and sand flats (NPWS, 2012). The SPA holds internationally important numbers (Lewis *et al.* 2019). The baseline data for 1999/00 for Shoveler is given as 107 individuals which are numbers of all-Ireland importance (NPWS, 2011a).

The conservation objectives supporting documents also have waterbird distribution dot density diagrams for the 2010/11 period low tide counts which show that Shoveler were not recorded roosting or foraging in the area of the SPA c. 7.2rkm downstream of the site (NPWS, 2011a).

#### *4.3.2.2.9 Scaup Aythya marila [A062]*

Scaup occur in the subtidal areas of the SPA (NPWS, 2012). This habitat is not present at the site and neither is this species. The baseline data for 1999/00 for Scaup is given as 102 individuals which are numbers of All-Ireland importance (NPWS, 2011a).

The conservation objectives supporting documents also have waterbird distribution dot density diagrams for the 2010/11 period low tide counts which show that Scaup were not recorded roosting or foraging in the area of the SPA c. 7.2rkm downstream of the site (NPWS, 2011a).

#### *4.3.2.2.10 Ringed Plover Charadrius hiaticula [A137]*

This species habitat includes intertidal mud and sand flats (NPWS, 2012). During winter the site regularly supports 1% or more of the all-Ireland population of Ringed Plover. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 223 individuals (NPWS, 2011a).

The conservation objectives supporting documents also have waterbird distribution dot density diagrams for the 2010/11 period low tide counts which show that Ringed Plover were recorded foraging in the area of the SPA at the mouth of the River Owvane c. 7.2rkm downstream of the bridge site (NPWS, 2011a).

#### *4.3.2.2.11 Golden Plover Pluvialis apricaria [A140]*

This species habitat includes intertidal mud and sand flats (NPWS, 2012). The SPA holds nationally important numbers of the species (Lewis *et al*. 2019). During winter the site regularly supports 1% or more of the all-Ireland population of the Annex I species Golden Plover. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 5,664 individuals (NPWS, 2011a).

The conservation objectives supporting documents also have waterbird distribution dot density diagrams for the 2010/11 period low tide counts which shows that Golden Plover have been recorded roosting in the SPA at the mouth of the River Owvane c. 7.2rkm downstream of the bridge site (NPWS, 2011a).

#### *4.3.2.2.12 Grey Plover Pluvialis squatarola [A141]*

This species habitat includes intertidal mud and sand flats (NPWS, 2012). The SPA holds nationally important numbers of the species (Lewis *et al*. 2019). During winter the site regularly supports 1% or more of the all-Ireland population of Grey Plover. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 558 individuals (NPWS, 2011a).

The conservation objectives supporting documents also have waterbird distribution dot density diagrams for the 2010/11 period low tide counts which shows that Grey Plover were not recorded in the SPA c. 7.2rkm of the bridge site and instead were recorded elsewhere in the Shannon estuary (NPWS, 2011a).

#### *4.3.2.2.13 Lapwing Vanellus vanellus [A142]*

This species habitat includes intertidal mud and sand flats (NPWS, 2012). The SPA holds nationally important numbers of the species (Lewis *et al*. 2019). During winter the site regularly supports 1% or more of the all-Ireland population of Lapwing. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 15,126 individuals (NPWS, 2011a).

The conservation objectives supporting documents also have waterbird distribution dot density diagrams for the 2010/11 period low tide counts which shows that Lapwing were recorded roosting and foraging in the area of the SPA at the mouth of the River Owvane c. 7.2rkm downstream of the site (NPWS, 2011a).

*4.3.2.2.14 Knot Calidris canutus [A143]*

This species habitat includes intertidal mud and sand flats (NPWS, 2012). The SPA holds nationally important numbers of the species (Lewis *et al*. 2019). During winter the site regularly supports 1% or more of the all-Ireland population of Knot. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 2,015 individuals (NPWS, 2011a).

The conservation objectives supporting documents also have waterbird distribution dot density diagrams for the 2010/11 period low tide counts which shows that Knot were recorded foraging in low densities c. 7.2rkm downstream of the bridge site in the SPA boundary (NPWS, 2011a).

*4.3.2.2.15 Dunlin Calidris alpina [A149]*

This species habitat includes intertidal mud and sand flats (NPWS, 2012). The SPA holds nationally important numbers of the species (Lewis *et al*. 2019). During winter the site regularly supports 1% or more of the biogeographic population of Dunlin. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 15,131 individuals (NPWS, 2011a).

The conservation objectives supporting documents also have waterbird distribution dot density diagrams for the 2010/11 period low tide counts which show that Dunlin were recorded foraging in the SPA c. 7.2rkm downstream of the bridge site at the mouth of the River Owvane (NPWS, 2011a).

*4.3.2.2.16 Black-tailed Godwit Limosa limosa [A156]*

This species habitat includes intertidal mud and sand flats (NPWS, 2012). The SPA no longer holds nationally important numbers of the species (Lewis *et al*. 2019). During winter the site regularly supports 1% or more of the biogeographical population of Black-tailed Godwit. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 2,035 individuals (NPWS, 2011a).

The conservation objectives supporting documents also have waterbird distribution dot density diagrams for the 2010/11 period low tide counts which show that Black-tailed Godwit were not recorded foraging or roosting c. 7.2rkm downstream of the bridge site but instead were recorded elsewhere in the Shannon estuary (NPWS, 2011a).

*4.3.2.2.17 Bar-tailed Godwit Limosa lapponica [A157]*

This species habitat includes intertidal mud and sand flats (NPWS, 2012b). During winter the site regularly supports 1% or more of the all-Ireland population of the Annex I species Bar-tailed Godwit. The mean peak number within the SPA during the baseline period (1995/96 – 1999/00) was 460 individuals (NPWS, 2011a).

The conservation objectives supporting documents also have waterbird distribution dot density diagrams for the 2010/11 period low tide counts which show that Bar-tailed Godwit were not recorded foraging or roosting c. 7.2rkm downstream of the bridge site but instead were recorded elsewhere in the Shannon estuary (NPWS, 2011a).

*4.3.2.2.18 Curlew Numenius arquata [A160]*

This species habitat includes intertidal mud and sand flats (NPWS, 2012b). The SPA no longer holds nationally important numbers of the species (Lewis *et al*. 2019). During winter the site regularly supports

1% or more of the all-Ireland population of Curlew. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 2,396 individuals (NPWS, 2011a).

The conservation objectives supporting documents also have waterbird distribution dot density diagrams for the 2010/11 period low tide counts which show that Curlew were frequently recorded roosting and sometimes foraging in the area of the SPA c. 7.2rkm downstream of the site (NPWS, 2011a).

*4.3.2.2.19 Redshank Tringa totanus [A162]*

This species habitat includes intertidal mud and sand flats (NPWS, 2012b). The SPA no longer holds nationally important numbers of the species (Lewis *et al*. 2019). During winter the site regularly supports 1% or more of the all-Ireland population of Redshank. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 2,645 individuals (NPWS, 2011a).

The conservation objectives supporting documents also have waterbird distribution dot density diagrams for the 2010/11 period low tide counts which show that Redshank were recorded foraging at the mouth of the River Owvane c. 7.2rkm downstream of the site (NPWS, 2011a).

*4.3.2.2.20 Greenshank Tringa nebularia [A164]*

This species habitat includes intertidal mud and sand flats (NPWS, 2012b). The SPA no longer holds nationally important numbers of the species (Lewis *et al*. 2019). During winter the site regularly supports 1% or more of the all-Ireland population of Greenshank. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 61 individuals (NPWS, 2011a).

The conservation objectives supporting documents also have waterbird distribution dot density diagrams for the 2010/11 period low tide counts which show that Greenshank were recorded in low densities foraging in the SPA c. 7.2rkm downstream of the site (NPWS, 2011a).

*4.3.2.2.21 Black-headed Gull Chroicocephalus ridibundus [A179]*

This species habitat in the SPA includes intertidal flats & sheltered & shallow subtidal areas (NPWS, 2012b). The Shannon and Fergus estuaries regularly support more than 1000 individuals (Lewis *et al*. 2019). The baseline data for 1999/00 for Black-headed Gull in the SPA is given as 2,681 individuals which are numbers of All-Ireland importance (NPWS, 2011a).

The conservation objectives supporting documents also have waterbird distribution dot density diagrams for the 2010/11 period low tide counts which show that Black-headed Gull were recorded foraging and roosting in the SPA in the area of the mouth of the River Owvane c. 7.2rkm downstream of the site (NPWS, 2011a).

**Table 3** Annex II species listed as qualifying interests of River Shannon and River Fergus Estuaries SPA.

| Natura Code | Qualifying Interest | Occurrence in the study area |
|---|---|---|
| A017 | Cormorant (*Phalacrocorax carbo*) | ✗ |
| A038 | Whooper Swan (*Cygnus cygnus*) | ✗ |
| A046 | Light-bellied Brent Goose (*Branta bernicla hrota*) | ✗ |
| A048 | Shelduck (*Tadorna tadorna*) | ✓ |
| A050 | Wigeon (*Anas penelope*) | ✓ |

| Natura Code | Qualifying Interest | Occurrence in the study area |
|---|---|---|
| A052 | Teal (*Anas crecca*) | ✓ |
| A054 | Pintail (*Anas acuta*) | ✗ |
| A056 | Shoveler (*Anas clypeata*) | ✗ |
| A062 | Scaup (*Aythya marila*) | ✗ |
| A137 | Ringed Plover (*Charadrius hiaticula*) | ✓ |
| A140 | Golden Plover (*Pluvialis apricaria*) | ✓ |
| A141 | Grey Plover (*Pluvialis squatarola*) | ✗ |
| A142 | Lapwing (*Vanellus vanellus*) | ✓ |
| A143 | Knot (*Calidris canutus*) | ✓ |
| A149 | Dunlin (*Calidris alpina*) | ✓ |
| A156 | Black-tailed Godwit (*Limosa limosa*) | ✗ |
| A157 | Bar-tailed Godwit (*Limosa lapponica*) | ✗ |
| A160 | Curlew (*Numenius arquata*) | ✓ |
| A162 | Redshank (*Tringa totanus*) | ✓ |
| A164 | Greenshank (*Tringa nebularia*) | ✓ |
| A179 | Black-headed Gull (*Chroicocephalus ridibundus*) | ✓ |

# 5. IMPACT ASSESSMENT

At NIS stage, mitigation to offset potential negative impacts can be provided. In addition, the impact of the project / plan affecting the integrity of a Natura 2000 site is considered with respect to the conservation objectives of the site. Integrity is defined as: 'the coherence of the site's ecological structure and function, across its whole area, or the habitats, complex of habitats and/or populations of species for which the site is or will be classified'. Therefore, the integrity of a site is principally related to the structure and function of the site with regard to its Annex I habitats and Annex II species listed as the qualifying interests. The conservation status of these qualifying interests comprises the primary conservation objectives for all designated Natura 2000 sites.

## 5.1 Lower River Shannon SAC

The affected qualifying interests of the Lower River Shannon SAC are presented in Table 4 below with the potential impacts of the proposed works on each. The qualifying interests are discussed individually below in terms of the potential impacts that could arise from the proposed works.

**Table 4** Potential impacts on the affected qualifying interests of the Lower River Shannon SAC arising from the proposed rehabilitation works at Mohernagh Bridge.

| | Natura Code | Qualifying Interest | Impacts |
|---|---|---|---|
| Annex I Habitats | 1130 | Estuaries | Water Quality; Invasive Species |
| | 1140 | Mudflats and sandflats not covered by seawater at low tide | Water Quality; Invasive Species |
| | 1170 | Reefs | Water Quality; Invasive Species |
| | 1330 | Atlantic salt meadows (*Glauco-Puccinellietalia maritimae)* | Water Quality; Invasive Species |
| Annex II Species | 1096 | Sea lamprey | Water Quality; Invasive Species |
| | 1096 | Brook lamprey | Water Quality; Disturbance; Invasive Species |
| | 1099 | River lamprey | Water Quality; Disturbance; Invasive Species |
| | 1106 | Salmon | Water Quality; Disturbance; Invasive Species |
| | 1355 | Otter | Water Quality; Disturbance; Invasive Species |

### *5.1.1 Annex I Habitats*

#### *5.1.1.1 Estuaries*

##### *5.1.1.1.1 Construction Phase*

The estuarine habitat of the Lower River Shannon SAC occurs approximately 7.2rkm downstream of Mohernagh Bridge and is not present at the site. There is no potential for direct impacts, but indirect impacts may occur and affect this habitat downstream of the site.

Estuaries could be affected by water quality and invasive species impacts arising from the proposed rehabilitation works. Water quality issues could arise from an increase in suspended solids and / or contaminants in the watercourse which can be generated by the activities at the works site. Such as when raking out the mortar joints and removing debris. These can also come from accidental spillages of oil / fuel, cement / concrete and / or root herbicide that may be used for the bridge rehabilitation works. It is proposed to replace the deck, slab and beams of the bridge structure with a new concrete culvert. There is a risk of concrete / cement sediment instream which can alter the pH of watercourses. It is noted however that the proposed use of precast concrete for the new culvert does help to reduce this risk. The dewatering of areas to facilitate the proposed replacement and the excavation of the riverbed also poses risks to water quality. In such situations there is also a risk of water quality impacts arising from the potential accidental release of sand into the river from sandbags used around dewatered areas in the event of a flood. Given the distance between the works and the estuaries habitat c. 7.2rkm downstream, as well as the naturally occurring and dynamic sediment levels in this type of habitat, it is unlikely that these potential impacts from this small scale bridge rehabilitation would have a likely significant effect.

Machinery and personnel working on site could also lead to the introduction of invasive species to the site. Invasive species can quickly take over an ecosystem and disrupt the balance of the system. Invasive species can also spread rapidly and affect habitats downstream. It is unlikely given the distance to this habitat downstream that this impact would be significant, but the precautionary principle must be applied.

##### *5.1.1.1.2 Operational Phase*

As the bridge is an existing bridge, there is no potential for operational phase impacts to arise as a result of the proposed rehabilitation works. There will be no change of use for the bridge site.

#### *5.1.1.2 Mudflats and Sandflats not covered by seawater at low tide*

##### *5.1.1.2.1 Construction Phase*

This habitat occurs approximately 7.2km downstream of the bridge site at its closest point, according to the conservation objectives map 5 (NPWS, 2012a). This habitat does not occur in the vicinity of the proposed project but is located downstream.

This habitat therefore could be affected similarly to the Estuaries habitat discussed above in section 5.1.1.1.1, through indirect water quality and invasive species impacts. Again, given the distance to the habitat and the naturally occurring sediment levels, these impacts are considered unlikely to be significant. The precautionary principle is applied for invasive species impacts.

*5.1.1.2.2 Operational Phase*

As the bridge is an existing bridge, there is no potential for operational phase impacts to arise as a result of the proposed rehabilitation works. There will be no change of use for the bridge site.

#### *5.1.1.3 Reefs*

*5.1.1.3.1 Construction Phase*

According to the conservation objectives map 8; this habitat is located c. 7.3rkm downstream in the Shannon estuary, just west of the mouth of the River Owvane at Loghill (NPWS, 2012a). This habitat does not occur in the vicinity of the proposed project but is located downstream.

The Reefs habitat could be affected by indirect water quality and invasive species impacts, similarly to estuaries in section 5.1.1.1.1. Again, given the distance to the habitat these impacts are considered unlikely to be significant, but the precautionary principle is applied.

*5.1.1.3.2 Operational Phase*

As the bridge is an existing bridge, there is no potential for operational phase impacts to arise as a result of the proposed rehabilitation works. There will be no change of use for the bridge site.

#### *5.1.1.4 Atlantic Salt Meadows*

*5.1.1.4.1 Construction Phase*

According to the conservation objectives map 12 there is potential Atlantic Salt Meadows located c. 7.2rkm downstream of the bridge site at Loghill (NPWS, 2012a). This habitat does not occur in the vicinity of the proposed project but is located downstream.

This habitat therefore could be affected similarly to the Estuaries habitat discussed above in section 5.1.1.1.1, through indirect water quality and invasive species impacts. Again, given the distance to the habitat and the naturally occurring sediment levels, these impacts are considered unlikely to be significant. The precautionary principle is applied for invasive species impacts.

*5.1.1.4.2 Operational Phase*

As the bridge is an existing bridge, there is no potential for operational phase impacts to arise as a result of the proposed rehabilitation works. There will be no change of use for the bridge site.

### *5.1.2 Annex II Species*

#### *5.1.2.1 Sea lamprey*

*5.1.2.1.1 Construction Phase*

Sea lamprey is likely to be present downstream and would be found in the Shannon estuary. This species is unlikely to be present at the site as it is in the higher reaches of the river, but the precautionary approach is taken, and this species could be present at the site. No lampreys were recorded however during the Sampling Fish for the Water Framework Directive surveys in 2009 (Central and Regional Fisheries Boards, 2009).

Sea lamprey could be affected by water quality impacts arising from the proposed rehabilitation works. Water quality issues could arise from an increase in suspended solids and / or contaminants in the watercourse which can be generated by the activities at the works site. Such as when raking out the mortar joints and removing debris. These can also come from accidental spillages of oil / fuel, cement / concrete and / or root herbicide that may be used for the bridge rehabilitation works. It is proposed to replace the deck, slab and beams of the bridge structure with a new concrete culvert. There is a risk of concrete / cement sediment instream which can alter the pH of watercourses. It is noted however that the proposed use of precast concrete for the new culvert does help to reduce this risk. The dewatering of areas to facilitate the proposed replacement and the excavation of the riverbed also poses risks to water quality. In such situations there is also a risk of water quality impacts arising from the potential accidental release of sand into the river from sandbags used around dewatered areas in the event of a flood. Any water pollution could affect lampreys and habitats downstream. It is unlikely this species is present at the site but is found downstream. Given the distance between the works and the SAC c. 7.2rkm downstream and the small scale of the bridge site, it is unlikely these impacts would have a likely effect this far downstream. Nonetheless, there remains the potential for this species to be present downstream.

Machinery and personnel working on site could also lead to the introduction of invasive species to the site. Invasive species can quickly take over an ecosystem and disrupt the balance of the system. Invasive species can also spread rapidly and affect habitats utilized by lampreys downstream. It is unlikely given the distance to the SAC that this impact would be significant, but the precautionary principle must be applied.

#### *5.1.2.1.2 Operational Phase*

As the bridge is an existing bridge, there is no potential for operational phase impacts to arise as a result of the proposed rehabilitation works. There will be no change of use for the bridge site.

### *5.1.2.2 Brook lamprey*

#### *5.1.2.2.1 Construction Phase*

Brook lamprey are likely to be present in the River Owvane at the site and suitable habitat is present. No lampreys were recorded however during the Sampling Fish for the Water Framework Directive surveys in 2009 (Central and Regional Fisheries Boards, 2009).

Brook lamprey, similarly to Sea lamprey, could be affected by water quality impacts arising from the proposed rehabilitation works. Water quality issues could arise from an increase in suspended solids and / or contaminants in the watercourse which can be generated by the activities at the works site. Such as when raking out the mortar joints and removing debris. These can also come from accidental spillages of oil / fuel, cement / concrete and / or root herbicide that may be used for the bridge rehabilitation works. It is proposed to replace the deck, slab and beams of the bridge structure with a new concrete culvert. There is a risk of concrete / cement sediment instream which can alter the pH of watercourses. It is noted however that the proposed use of precast concrete for the new culvert does help to reduce this risk. The dewatering of areas to facilitate the proposed replacement and the excavation of the riverbed also poses risks to water quality. In such situations there is also a risk of water quality impacts arising from the potential accidental release of sand into the river from sandbags used around dewatered areas in the event of a flood. Any water pollution will affect lampreys and habitats downstream. If present at the site, this species could also be affected by disturbance from the instream works as well as potential mortality during the extensive excavations of the riverbed required for the placing of the new culvert.

Machinery and personnel working on site could also lead to the introduction of invasive species to the site. Invasive species can quickly take over an ecosystem and disrupt the balance of the system. Invasive species can also spread rapidly and could affect the habitats that Brook lampreys utilize at the site and downstream. In the absence of any biosecurity mitigation, this could be a significant impact.

*5.1.2.2.2 Operational Phase*

As the bridge is an existing bridge, there is no potential for operational phase impacts to arise as a result of the proposed rehabilitation works. There will be no change of use for the bridge site.

### *5.1.2.3 River lamprey*

*5.1.2.3.1 Construction Phase*

Brook lamprey are likely to be present in the River Owvane at the site and suitable habitat is present. No lampreys were recorded however during the Sampling Fish for the Water Framework Directive surveys in 2009 (Central and Regional Fisheries Boards, 2009).

Impacts on River lamprey are the same as those discussed for Brook lamprey in section 5.1.2.2 above. This species could be impacted by water quality issues arising from the works at the site, or by disturbance if present in the River Owvane at the site. This species could also be affected by any invasive species impacts as this could degrade their habitat.

*5.1.2.3.2 Operational Phase*

As the bridge is an existing bridge, there is no potential for operational phase impacts to arise as a result of the proposed rehabilitation works. There will be no change of use for the bridge site.

### *5.1.2.4 Salmon*

*5.1.2.4.1 Construction Phase*

Salmon are noted to be present in this river but have declined in recent years and have struggled to replenish themselves (O'Reilly, 2009). Salmon were recorded in the lower Owvane near Loghill as part of the Sampling Fish for the Water Framework Directive (Central and Regional Fisheries Boards, 2009). It is likely that Salmon are present at the Mohernagh bridge site and are known to be present downstream. There is suitable salmonid habitat at the site, but no spawning habitat was recorded.

Salmon could be affected by water quality impacts arising from the proposed rehabilitation works. Water quality issues could arise from an increase in suspended solids and / or contaminants in the watercourse which can be generated by the activities at the works site. Such as when raking out the mortar joints and removing debris. These can also come from accidental spillages of oil / fuel, cement / concrete and / or root herbicide that may be used for the bridge rehabilitation works. It is proposed to replace the deck, slab and beams of the bridge structure with a new concrete culvert. There is a risk of concrete / cement sediment instream which can alter the pH of watercourses. It is noted however that the proposed use of precast concrete for the new culvert does help to reduce this risk. The dewatering of areas to facilitate the proposed replacement and the excavation of the riverbed also poses risks to water quality. In such situations there is also a risk of water quality impacts arising from the potential accidental release of sand into the river from sandbags used around dewatered areas in the event of a flood. Any water pollution will affect salmon and their habitats downstream. Salmonid habitat is present

at the site and this could be adversely affected by water quality. If salmon are present at the site, they could also be affected by disturbance impacts arising from the instream works.

Machinery and personnel working on site could also lead to the introduction of invasive species to the site. Invasive species can quickly take over an ecosystem and disrupt the balance of the system. Invasive species can also spread rapidly and could affect the habitats that Salmon utilize. In the absence of any biosecurity mitigation, this could be a significant impact.

*5.1.2.4.2 Operational Phase*

As the bridge is an existing bridge, there is no potential for operational phase impacts to arise as a result of the proposed rehabilitation works. There will be no change of use for the bridge site.

### *5.1.2.5 Otter*

*5.1.2.5.1 Construction Phase*

The National Biodiversity Data Centres maps show an old record of Otter on the River Owvane c. 650rm downstream of Mohernagh Bridge. It is considered likely that Otters use the bridge site for foraging and commuting. This species could be affected by impacts arising from the proposed rehabilitation works, such as water quality, disturbance if present at the site, and invasive species.

Otters could also be affected indirectly by water quality impacts arising from the proposed rehabilitation works. Water quality issues could arise from an increase in suspended solids and / or contaminants in the watercourse which can be generated by the activities at the works site. Such as when raking out the mortar joints and removing debris. These can also come from accidental spillages of oil / fuel, cement / concrete and / or root herbicide that may be used for the bridge rehabilitation works. It is proposed to replace the deck, slab and beams of the bridge structure with a new concrete culvert. There is a risk of concrete / cement sediment instream which can alter the pH of watercourses. It is noted however that the proposed use of precast concrete for the new culvert does help to reduce this risk. The dewatering of areas to facilitate the proposed replacement and the excavation of the riverbed also poses risks to water quality. In such situations there is also a risk of water quality impacts arising from the potential accidental release of sand into the river from sandbags used around dewatered areas in the event of a flood. Any water pollution will affect Otters food sources, i.e. fish, and therefore can result in an indirect impact on this species. If Otters are present at the site, they could also be affected by disturbance impacts through the increase in noise and human activity for the duration of the construction works on site as well as potential interference to passage through the bridge site along the channel.

Machinery and personnel working on site could also lead to the introduction of invasive species to the site. Invasive species can quickly take over an ecosystem and disrupt the balance of the system. Invasive species can also spread rapidly and could affect the habitats that otters utilize, particularly riparian areas as this is a semi-aquatic species. In the absence of any biosecurity mitigation, this could be a significant impact.

*5.1.2.5.2 Operational Phase*

As the bridge is an existing bridge, there is no potential for operational phase impacts to arise as a result of the proposed rehabilitation works. There will be no change of use for the bridge site.

## 5.2 River Shannon and River Fergus Estuaries SPA

The affected qualifying interests of the River Shannon and River Fergus Estuaries SPA are presented in Table 5 below with the potential impacts of the proposed works on each. The qualifying interests are discussed individually below in terms of the potential impacts that could arise from the proposed works.

**Table 5** Potential impacts on the affected qualifying interests of the River Shannon and River Fergus Estuaries SPA arising from the proposed rehabilitation works at Mohernagh Bridge.

| | Natura Code | Qualifying Interest | Impacts |
|---|---|---|---|
| Annex I Habitats | A999 | Wetland and Waterbirds | Water Quality; Invasive Species |
| Annex II Species | A048 | Shelduck (*Tadorna tadorna*) | Water Quality; Invasive Species |
| | A050 | Wigeon (*Anas penelope*) | Water Quality; Invasive Species |
| | A052 | Teal (*Anas crecca*) | Water Quality; Invasive Species |
| | A137 | Ringed Plover (*Charadrius hiaticula*) | Water Quality; Invasive Species |
| | A140 | Golden Plover (*Pluvialis apricaria*) | Water Quality; Invasive Species |
| | A142 | Lapwing (*Vanellus vanellus*) | Water Quality; Invasive Species |
| | A143 | Knot (*Calidris canutus*) | Water Quality; Invasive Species |
| | A149 | Dunlin (*Calidris alpina*) | Water Quality; Invasive Species |
| | A160 | Curlew (*Numenius arquata*) | Water Quality; Invasive Species |
| | A162 | Redshank (*Tringa totanus*) | Water Quality; Invasive Species |
| | A164 | Greenshank (*Tringa nebularia*) | Water Quality; Invasive Species |
| | A179 | Black-headed Gull (*Chroicocephalus ridibundus*) | Water Quality; Invasive Species |

### *5.2.1 Annex I Habitats*

#### *5.2.1.1 Wetland and Waterbirds*

##### *5.2.1.1.1 Construction Phase*

The Wetland and Waterbirds Annex I habitat is the habitat that these birds utilise within the boundary of the SPA. This habitat is therefore present c. 7.2rkm downstream from the bridge site at its closest point. This habitat does not occur at the proposed development site. The Wetland and Waterbirds habitat could therefore be indirectly affected by water quality and invasive species impacts.

This habitat therefore could be affected similarly to the Estuaries habitat discussed above in section 5.1.1.1.1, through indirect water quality and invasive species impacts. Again, given the distance to the habitat and the naturally occurring sediment levels, these impacts are considered unlikely to be significant. The precautionary principle is applied for invasive species impacts.

##### *5.2.1.1.2 Operational Phase*

As the bridge is an existing bridge, there is no potential for operational phase impacts to arise as a result of the proposed rehabilitation works. There will be no change of use for the bridge site.

### *5.2.2 Annex II Species*

#### *5.2.2.1 Shelduck*

*5.2.2.1.1 Construction Phase*

The conservation objectives supporting documents also have waterbird distribution dot density diagrams for the 2010/11 period low tide counts which show that this species does forage in the area of the mouth of the River Owvane c. 7.2rkm downstream of the bridge site (NPWS, 2011a). This species is unlikely to be found at the bridge site but is located downstream, and therefore could be affected by water quality and invasive species impacts.

There is no potential for disturbance impacts to affect this species due to the distance between the bridge site and the SPA, c. 7.2rkm. Indirect water quality impacts may arise and travel downstream to this species habitat in the SPA. These impacts would be similar to those described above for the Estuaries habitat discussed above in section 5.1.1.1.1. Invasive species impacts can also result in degradation of Shelduck habitat in the SPA. Although given the distance between this species habitat in the SPA and the bridge site, c. 7.2rkm, this impact is unlikely to be significant, but the precautionary principle is applied.

*5.2.2.1.2 Operational Phase*

As the bridge is an existing bridge, there is no potential for operational phase impacts to arise as a result of the proposed rehabilitation works. There will be no change of use for the bridge site.

#### *5.2.2.2 Wigeon*

*5.2.2.2.1 Construction Phase*

The conservation objectives supporting documents also have waterbird distribution dot density diagrams for the 2010/11 period low tide counts which shows that Wigeon do roost and forage in the area of the mouth of the River Owvane within the SPA, which is c. 7.2rkm downstream of the bridge site (NPWS, 2011a). This species is unlikely to be found at the bridge site but is located downstream, and therefore could be affected by water quality and invasive species impacts.

There is no potential for disturbance impacts to affect this species due to the distance between the bridge site and the SPA, c. 7.2rkm. Indirect water quality impacts may arise and travel downstream to this species habitat in the SPA. These impacts would be similar to those described above for the Estuaries habitat discussed above in section 5.1.1.1.1. Invasive species impacts can also result in degradation of Wigeon habitat in the SPA. Although given the distance between this species habitat in the SPA and the bridge site, c. 7.2rkm, this impact is unlikely to be significant, but the precautionary principle is applied.

*5.2.2.2.2 Operational Phase*

As the bridge is an existing bridge, there is no potential for operational phase impacts to arise as a result of the proposed rehabilitation works. There will be no change of use for the bridge site.

#### *5.2.2.3 Teal*

##### *5.2.2.3.1 Construction Phase*

The conservation objectives supporting documents also have waterbird distribution dot density diagrams for the 2010/11 period low tide counts which shows that Teal do roost and forage in the area of the mouth of the River Owvane within the SPA, which is c. 7.2rkm downstream of the bridge site (NPWS, 2011a). This species is unlikely to be found at the bridge site but is located downstream, and therefore could be affected by water quality and invasive species impacts.

There is no potential for disturbance impacts to affect this species due to the distance between the bridge site and the SPA, c. 7.2rkm. Indirect water quality impacts may arise and travel downstream to this species habitat in the SPA. These impacts would be similar to those described above for the Estuaries habitat discussed above in section 5.1.1.1.1. Invasive species impacts can also result in degradation of Teal habitat in the SPA. Although given the distance between this species habitat in the SPA and the bridge site, c. 7.2rkm, this impact is unlikely to be significant, but the precautionary principle is applied.

##### *5.2.2.3.2 Operational Phase*

As the bridge is an existing bridge, there is no potential for operational phase impacts to arise as a result of the proposed rehabilitation works. There will be no change of use for the bridge site.

#### *5.2.2.4 Ringed Plover*

##### *5.2.2.4.1 Construction Phase*

The conservation objectives supporting documents also have waterbird distribution dot density diagrams for the 2010/11 period low tide counts which show that Ringed Plover were recorded foraging in the area of the SPA at the mouth of the River Owvane c. 7.2rkm downstream of the bridge site (NPWS, 2011a). This species is unlikely to be found at the bridge site but is located downstream, and therefore could be affected by water quality and invasive species impacts.

There is no potential for disturbance impacts to affect this species due to the distance between the bridge site and the SPA, c. 7.2rkm. Indirect water quality impacts may arise and travel downstream to this species habitat in the SPA. These impacts would be similar to those described above for the Estuaries habitat discussed above in section 5.1.1.1.1. Invasive species impacts can also result in degradation of Ringed Plover habitat in the SPA. Although given the distance between this species habitat in the SPA and the bridge site, c. 7.2rkm, this impact is unlikely to be significant, but the precautionary principle is applied.

##### *5.2.2.4.2 Operational Phase*

As the bridge is an existing bridge, there is no potential for operational phase impacts to arise as a result of the proposed rehabilitation works. There will be no change of use for the bridge site.

### *5.2.2.5 Golden Plover*

#### *5.2.2.5.1 Construction Phase*

The conservation objectives supporting documents also have waterbird distribution dot density diagrams for the 2010/11 period low tide counts which shows that Golden Plover have been recorded roosting in the SPA at the mouth of the River Owvane c. 7.2rkm downstream of the bridge site (NPWS, 2011a). This species is unlikely to be found at the bridge site but is located downstream, and therefore could be affected by water quality and invasive species impacts.

There is no potential for disturbance impacts to affect this species due to the distance between the bridge site and the SPA, c. 7.2rkm. Indirect water quality impacts may arise and travel downstream to this species habitat in the SPA. These impacts would be similar to those described above for the Estuaries habitat discussed above in section 5.1.1.1.1. Invasive species impacts can also result in degradation of Golden Plover habitat in the SPA. Although given the distance between this species habitat in the SPA and the bridge site, c. 7.2rkm, this impact is unlikely to be significant, but the precautionary principle is applied.

#### *5.2.2.5.2 Operational Phase*

As the bridge is an existing bridge, there is no potential for operational phase impacts to arise as a result of the proposed rehabilitation works. There will be no change of use for the bridge site.

### *5.2.2.6 Lapwing*

#### *5.2.2.6.1 Construction Phase*

The conservation objectives supporting documents also have waterbird distribution dot density diagrams for the 2010/11 period low tide counts which shows that Lapwing were recorded roosting and foraging in the area of the SPA at the mouth of the River Owvane c. 7.2rkm downstream of the site (NPWS, 2011a). This species is unlikely to be found at the bridge site but is located downstream, and therefore could be affected by water quality and invasive species impacts.

There is no potential for disturbance impacts to affect this species due to the distance between the bridge site and the SPA, c. 7.2rkm. Indirect water quality impacts may arise and travel downstream to this species habitat in the SPA. These impacts would be similar to those described above for the Estuaries habitat discussed above in section 5.1.1.1.1. Invasive species impacts can also result in degradation of Lapwing habitat in the SPA. Although given the distance between this species habitat in the SPA and the bridge site, c. 7.2rkm, this impact is unlikely to be significant, but the precautionary principle is applied.

#### *5.2.2.6.2 Operational Phase*

As the bridge is an existing bridge, there is no potential for operational phase impacts to arise as a result of the proposed rehabilitation works. There will be no change of use for the bridge site.

### *5.2.2.7 Knot*

#### *5.2.2.7.1 Construction Phase*

The conservation objectives supporting documents also have waterbird distribution dot density diagrams for the 2010/11 period low tide counts which shows that Knot were recorded foraging in low densities c. 7.2rkm downstream of the bridge site in the SPA boundary (NPWS, 2011a). This species is unlikely to be found at the bridge site but is located downstream, and therefore could be affected by water quality and invasive species impacts.

There is no potential for disturbance impacts to affect this species due to the distance between the bridge site and the SPA, c. 7.2rkm. Indirect water quality impacts may arise and travel downstream to this species habitat in the SPA. These impacts would be similar to those described above for the Estuaries habitat discussed above in section 5.1.1.1.1. Invasive species impacts can also result in degradation of Knot habitat in the SPA. Although given the distance between this species habitat in the SPA and the bridge site, c. 7.2rkm, this impact is unlikely to be significant, but the precautionary principle is applied.

#### *5.2.2.7.2 Operational Phase*

As the bridge is an existing bridge, there is no potential for operational phase impacts to arise as a result of the proposed rehabilitation works. There will be no change of use for the bridge site.

### *5.2.2.8 Dunlin*

#### *5.2.2.8.1 Construction Phase*

The conservation objectives supporting documents also have waterbird distribution dot density diagrams for the 2010/11 period low tide counts which show that Dunlin were recorded foraging in the SPA c. 7.2rkm downstream of the bridge site at the mouth of the River Owvane (NPWS, 2011a). This species is unlikely to be found at the bridge site but is located downstream, and therefore could be affected by water quality and invasive species impacts.

There is no potential for disturbance impacts to affect this species due to the distance between the bridge site and the SPA, c. 7.2rkm. Indirect water quality impacts may arise and travel downstream to this species habitat in the SPA. These impacts would be similar to those described above for the Estuaries habitat discussed above in section 5.1.1.1.1. Invasive species impacts can also result in degradation of Dunlin habitat in the SPA. Although given the distance between this species habitat in the SPA and the bridge site, c. 7.2rkm, this impact is unlikely to be significant, but the precautionary principle is applied.

#### *5.2.2.8.2 Operational Phase*

As the bridge is an existing bridge, there is no potential for operational phase impacts to arise as a result of the proposed rehabilitation works. There will be no change of use for the bridge site.

### *5.2.2.9 Curlew*

#### *5.2.2.9.1 Construction Phase*

The conservation objectives supporting documents also have waterbird distribution dot density diagrams for the 2010/11 period low tide counts which show that Curlew were frequently recorded roosting and sometimes foraging in the area of the SPA c. 7.2rkm downstream of the site (NPWS, 2011a). This species is unlikely to be found at the bridge site but is located downstream, and therefore could be affected by water quality and invasive species impacts.

There is no potential for disturbance impacts to affect this species due to the distance between the bridge site and the SPA, c. 7.2rkm. Indirect water quality impacts may arise and travel downstream to this species habitat in the SPA. These impacts would be similar to those described above for the Estuaries habitat discussed above in section 5.1.1.1.1. Invasive species impacts can also result in degradation of Curlew habitat in the SPA. Although given the distance between this species habitat in the SPA and the bridge site, c. 7.2rkm, this impact is unlikely to be significant, but the precautionary principle is applied.

#### *5.2.2.9.2 Operational Phase*

As the bridge is an existing bridge, there is no potential for operational phase impacts to arise as a result of the proposed rehabilitation works. There will be no change of use for the bridge site.

### *5.2.2.10 Redshank*

#### *5.2.2.10.1 Construction Phase*

The conservation objectives supporting documents also have waterbird distribution dot density diagrams for the 2010/11 period low tide counts which show that Redshank were recorded foraging at the mouth of the River Owvane c. 7.2rkm downstream of the site (NPWS, 2011a). This species is unlikely to be found at the bridge site but is located downstream, and therefore could be affected by water quality and invasive species impacts.

There is no potential for disturbance impacts to affect this species due to the distance between the bridge site and the SPA, c. 7.2rkm. Indirect water quality impacts may arise and travel downstream to this species habitat in the SPA. These impacts would be similar to those described above for the Estuaries habitat discussed above in section 5.1.1.1.1. Invasive species impacts can also result in degradation of Redshank habitat in the SPA. Although given the distance between this species habitat in the SPA and the bridge site, c. 7.2rkm, this impact is unlikely to be significant, but the precautionary principle is applied.

#### *5.2.2.10.2 Operational Phase*

As the bridge is an existing bridge, there is no potential for operational phase impacts to arise as a result of the proposed rehabilitation works. There will be no change of use for the bridge site.

#### *5.2.2.11 Greenshank*

##### *5.2.2.11.1 Construction Phase*

The conservation objectives supporting documents also have waterbird distribution dot density diagrams for the 2010/11 period low tide counts which show that Greenshank were recorded in low densities foraging in the SPA c. 7.2rkm downstream of the site (NPWS, 2011a). This species is unlikely to be found at the bridge site but is located downstream, and therefore could be affected by water quality and invasive species impacts.

There is no potential for disturbance impacts to affect this species due to the distance between the bridge site and the SPA, c. 7.2rkm. Indirect water quality impacts may arise and travel downstream to this species habitat in the SPA. These impacts would be similar to those described above for the Estuaries habitat discussed above in section 5.1.1.1.1. Invasive species impacts can also result in degradation of Greenshank habitat in the SPA. Although given the distance between this species habitat in the SPA and the bridge site, c. 7.2rkm, this impact is unlikely to be significant, but the precautionary principle is applied.

##### *5.2.2.11.2 Operational Phase*

As the bridge is an existing bridge, there is no potential for operational phase impacts to arise as a result of the proposed rehabilitation works. There will be no change of use for the bridge site.

#### *5.2.2.12 Black-headed Gull*

##### *5.2.2.12.1 Construction Phase*

The conservation objectives supporting documents also have waterbird distribution dot density diagrams for the 2010/11 period low tide counts which show that Black-headed Gull were recorded foraging and roosting in the SPA in the area of the mouth of the River Owvane c. 7.2rkm downstream of the site (NPWS, 2011a). This species is unlikely to be found at the bridge site but is located downstream, and therefore could be affected by water quality and invasive species impacts.

There is no potential for disturbance impacts to affect this species due to the distance between the bridge site and the SPA, c. 7.2rkm. Indirect water quality impacts may arise and travel downstream to this species habitat in the SPA. These impacts would be similar to those described above for the Estuaries habitat discussed above in section 5.1.1.1.1. Invasive species impacts can also result in degradation of Black-headed Gull habitat in the SPA. Although given the distance between this species habitat in the SPA and the bridge site, c. 7.2rkm, this impact is unlikely to be significant, but the precautionary principle is applied.

##### *5.2.2.12.2 Operational Phase*

As the bridge is an existing bridge, there is no potential for operational phase impacts to arise as a result of the proposed rehabilitation works. There will be no change of use for the bridge site.

## 6. POTENTIAL FOR IN-COMBINATION EFFECTS

The standard data Natura 2000 form for the Lower River Shannon SAC lists the threats and pressures currently having an impact on this protected site. There are no impacts listed that are having a high impact on this SAC. The following are noted as having a medium impact on the SAC: Fertilisation,

urbanised areas, human habitation, air pollution, air-borne pollutants, discharges, eutrophication (natural), grazing, polderisation, reclamation of land from sea, estuary or marsh. The standard data Natura 2000 form for the River Shannon and River Fergus Estuaries SPA notes the following as having a high impact on the SPA: Industrial or commercial areas, Discharges, Fertilisation, Urbanised areas and human habitation.

A search for planning applications was carried out on the online National Planning Applications Database (NPAD). There are no planning applications in the direct vicinity of Mohernagh Bridge in Co. Limerick. However, there are some located downstream near the River Owvane (Limerick) in Ballynahill, c. 1km north-west of the bridge. There is one application east of Ballnahill town but adjacent to the River Owvane (Limerick) in 2017 which was for the installation of an above ground enclosure to house a new natural has District Regulating Installation (DRI) with all ancillary services and associated works, including a vent stack (Planning Ref No.: 17872). Limerick City and County Council carried out a screening report for this application which determined that there would be no significant effects on the Natura 2000 network. There are two further applications adjacent to here, one in 2014 for the construction of an extension to existing dwelling house, detached garage, new site entrance and all associated site works (Planning Ref No.: 141226) and the other for a retention permission in 2019 for built revisions to a previously approved workshop including additional floor area and elevation changes (Planning Ref No.: 19456).

The River Owvane at Mohernagh Bridge has a 'Good' River Waterbody WFD Status (2013-2018) at the subject bridge site. It has a WFD River Waterbodies Risk status of 'At risk'. The nearest recent Q-rating on the watercourse was recorded in 2017 just c. 750rm downstream of Mohernagh Bridge, at the Bridge upstream of Ballyhahill Bridge (Station: 24O02 0090). A rating of Q4 was recorded here. This is equivalent to 'Good' water quality. Downstream of this monitoring point, the River Waterbody WFD Status 2013-2018 declines to 'Poor'. A Q-rating of Q4 was also obtained at the nearest upstream monitoring station to Mohernagh Bridge in 2017. This was at the Bridge South of Gortadroma (Station: 24O02 0075) which is located c. 2.2rkm upstream of Mohernagh Bridge.

The Ballynahill WwTP discharges into the River Owvane c. 2rkm downstream of the Mohernagh bridge site and the application form notes that the WwTP has primary and secondary treatment and is serving an agglomeration of 221 p.e. (in 2010) (Limerick County Council, 2010a). It is unclear what the design capacity of the plant is. There is also the Loghill WwTP (Reg No.: A0217-01) which discharges into the lower reaches of the River Owvane where it is a transitional waterbody and enters the Shannon estuary. The application form from 2010 notes that the WwTP does serve a p.e. of 200 but it is unclear what the design capacity of the plant is (Limerick County Council, 2010b).

Taking the above information into account, concerning background pressures in the area and the list of threats and pressures on the SAC and SPA downstream of Mohernagh Bridge, there is some potential for cumulative water quality impacts to arise. These impacts could act in-combination with the existing WwTP discharges in the catchment, the pressures of fertilisation, discharges, grazing and human habitation. Water quality impacts may arise during the rehabilitation works at Mohernagh Bridge, which could travel downstream and result in a larger impact cumulatively with the existing pressures on the catchment, SAC and SPA. It is noted that the works at Mohernagh Bridge in the context of the SAC and SPA downstream are minor and are expected to be short-term. This is unlikely therefore to result in a significant increase in water quality pollution. It is considered that with the mitigation measures outlined in this NIS to protect water quality, cumulative impacts will not be significant.

# 7. MITIGATION

Mitigation measures for the protection of the Lower River Shannon SAC, the River Shannon and River Fergus Estuaries SPA and their qualifying interests have been prepared. The proposed rehabilitation works to Mohernagh Bridge have been identified as having some potential to cause water quality, disturbance and invasive species impacts affecting the qualifying interests of these sites.

## 7.1 Detailed Method Statement and CEMP

Prior to commencement of works a site specific Construction and Environmental Management Plan and Method Statement must be drawn up detailing precisely how the works will be carried out in compliance with the necessary mitigation measures. These documents will provide the precise details of the works to be undertaken and how each process and each step of the works will be carried out to adhere to the mitigation measures: timing of works, limiting access outside of the proposed works area, biosecurity protocols and water quality protection measures.

The CEMP and Method Statement will be prepared following best practice procedure and guidelines, having due regard to the relevant sections of the following:

- IFI, (2010) *'Biosecurity Protocol for Field Survey Work'*
- IFI, (2016) *'Guidelines of protection of Fisheries during construction works in and adjacent to waters'*
- NRA, (2010) *'The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads'*
- NRA, (2008) *'Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes'*
- CIRIA (2006) *'Control of Water Pollution from Linear Construction Projects- Site Guide (C649)'*
- CIRIA (2005) *'Environmental Good Practice – Site Guide (C650)'*

## 7.2 Avoidance

### *7.2.1 Footprint of works*

The footprint of the works will be limited and works areas will be surrounded by silt fences and sandbags to help prevent water contamination from the proposed bridge works. Appropriate set back distances from the river will be maintained. The main site compound will not be located within 5m of the river and will be located on dry land.

Access to the river for any instream bridge works should be limited to a single access route to minimise the footprint of works. Impacts to the riparian habitats will be kept to a minimum with natural re-vegetation after the completion of works.

Access under the bridge must be provided at all times to allow safe passage along the river channel for wildlife such as Otter.

### *7.2.2 Timing of works*

The proposed works will be undertaken outside of the salmonid close season and outside of the lamprey spawning season, with works permitted from July - September. The salmonid close season begins on

the 30th of September and therefore works will have to be completed before this time. Works should also be limited to daylight hours to avoid potential disturbance to nocturnal animals foraging at the subject bridge site, namely Otter. Works should be limited to between 8am and 5pm.

## 7.3 Water Quality Protection

Any oiling or refueling of machinery that may be required will be undertaken away from the watercourse. Any oils or fuels that may be required for minor machinery used during the proposed works will be stored appropriately in bunded tanks in the site compound (which should be fenced off 5m from the river) to ensure no spillages occur. Machinery will be well-maintained and checked for leaks prior to its use on site and prior to working in-stream if required. Spill kits will be used and any leaks on site will be cleaned immediately. The site compound will have security to deter vandalism, theft and unauthorised access.

Any tool washing and waste / grey water from the site will be stored securely until it can be removed from site. There could be impacts from welfare facilities for employees and to mitigate this portaloos should be provided and regularly maintained by a licenced facility and all sewage appropriately removed from the site to an authorised treatment plant.

No concrete / cement mixing will be carried out at the riverbank area; mixing within the mixing area in the site compound will be controlled by the contractor, with all wash water, tool washings and any waste / grey water stored securely and removed; no waste will be stored on site; concrete / cement and grout work must be carried out behind the silt fencing and sandbags, in the dry works area. Precast concrete will be used wherever possible. When removing the existing deck of the bridge, care will be taken to ensure no debris from the concrete deck will fall to the river below. A tarp or similar material will be placed underneath the bridge to catch any debris that may fall during the replacement and reinstallation of the bridge deck. Storage areas for concrete / cement and grout required for the works will be included in the site compound.

The waste from any vegetation removal will also have to be dealt with appropriately away from the river. Silt fences may be required here to ensure vegetation debris does not flow downstream and can be appropriately removed. Any mature trees within the vegetation removal area should be endeavored to be retained where possible to minimise debris. The chosen ecologically safe herbicide will be named in the Method Statement and stored safely and appropriately in the site compound. A detailed description of its use will be provided in the Method Statement. When removing vegetation from the bridge ensure no debris from damaged section of the bridge remains in the water. All work carried out on the bridge including raking out joints, flushing them to remove loose material and dust along with the construction of new walls will be carried out such that no debris will enter the river.

Silt fences will be placed on the outside of the works area first before works commence and before any silt is excavated, with sandbags placed inside to ensure no impacts regarding suspended solids arise. Details of the sandbags will be included in the method statement. The site ecologist will ensure that any sandbags and silt fences are erected correctly. The works area will be fenced to avoid trampling or disturbance by personnel outside of the works area or by public access to the site.

Prior to any instream works occurring, the site ecologist will agree a 5-day weather window of low flow conditions with the contractor to minimise the risk of works in the river during a flood event. The extent of instream works with regard to the methodology for damming of the works area will be agreed by the contractor in the site specific detailed CEMP, but the mitigations to protect water quality and the integrity of the river corridor remain regardless.

For any pumping out water from the dammed works area, silt bags will be installed at the end of the pumping pipes to filter water to be pumped from the dammed section of the river. These silt bags will be specified in the detailed method statement to adequately cope with the volume of water and will be maintained so it is operating effectively with suspended solids loadings at the end of pipe at less than 10 mg/l. Any dewatering must pass through a silt bag, which would be similar in nature to flood water in the area.

## 7.4 Biosecurity

No invasive species were recorded at the site during the site survey, but precautions will be taken to ensure that no invasive species are introduced due to the proposed works. Biosecurity measures will follow NRA guidelines '*The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads'* (NRA, 2010) and the IFI guidelines '*Biosecurity Protocol for Field Survey Work'* (IFI, 2010).

Particular attention will have to be given to sterilising all equipment / work gear that will come in contact with the river, by using suitable disinfectants such as Virkon aquatic. All equipment to be used on site will be steam cleaned before dispatching to site, and all hired equipment will be treated on site with an approved biocide / cleaning agent. A disinfection / cleaning station will be set up next to the site compound and 5m back from the river. Any depot providing material for the works such as the stones to be placed on top of the culvert bed within the river should be able to provide either verbal or written certificate to ensure no non-native invasive species are present in the obtained material.

## 7.5 Site ecologist

A site ecologist will need to be appointed for the duration of the proposed works. The site ecologist will work with the contractor to draw up the precise site-specific method statement prior to the commencement of works. This method statement will include precise details of the works, accessing areas, equipment / machinery / materials etc. for each stage of the project. This will ensure that the works are carried out following the best practice guidelines and the mitigation measures provided in this document with minimal impacts on the Natura 2000 network. The ecologist will be on site on a regular basis to ensure compliance with the environmental and ecological protection measures specified in the method statement.

A site induction will be carried out by the site ecologist for all contractors' personnel including sub-contractor staff attending the site. The site induction will ensure that any person working on site is aware of the mitigation measures that will be implemented on site. This will include limiting access to within the works area, timing of works, water quality protection measures and biosecurity protocols. This will be the first element of the works undertaken.

The site ecologist will over-see the set-up of dry works areas for the proposed works. Any lamprey and fish species potentially caught behind the dammed area will be translocated upstream by the ecologist who will have obtained a section 14 license for this activity.

# 8. RESIDUAL IMPACTS

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. Favourable conservation status is defined for Annex I habitats and Annex II species in the Habitat Directive (1992):

Article 1 (e)

> Conservation status of a natural habitat means the sum of the influences acting on a natural habitat and its typical species that may affect its long-term natural distribution, structure and functions as well as the long-term survival of its typical species within the territory referred to in Article 2.
>
> The conservative status of a natural habitat will be taken as 'favourable' when: its natural range and areas it covers within that range are stable or increasing, and the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future.

Article 1 (i)

> Conservation status of a species means the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within the territory referred to in Article 2;
>
> The conservation status will be taken as 'favourable' when: population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

The Conservation Objectives of the River Shannon and River Fergus Estuaries SPA is also detailed in a site-specific report (NPWS, 2012b). The Conservation Objectives of the Lower River Shannon SAC are detailed in one site specific report prepared by the National Parks and Wildlife Service (NPWS, 2012c). The current assessment utilizes the site-specific conservation objectives and the national 'Status of EU Protected Habitats and Species in Ireland' Report (NPWS, 2019a; NPWS, 2019b; NPWS, 2019c).

Mohernagh bridge is located c. 7.2rkm upstream of both the Lower River Shannon SAC and the River Shannon and River Fergus Estuaries SPA. The proposed works comprise replacing the bridge deck, slab and beams with a new precast concrete culvert. Although upstream of the SAC boundary, salmonid

habitat is present at the site and there is potential for Salmon to be present here. There is also the potential for Brook / River lamprey and Otters to be present at the site. None of the habitats of the SAC or SPA are present at the site but are located downstream with a hydrological connection. The bird species of the SPA are unlikely to be present at the site but again are located downstream, in particular Shelduck, Wigeon, Teal, Ringed Plover, Golden Plover, Lapwing, Knot, Dunlin, Curlew, Redshank, Greenshank and Black-headed Gull which have been previously recorded at the mouth of the River Owvane (Limerick) near the SPA boundary at Loghill. Impacts on the affected Qualifying Interests were identified as water quality, disturbance and invasive species. Water quality impacts could arise from increased suspended solids, contaminants entering the watercourse, spillages of oils / fuels, cement / concrete and / or root herbicide. Dewatering of areas also poses risks to water quality. Disturbance may arise through increased noise and human activity on site. Invasive species could also be introduced on site through vectors such as machinery or tools / personnel on site. Mitigation provided includes a detailed method statement and CEMP, limiting the footprint and timing of the works, water quality protection measures, biosecurity measures and a site ecologist. No significant impacts are envisaged, and with mitigation, the impacts will be reduced insofar as possible.

The implementation of the provided mitigation measures is considered to be sufficient to minimise any risk of impacts to the SAC and SPA to imperceptible in scale. There are no impacts arising from the proposed development which could affected the conservation status of the Annex I habitats or Annex II species listed as qualifying interests of the SAC or SPA.

The proposed development will comply with the required mitigation to ensure that there will be no residual impacts arising.

**Table 6** Potential Impacts, Mitigation Measures and Residual Impacts for each of the affected Q.I.s.

| Natura 2000 Site | Qualifying Interest | Impact | Mitigation Measures | Residual Impact |
|---|---|---|---|---|
| Lower River Shannon SAC | Estuaries | Water Quality; Invasive Species | Detailed Method Statement and CEMP following listed guidelines; limiting the footprint of the works; silt fences and sandbags; site compound not within 5m of river and on dry land; access limited to single route for instream works; impacts to riparian habitats minimised with natural re-vegetation; any oiling / refuelling away from watercourse; oils / fuels in bunded tanks in site compound; machinery well maintained and checked for leaks; spill kits provided; security at site compound; tool washing / grey water stored securely until removed off site; portaloos provided and regularly maintained by licensed facility; no vegetation debris instream; silt fences on outside of works areas; sand bags placed inside; works are fenced off; no concrete / cement mixing at river bank area; precast concrete used where possible; tarp or similar material placed underneath bridge to catch potential debris; no waste stored on site; chosen ecologically safe herbicide named in method statement and stored securely in site compound; site ecologist to agree 5 day weather window of low flow conditions for instream works; if pumping out water from dewatered area silt bags installed at end of pipes; NRA guidelines followed for biosecurity; sterilise all equipment / work gear that comes into contact with river, all equipment steam cleaned before arriving on site; site ecologist employed; site ecologist to give site induction; site ecologist to oversee set up of dry works areas | No residual impacts. |
| | Mudflats and sandflats not covered by | Water Quality; | As above for Estuaries. | No residual impacts. |

| Natura 2000 Site | Qualifying Interest | Impact | Mitigation Measures | Residual Impact |
|---|---|---|---|---|
| | seawater at low tide | Invasive Species | | |
| | Reefs | Water Quality; Invasive Species | As above for Estuaries. | No residual impacts. |
| | Atlantic salt meadows (*Glauco-Puccinellietalia maritimae)* | Water Quality; Invasive Species | As above for Estuaries. | No residual impacts. |
| | Sea lamprey | Water Quality; Invasive Species | Detailed Method Statement and CEMP following listed guidelines; limiting the footprint of the works; silt fences and sandbags; site compound not within 5m of river and on dry land; access limited to single route for instream works; impacts to riparian habitats minimised with natural re-vegetation; timing of works outside lamprey spawning season with works permitted from July-September; any oiling / refuelling away from watercourse; oils / fuels in bunded tanks in site compound; machinery well maintained and checked for leaks; spill kits provided; security at site compound; tool washing / grey water stored securely until removed off site; portaloos provided and regularly maintained by licensed facility; no vegetation debris instream; silt fences on outside of works areas; sand bags placed inside; works are fenced off; no concrete / cement mixing at river bank area; precast concrete used where possible; tarp or similar material placed underneath bridge to catch potential debris; no waste stored on site; chosen ecologically safe herbicide named in method statement and stored securely in site compound; site ecologist to agree 5 day weather window of low flow conditions for instream works; if pumping out water from dewatered area, silt bags installed at end of pipes; NRA guidelines followed for biosecurity; sterilise all equipment / work gear that comes into contact with river, all equipment steam cleaned before arriving on site; site ecologist employed; site ecologist to give site induction; site ecologist to oversee set up of dry works areas and any lamprey species potentially caught will be translocated upstream with section 14 licence by site ecologist | No residual impacts. |
| | Brook lamprey | Water Quality; Disturbance; Invasive Species | Detailed Method Statement and CEMP following listed guidelines; limiting the footprint of the works; silt fences and sandbags; site compound not within 5m of river and on dry land; access limited to single route for instream works; impacts to riparian habitats minimised with natural re-vegetation; timing of works outside lamprey spawning season with works permitted from July-September; works limited to daytime hours; any oiling / refuelling away from watercourse; oils / fuels in bunded tanks in site compound; machinery well maintained and checked for leaks; spill kits provided; security at site compound; tool washing / grey water stored securely until removed off site; portaloos provided and regularly maintained by licensed facility; no vegetation debris instream; silt fences on outside of works areas; sand bags placed inside; works are fenced off; no concrete / cement mixing at river bank area; precast concrete used where possible; tarp or similar material placed underneath bridge to catch | No residual impacts. |

| Natura 2000 Site | Qualifying Interest | Impact | Mitigation Measures | Residual Impact |
|---|---|---|---|---|
| | | | potential debris; no waste stored on site; chosen ecologically safe herbicide named in method statement and stored securely in site compound; site ecologist to agree 5 day weather window of low flow conditions for instream works; if pumping out water from dewatered area silt bags installed at end of pipes; NRA guidelines followed for biosecurity; sterilise all equipment / work gear that comes into contact with river, all equipment steam cleaned before arriving on site; site ecologist employed; site ecologist to give site induction; site ecologist to oversee set up of dry works areas and any lamprey species potentially caught will be translocated upstream with section 14 licence by site ecologist | |
| | River lamprey | Water Quality; Disturbance; Invasive Species | As above for Brook lamprey. | No residual impacts. |
| | Salmon | Water Quality; Disturbance; Invasive Species | Detailed Method Statement and CEMP following listed guidelines; limiting the footprint of the works; silt fences and sandbags; site compound not within 5m of river and on dry land; access limited to single route for instream works; impacts to riparian habitats minimised with natural re-vegetation; timing of works outside salmonid spawning season with works permitted from July-September; works limited to daytime hours; any oiling / refuelling away from watercourse; oils / fuels in bunded tanks in site compound; machinery well maintained and checked for leaks; spill kits provided; security at site compound; tool washing / grey water stored securely until removed off site; portaloos provided and regularly maintained by licensed facility; no vegetation debris instream; silt fences on outside of works areas; sand bags placed inside; works are fenced off; no concrete / cement mixing at river bank area; precast concrete used where possible; tarp or similar material placed underneath bridge to catch potential debris; no waste stored on site; chosen ecologically safe herbicide named in method statement and stored securely in site compound; site ecologist to agree 5 day weather window of low flow conditions for instream works required; if pumping out water from dewatered area silt bags installed at end of pipes; NRA guidelines followed for biosecurity; sterilise all equipment / work gear that comes into contact with river, all equipment steam cleaned before arriving on site; site ecologist employed; site ecologist to give site induction; site ecologist to oversee set up of dry works areas and any fish species potentially caught will be translocated upstream with section 14 licence by site ecologist | No residual impacts. |
| | Otter | Water Quality; Disturbance; Invasive Species | Detailed Method Statement and CEMP following listed guidelines; limiting the footprint of the works; silt fences and sandbags; site compound not within 5m of river and on dry land; access limited to single route for instream works; impacts to riparian habitats minimised with natural re-vegetation; access at all times under the bridge for Otter; works limited to daytime hours; any oiling / refuelling away from watercourse; oils / fuels in bunded tanks in site compound; machinery well maintained and checked for leaks; spill kits provided; security at site compound; tool washing / grey water stored securely until removed off site; portaloos provided and regularly maintained by licensed facility; | No residual impacts. |

| Natura 2000 Site | Qualifying Interest | Impact | Mitigation Measures | Residual Impact |
|---|---|---|---|---|
| | | | no vegetation debris instream; silt fences on outside of works areas; sand bags placed inside; works are fenced off; no concrete / cement mixing at river bank area; precast concrete used where possible; tarp or similar material placed underneath bridge to catch potential debris; no waste stored on site; chosen ecologically safe herbicide named in method statement and stored securely in site compound; site ecologist to agree 5 day weather window of low flow conditions for instream works required; if pumping out water from dewatered area silt bags installed at end of pipes; NRA guidelines followed for biosecurity; sterilise all equipment / work gear that comes into contact with river, all equipment steam cleaned before arriving on site; site ecologist employed; site ecologist to give site induction; site ecologist to oversee set up of dry works areas | |
| River Shannon and River Fergus Estuaries SPA | Wetland and Waterbirds | Water Quality; Invasive Species | As above for Estuaries. | No residual impacts. |
| | Shelduck (*Tadorna tadorna*) | Water Quality; Invasive Species | As above for Estuaries. | No residual impacts. |
| | Wigeon (*Anas penelope*) | Water Quality; Invasive Species | As above for Estuaries. | No residual impacts. |
| | Teal (*Anas crecca*) | Water Quality; Invasive Species | As above for Estuaries. | No residual impacts. |
| | Ringed Plover (*Charadrius hiaticula*) | Water Quality; Invasive Species | As above for Estuaries. | No residual impacts. |
| | Golden Plover (*Pluvialis apricaria*) | Water Quality; Invasive Species | As above for Estuaries. | No residual impacts. |
| | Lapwing (*Vanellus vanellus*) | Water Quality; Invasive Species | As above for Estuaries. | No residual impacts. |
| | Knot (*Calidris canutus*) | Water Quality; Invasive Species | As above for Estuaries. | No residual impacts. |
| | Dunlin (*Calidris alpina*) | Water Quality; Invasive Species | As above for Estuaries. | No residual impacts. |
| | Curlew (*Numenius arquata*) | Water Quality; Invasive Species | As above for Estuaries. | No residual impacts. |
| | Redshank (*Tringa totanus*) | Water Quality; Invasive Species | As above for Estuaries. | No residual impacts. |

| Natura 2000 Site | Qualifying Interest | Impact | Mitigation Measures | Residual Impact |
|---|---|---|---|---|
| | Greenshank (*Tringa nebularia*) | Water Quality; Invasive Species | As above for Estuaries. | No residual impacts. |
| | Black-headed Gull (*Chroicocephalus ridibundus*) | Water Quality; Invasive Species | As above for Estuaries. | No residual impacts. |

## 9. CONCLUSION STATEMENT

The provisions of Article 6 of the 'Habitats' Directive 92/43/EC (2000) defines 'integrity' as the: 'coherence of the site's ecological structure and function, across its whole area, or the habitats, complex of habitats and/or population of species for which the site is or will be classified'.

Mitigation measures proposed ensure that there are no residual impacts on the Lower River Shannon SAC or the River Shannon and River Fergus Estuaries SPA. The potential impacts identified, including water quality, disturbance and invasive species, will be successfully reduced to imperceptible in scale following the implementation of the mitigation measures in this NIS. It has therefore been concluded that following an examination, analysis and evaluation of the relevant information, including in particular the nature of the predicted impacts from the proposed works, and with the implementation of the mitigation measures proposed, that the proposed works do not pose a risk adversely affecting the integrity of any Natura 2000 site, either alone or in-combination with other plans or projects.

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## PLATES

**Plate 1** Mohernagh Bridge in Co. Limerick.

**Plate 2** River Owvane at Mohernagh Bridge.

# APPENDIX 1 NPWS SITE SYNOPSIS

**SITE NAME: LOWER RIVER SHANNON SAC**
**SITE CODE: 002165**

This very large site stretches along the Shannon valley from Killaloe to Loop Head/ Kerry Head, a distance of some 120km. The site thus encompasses the Shannon, Feale, Mulkear and Fergus Estuaries, the freshwater lower reaches of the River Shannon (between Killaloe and Limerick), the freshwater stretches of much of the Feale and Mulkear catchments and the marine area between Loop Head and Kerry Head. The Shannon and Fergus flow through Carboniferous limestone as far as Foynes, but west of Foynes Namurian shales and flagstones redominate (except at Kerry Head, which is formed from Old Red Sandstone). The eastern sections of the Feale catchment flow through Namurian Rocks and the western stretches through Carboniferous Limestone. The Mulkear flows through Lower Palaeozoic Rocks in the upper reaches before passing through Namurian Rocks, followed by Lower Carboniferous Shales and Carboniferous Limestone. The Mulkear River itself, immediately north of Pallasgreen, passes through an area of Rhyolites, Tuffs and Agglomerates. Rivers within the subcatchment of the Feale include the Galey, Smearlagh, Oolagh, Allaughaun, Owveg, Clydagh, Caher, Breanagh and Glenacarney. Rivers within the sub-catchment of the Mulkear include the Killeenagarriff, Annagh, Newport, the Dead River, the Bilboa, Glashacloonaraveela, Gortnageragh and Cahernahallia.

The site is a candidate SAC selected for lagoons and alluvial wet woodlands, both habitats listed on Annex I of the E.U. Habitats Directive. The site is also selected for floating river vegetation, *Molinia* meadows, estuaries, tidal mudflats, Atlantic salt meadows, Mediterranean salt meadows, *Salicornia* mudflats, sand banks, perennial vegetation of stony banks, sea cliffs, reefs and large shallow inlets and bays all habitats listed on Annex I of the E.U. Habitats Directive. The site is also selected for the following species listed on Annex II of the same directive – Bottle-nosed Dolphin, Sea Lamprey, River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Atlantic salmon and Otter.

The Shannon and Fergus Estuaries form the largest estuarine complex in Ireland. They form a unit stretching from the upper tidal limits of the Shannon and Fergus Rivers to the mouth of the Shannon estuary (considered to be a line across the narrow strait between Kilcredaun Point and Kilconly Point). Within this main unit there are several tributaries with their own 'sub-estuaries' e.g. the Deel River, Mulkear River, and Maigue River. To the west of Foynes, a number of small estuaries form indentations in the predominantly hard coastline, namely Poulnasherry Bay, Ballylongford Bay, Clonderalaw Bay and the Feale or Cashen River Estuary.

Both the Fergus and inner Shannon estuaries feature vast expanses of intertidal mudflats, often fringed with saltmarsh vegetation. The smaller estuaries also feature mudflats, but have their own unique characteristics, e.g. Poulnasherry Bay is stony and unusually rich in species and biotopes. Plant species are typically scarce on the mudflats, although there are some Eel-grass beds (*Zostera* spp.) and patches of green algae (e.g. *Ulva* sp. and *Enteromorpha* sp.). The main macro-invertebrate community, which has been noted from the inner Shannon and Fergus estuaries, is a *Macoma- Scrobicularia-Nereis* community.

In the transition zone between mudflats and saltmarsh, specialised colonisers of mud predominate: swards of Common Cord-grass (*Spartina anglica*) frequently occur in the upper parts of the estuaries. Less common are swards of Glasswort (*Salicornia europaea* agg.). In the innermost parts of the estuaries, the tidal channels or creeks are fringed with species such as Common Reed (*Phragmites australis*) and Club-rushes (*Scirpus maritimus, S. tabernaemontani* and *S. triquetrus*). In addition to the

nationally rare Triangular Club-rush (*Scirpus triquetrus*), two scarce species are found in some of these creeks (e.g. Ballinacurra Creek): Lesser Bulrush (*Typha angustifolia*) and Summer Snowflake (*Leucojum aestivum*).

Saltmarsh vegetation frequently fringes the mudflats. Over twenty areas of estuarine saltmarsh have been identified within the site, the most important of which are around the Fergus Estuary and at Ringmoylan Quay. The dominant type of saltmarsh present is Atlantic salt meadow occurring over mud. Characteristic species occurring include Common Saltmarsh Grass (*Puccinellia maritima*), Sea Aster (*Aster tripolium*), Thrift (*Armeria maritima*), Sea-milkwort (*Glaux maritima*), Sea Plantain (*Plantago maritima*), Red Fescue (*Festuca rubra*), Creeping Bent (*Agrostis stolonifera*), Saltmarsh Rush (*Juncus gerardi*), Long-bracted Sedge (*Carex extensa*), Lesser Seaspurrey (*Spergularia marina*) and Sea Arrowgrass (*Triglochin maritima*). Areas of Mediterranean salt meadows, characterised by clumps of Sea Rush (*Juncus maritimus*) occur occasionally. Two scarce species are found on saltmarshes in the vicinity of the Fergus Estuary: a type of robust Saltmarsh-grass (*Puccinellia foucaudii*), sometimes placed within the compass of Common Saltmarsh-grass (*Puccinellia maritima*) and Hard-grass (*Parapholis strigosa*).

Saltmarsh vegetation also occurs around a number of lagoons within the site. The two which have been surveyed as part of a National Inventory of Lagoons are Shannon Airport Lagoon and Cloonconeen Pool. Cloonconeen Pool (4-5 ha) is a natural sedimentary lagoon impounded by a low cobble barrier. Seawater enters by percolation through the barrier and by overwash. This lagoon represents a type which may be unique to Ireland since the substrate is composed almost entirely of peat. The adjacent shore features one of the best examples of a drowned forest in Ireland. Aquatic vegetation in the lagoon includes typical species such as Beaked Tasselweed (*Ruppia maritima*) and green algae (*Cladophora* sp.). The fauna is not diverse, but is typical of a high salinity lagoon and includes six lagoon specialists (*Hydrobia ventrosa, Cerastoderma glaucum, Lekanesphaera hookeri, Palaemonetes varians, Sigara stagnalis* and *Enochrus bicolor*). In contrast, Shannon Airport Lagoon (2 ha) is an artificial saline lake with an artificial barrier and sluiced outlet. However, it supports two Red Data Book species of Stonewort (*Chara canescens* and *Chara cf. connivens*).

Most of the site west of Kilcredaun Point/Kilconly Point is bounded by high rocky sea cliffs. The cliffs in the outer part of the site are sparsely vegetated with lichens, Red Fescue, Sea Beet (*Beta vulgaris*), Sea Campion (*Silene maritima*), Thrift and Plantains (*Plantago* spp.). A rare endemic Sea Lavender (*Limonium recurvum* subsp. *pseudotranswallinum*) occurs on cliffs near Loop Head. Cliff-top vegetation usually consists of either grassland or maritime heath. The boulder clay cliffs further up the estuary tend to be more densely vegetated, with swards of Red Fescue and species such as Kidney Vetch (*Anthyllis vulneraria*) and Bird's-foot Trefoil (*Lotus corniculatus*).

The site supports an excellent example of a large shallow inlet and bay. Littoral sediment communities in the mouth of the Shannon Estuary occur in areas that are exposed to wave action and also in areas extremely sheltered from wave action. Characteristically, exposed sediment communities are composed of coarse sand and have a sparse fauna. Species richness increases as conditions become more sheltered. All shores in the site have a zone of sand hoppers at the top and below this each of the shores has different characteristic species giving a range of different shore types in the cSAC.

The intertidal reefs in the Shannon Estuary are exposed or moderately exposed to wave action and subject to moderate tidal streams. Known sites are steeply sloping and show a good zonation down the shore. Well developed lichen zones and littoral reef communities offering a high species richness in the sublittoral fringe and strong populations of *Paracentrotus lividus* are found. The communities found are tolerant to sand scour and tidal streams. The infralittoral reefs range from sloping platforms with some

vertical steps to ridged bedrock with gullies of sand between the ridges to ridged bedrock with boulders or a mixture of cobbles, gravel and sand. Kelp is very common to about 18m. Below this it becomes rare and the community is characterised by coralline crusts and red foliose algae. Flowing into the estuaries are a number of tidal rivers.

Other coastal habitats that occur within the site include the following:

- Stony beaches and bedrock shores - these shores support a typical zonation of seaweeds (*Fucus* spp., *Ascophyllum nodosum* and kelps).
- Shingle beaches - the more stable areas of shingle support characteristic species such as Sea Beet, Sea Mayweed (*Matricaria maritima*), Sea Campion and Curled Dock (*Rumex crispus*).
- Sandbanks which are slightly covered by sea water at all times – there is a known occurrence of sand/gravel beds in the area from Kerry Head to Beal Head.
- Sand dunes - a small area of sand dunes occurs at Beal Point. The dominant species is Marram Grass (*Ammophila arenaria*).

Freshwater rivers have been included in the site, most notably the Feale and Mulkear catchments, the Shannon from Killaloe to Limerick (along with some of its tributaries, including a short stretch of the Kilmastulla River), the Fergus up as far as Ennis, and the Cloon River. These systems are very different in character: the Shannon being broad, generally slow-flowing and naturally eutrophic; the Fergus being smaller and alkaline; while the narrow, fast-flowing Cloon is acid in nature. The Feale and Mulkear catchments exhibit all the aspects of a river from source to mouth. Semi-natural habitats, such as wet grassland, wet woodland and marsh occur by the rivers, however, improved grassland is most common. One grassland type of particular conservation significance, *Molinia* meadows, occurs in several parts of the site and the examples at Worldsend on the River Shannon are especially noteworthy. Here are found areas of wet meadow dominated by rushes and sedges and supporting diverse and species-rich vegetation, including such uncommon species as Blue-eyed Grass (*Sisyrinchium bermudiana*) and Pale Sedge (*Carex pallescens*).

Floating river vegetation characterised by species of Water-crowfoot (*Ranunculus* spp.), Pondweeds (*Potamogeton* spp.) and the moss *Fontinalius antipyretica* are present throughout the major river systems within the site. The rivers contain an interesting bryoflora with *Schistidium alpicola* var. *alpicola* recorded from in-stream boulders on the Bilboa, new to county Limerick.

Alluvial woodland occurs on the banks of the Shannon and on islands in the vicinity of the University of Limerick. The woodland is up to 25m wide on the banks and somewhat wider on the largest island. The most prominent woodland type is gallery woodland where White Willow (*Salix alba*) dominates the tree layer with occasional Alder (*Alnus glutinosa*). The shrub layer consists of various willow species with sally (*Salix cinerea* ssp. *oleifolia*) and what appear to be hybrids of *S. alba* x *S. viminalis.* The herbaceous layer consists of tall perennial herbs. A fringe of Bulrush (*Typha* sp.) occurs on the riverside of the woodland. On slightly higher ground above the wet woodland and on the raised embankment remnants of mixed oak-ash-alder woodland occur. These are poorly developed and contain numerous exotic species but locally *t*here are signs that it is invading open grassland. Alder is the principal tree species with occasional Oak (*Quercus robur*), Elm (*Ulmus glabra, U. procera*), Hazel (*Corylus avellana*), Hawthorn (*Crataegus monogyna*) and the shrubs Guelder-rose (*Viburnum opulus*) and willows. The ground flora is species-rich.

Woodland is infrequent within the site; however Cahiracon Wood contains a strip of old Oak woodland. Sessile Oak (*Quercus petraea*) forms the canopy, with an understorey of Hazel and Holly (*Ilex aquifolium*). Great Wood-rush (*Luzula sylvatica*) dominates the ground flora. Less common species present include Great Horsetail (*Equisetum telmeteia*) and Pendulous Sedge (*Carex pendula*).

In the low hills to the south of the Slievefelim Mountains, the Cahernahallia River cuts a valley through the Upper Silurian rocks. For approximately 2km south of Cappagh Bridge at Knockanavar, the valley sides are wooded. The woodland consists of Birch (*Betula* spp.), Hazel, Oak, Rowan (*Sorbus aucuparia*), some Ash (*Fraxinus excelsior*) and Willow (*Salix* spp.). Most of the valley is not grazed by stock, and as a result the trees are regenerating well. The ground flora feature prominent Greater wood-rush and Bilberry (*Vaccinium myrtillus*) with a typical range of woodland herbs. Where there is more light available, Bracken (*Pteridium aquilinum*) features.

The valley sides of the Bilboa and Gortnageragh Rivers, on higher ground north east of Cappamore, support patches of semi-natural broadleaf woodland dominated by Ash, Hazel, Oak and Birch. There is a good scrub layer with Hawthorn, Willow, Holly and Blackthorn (*Prunus spinosa*) common. The herb layer in these woodlands is often open with a typically rich mixture of woodland herbs and ferns. Moss species diversity is high. The woodlands are ungrazed. The hazel is actively coppiced in places.
There is a small area of actively regenerating cut away raised bog at Ballyrorheen. It is situated approx. 5km north west of Cappamore Co. Limerick. The bog contains some wet areas with good moss (*Sphagnum*) cover. Species of particular interest include the Cranberry (*Vaccinium oxycoccos*) and the White Sedge (*Carex curta*) along with two other regionally rare mosses including *S. fimbriatum*. The site is being invaded by Birch (*Betula pubescens*) scrub woodland. Both commercial forestry and the spread of rhododendron has greatly reduced the overall value of the site.

A number of plant species that are Irish Red Data Book species occur within the site; several are protected under the Flora (Protection) Order, 1999:

- Triangular Club-rush (*Scirpus triquetrus*) - in Ireland this protected species is only found in the Shannon Estuary, where it borders creeks in the inner estuary.
- Opposite-leaved Pondweed (*Groenlandia densa*) - this protected pondweed is found in the Shannon where it passes through Limerick City.
- Meadow Barley (*Hordeum secalinum*) - this protected species is abundant in saltmarshes at Ringmoylan and Mantlehill.
- Hairy Violet (*Viola hirta*) - this protected violet occurs in the Askeaton/Foynes area.
- Golden Dock (*Rumex maritimus*) - noted as occurring in the River Fergus Estuary.
- Bearded Stonewort (*Chara canescens*) - a brackish water specialist found in Shannon Airport lagoon.
- Convergent Stonewort (*Chara connivens*) - presence in Shannon Airport Lagoon to be confirmed.

Overall, the Shannon and Fergus Estuaries support the largest numbers of wintering waterfowl in Ireland. The highest count in 1995-96 was 51,423 while in 1994-95 it was 62,701. Species listed on Annex I of the E.U. Birds Directive which contributed to these totals include: Great Northern Diver (3; 1994/95), Whooper Swan (201; 1995/96), Pale-bellied Brent Goose (246; 1995/96), Golden Plover (11,067; 1994/95) and Bar-tailed Godwit (476; 1995/96). In the past, three separate flocks of Greenland White-fronted Goose were regularly found but none were seen in 1993/94. Other wintering waders and wildfowl present include Greylag Goose (216; 1995/96), Shelduck (1,060; 1995/96), Wigeon (5,976; 1995/96); Teal (2,319; 1995-96); Mallard (528; 1995/96), Pintail (45; 1995/96), Shoveler (84; 1995/96), Tufted Duck (272; 1995/96), Scaup (121; 1995/96), Ringed Plover (240; 1995/96), Grey Plover (750; 1995/96), Lapwing (24,581; 1995/96), Knot (800; 1995/96), Dunlin (20,100; 1995/96), Snipe (719, 1995/96), Black-tailed Godwit (1062; 1995/96), Curlew (1504; 1995/96), Redshank (3228; 1995/96), Greenshank (36; 1995/96) and Turnstone (107; 1995/96). A number of wintering gulls are also present,

including Black-headed Gull (2,216; 1995/96), Common Gull (366; 1995/96) and Lesser Black-backed Gull (100; 1994/95).

This is the most important coastal site in Ireland for a number of the waders including Lapwing, Dunlin, Snipe and Redshank. It also provides an important staging ground for species such as Black-tailed Godwit and Greenshank.

A number of species listed on Annex I of the E.U. Birds Directive breed within the site. These include Peregrine Falcon (2-3 pairs), Sandwich Tern (34 pairs on Rat Island, 1995), Common Tern (15 pairs: 2 on Sturamus Island and 13 on Rat Island, 1995), Chough (14-41 pairs, 1992) and Kingfisher. Other breeding birds of note include Kittiwake (690 pairs at Loop Head, 1987) and Guillemot (4010 individuals at Loop Head, 1987)

There is a resident population of Bottle-nosed Dolphin in the Shannon Estuary consisting of at least 56-68 animals (1996). This is the only known resident population of this E.U. Habitats Directive Annex II species in Ireland. Otter, a species also listed on Annex II of this directive, is commonly found on the site.

Five species of fish listed on Annex II of the E.U. Habitats Directive are found within the site. These are Sea Lamprey (*Petromyzon marinus*), Brook Lamprey (*Lampetra planeri*), River Lamprey (*Lampetra fluviatilis*), Twaite Shad (*Allosa fallax fallax*) and Salmon (*Salmo salar*). The three lampreys and Salmon have all been observed spawning in the lower Shannon or its tributaries. The Fergus is important in its lower reaches for spring salmon while the Mulkear catchment excels as a grilse fishery though spring fish are caught on the actual Mulkear River. The Feale is important for both types. Twaite Shad is not thought to spawn within the site. There are few other river systems in Ireland which contain all three species of Lamprey.

Two additional fish of note, listed in the Irish Red Data Book also occur, namely Smelt (*Osmerus eperlanus*) and Pollan (*Coregonus autumnalis pollan*). Only the former has been observed spawning in the Shannon.

Freshwater Pearl-mussel (*Margaritifera margaritifera*), a species listed on Annex II of the E.U. Habitats Directive, occurs abundantly in parts of the Cloon River.

There is a wide range of landuses within the site. The most common use of the terrestrial parts is grazing by cattle and some areas have been damaged through overgrazing and poaching. Much of the land adjacent to the rivers and estuaries has been improved or reclaimed and is protected by embankments (especially along the Fergus Estuary). Further, reclamation continues to pose a threat as do flood relief works (e.g. dredging of rivers). Gravel extraction poses a major threat on the Feale.

In the past, Cord-grass (*Spartina* sp.) was planted to assist in land reclamation. This has spread widely, and may oust less vigorous colonisers of mud and may also reduce the area of mudflat available to feeding birds.

Domestic and industrial wastes are discharged into the Shannon, but water quality is generally satisfactory - except in the upper estuary, reflecting the sewage load from Limerick City. Analyses for trace metals suggest a relatively clean estuary with no influences by industrial discharges apparent. Further industrial development along the Shannon and water polluting operations are potential threats.

Fishing is a main tourist attraction on the Shannon and there are a large number of Angler Associations, some with a number of beats. Fishing stands and styles have been erected in places. The River Feale is a designated Salmonid Water under the E.U. Freshwater Fish Directive. Other uses of the site include commercial angling, oyster farming, boating (including dolphin-watching trips) and shooting. Some of these may pose threats to the birds and dolphins through disturbance. Specific threats to the dolphins include underwater acoustic disturbance, entanglement in fishing gear and collisions with fast moving craft.

This site is of great ecological interest as it contains a high number of habitats and species listed on Annexes I and II of the E.U. Habitats Directive, including the priority habitat lagoon, the only known resident population of Bottle-nosed Dolphin in Ireland and all three Irish lamprey species. A good number of Red Data Book species are also present, perhaps most notably the thriving populations of Triangular Club-rush. A number of species listed on Annex I of the E.U. Birds Directive are also present, either wintering or breeding. Indeed, the Shannon and Fergus Estuaries form the largest estuarine complex in Ireland and support more wintering wildfowl and waders than any other site in the country. Most of the estuarine part of the site has been designated a Special Protection Area (SPA), under the E.U. Birds Directive, primarily to protect the large numbers of migratory birds present in winter.

**SITE NAME: RIVER SHANNON AND RIVER FERGUS ESTUARIES SPA**
**SITE CODE: 004077**

The estuaries of the River Shannon and River Fergus form the largest estuarine complex in Ireland. The site comprises the entire estuarine habitat west from Limerick City and south from Ennis, extending west as far as Killadysert and Foynes on the north and south shores respectively of the River Shannon (a distance of some 25 km from east to west). Also included are several areas in the outer Shannon estuary, notably Clonderalaw Bay and Poulnasherry Bay, as well as the intertidal areas on the south shore of the Shannon between Tarbert and Beal Point.

The site has vast expanses of intertidal flats. The main macro-invertebrate community present is a *Macoma-Scrobicularia-Nereis* community which provides a rich food resource for the wintering birds. Other species occurring include Common Cockle (*Cerastoderma edule*), Lugworm (*Arenicola marina*), the polychaete *Nepthys hombergii*, the gastropod *Hydrobia ulvae* and the crustacean *Corophium volutator*. Eelgrass (*Zostera* spp.) is present in places, along with green algae (e.g. *Ulva* spp. and *Enteromorpha* spp.).

Salt marsh vegetation frequently fringes the mudflats and this provides important high tide roost areas for the wintering birds. Characteristic species occurring include Common Saltmarsh-grass (*Puccinellia maritima*), Sea Aster (*Aster tripolium*), Thrift (*Armeria maritima*), Sea-milkwort (*Glaux maritima*), Sea Plantain (*Plantago maritima*), Red Fescue (*Festuca rubra*) and Saltmarsh Rush (*Juncus gerardi*). In the innermost parts of the estuaries, the tidal channels or creeks are fringed with species such as Common Reed (*Phragmites australis*) and club-rushes (*Scirpus maritimus, S. lacustris* subsp. *tabernaemontani)*. Also found is the nationally rare Triangular Club-rush (*Scirpus triqueter*).

Elsewhere in the site the shoreline comprises stony or shingle beaches. The site is the most important coastal wetland site in the country and regularly supports in excess of 50,000 wintering waterfowl (mean of 59,183 for the 4 seasons 1996-97 to 1999/00), a concentration easily of international importance. The site has internationally important populations of Dunlin (14,987), Black-tailed Godwit (706) and Redshank (1,983) - all figures are average peaks for 3 of the 5 seasons in the 1995/96-1999/00 period. A further 16 species have populations of national importance, i.e. Cormorant (148), Whooper Swan (141), Greylag Goose (88), Shelduck (895), Wigeon (3,025), Teal (1,558), Pintail (40), Shoveler (56),

Scaup (76), Golden Plover (4,073), Grey Plover (564), Lapwing (13,007), Knot (686), Bar-tailed Godwit (481), Curlew (1,231) and Greenshank (33). The site is among the most important in the country for several of these species, notably Dunlin (11% of national total), Grey Plover (7.5% of total), Lapwing (6.5% of total), Redshank (6% of total) and Shelduck (6.0% of total). The site is also used by Oystercatcher (363), Ringed Plover (70), Brent Goose (135), Great Crested Grebe (47), Red-breasted Merganser (14), Mallard (247), Turnstone (71), Mute Swan (54), Grey Heron (25), Black-headed Gull (1,233) and Common Gull (194). The Shannon / Fergus system was formerly frequented by a Greenland Whitefronted Goose population but this declined during the 1980s and 1990s and the birds now appear to have abandoned the area. The site provides both feeding and roosting areas for the wintering birds. Habitat quality for most of the estuarine habitats is good. Some species, particularly Whooper Swan and Greylag Goose, utilise areas outside of the site for feeding. Apart from the wintering birds, large numbers of some species also pass through the site whilst on migration in spring and/or autumn. Regular species include Blacktailed Godwit, Whimbrel and Greenshank. Much of the land adjacent to the rivers and estuaries has been reclaimed and improved for agriculture and is protected by embankments (especially along the River Fergus estuary). Further reclamation, especially near to the urbanised and industrial areas continues to pose a threat. The site receives pollution from several sources, including industry and agriculture, but it is not known if this has any significant impacts on the wintering birds.

Aquaculture occurs in some areas of the site – future increases in this activity could cause disturbance to the habitats and the associated birds. Common Cord-grass (*Spartina anglica*) is well-established and may threaten some of the estuarine habitats. Some disturbance occurs from boating activities. This site is of great ornithological interest, being of international importance on account of the numbers of wintering birds it supports. It also supports internationally important numbers of three species, i.e. Dunlin, Black-tailed Godwit and Redshank. In addition, there are 16 species that have populations of national importance. For several of the bird species, it is the top site in the country. Also of note is that three of the species which occur regularly are listed on Annex I of the E.U. Birds Directive, i.e. Whooper Swan, Golden Plover and Bar-tailed Godwit. The site is most effectively censused from the air and this is carried out in most winters.

# APPENDIX 2 DEVELOPMENT APPLICATIONS UNIT LETTER

An Roinn Turasóireachta, Cultúir,
Ealaíon, Gaeltachta, Spóirt agus Meán
Department of Tourism, Culture,
Arts, Gaeltacht, Sport and Media

Your Ref: 201156 LCCC 2021
Our Ref: G Pre00015/2021 (Please quote in all related correspondence)

15th March 2021

Michael O'Sullivan
Punch Consulting
97 Henry Street
Limerick
V94 YC2H

Via email: mosullivan@punchconsulting.com

Re: Re: Notification to the Minister for Culture, Heritage and the Gaeltacht under the Planning and Development Act, 2000, as amended.

**Re: early notification that Limerick City and County Council (LCCC) intend to carry out rehabilitation works on 11 Bridges in Limerick County in 2021**

A chara

I refer to correspondence dated 21st January received in connection with the above. Outlined below are heritage-related observations/recommendations co-ordinated by the Development Applications Unit under the stated headings.

**Nature Conservation**

Please find below some general scoping comments for appropriate assessment screening, appropriate assessment/NIS, and for licensing requirements specific to bridge works which may assist. Please note that, should the project screen out for AA; that the comments apply to any ecological impact assessment (EcIA) or similar ecological report to be produced.

Alien invasive species

The assessment should address the issue of invasive alien plant and animal species, such as Japanese Knotweed, and detail the methods required to ensure they are not accidentally introduced or spread during construction. Information on alien invasive species in Ireland can be found at http://invasives.biodiversityireland.ie/ and at http://invasivespeciesireland.com/.

**Aonad na nIarratas ar Fhorbairt**
*Development Applications Unit*
**Oifigí an Rialtais**
*Government Offices*
**Bóthar an Bhaile Nua, Loch Garman, Contae Loch Garman, Y35 AP90**
Newtown Road, Wexford, County Wexford, Y35 AP90

Crayfish Plague is now present in several Irish rivers including some in Limerick, therefore it is essential that any equipment used which has the potential to carry the disease is disinfected and dried before use, pumps or other equipment that may hold water residues are particularly dangerous in this respect. Care must also be taken leaving the site that spores of the disease are not transported to any other site. All employees should also be briefed on the risk of disease transfer from and to other sites.

Bats

Bat roosts may be present in trees, buildings and bridges. Bat roosts can only be destroyed under licence under the Wildlife Acts and a derogation under the Birds and Natural Habitats Regulations and such a licence would only be given if suitable mitigation measures were implemented. Where so called bat friendly lighting is proposed as mitigation then it should be proven to work as mitigation. However please note that the recently published *Bats and Artificial Lighting in the UK, Guidance Note 08/18, Bat Conservation Trust and Institution of Lighting Professionals*, which can be downloaded from https://www.theilp.org.uk/documents/guidance-note-8-bats-and-artificial-lighting/, has found that artificial lighting has been found to be particularly harmful if used along river corridors, near woodland edges and near hedgerows. Therefore lighting in woodlands and ecological corridors should be avoided. The Local Authority should also consult the Eurobats Publication Series No. 8, Guidelines for consideration of bats in lighting projects, which can be downloaded from http://www.eurobats.org/publications/eurobats_publication_series

Rivers and Wetlands

Wetlands are important areas for biodiversity. Any watercourse or wetland impacted on should be surveyed for the presence of protected species and species listed on Annexes II and IV of the Habitats Directive. These species could include otters (*Lutra lutra*), which are protected under the Wildlife Acts and listed on Annexes II and IV of the Habitats Directive, Salmon (*Salmo salar*) and Lamprey species listed on Annex II of the Habitats Directive, Freshwater Pearl Mussels (*Margaritifera species*) and White-clawed Crayfish (*Austropotamobius pallipes* ) which are protected under the Wildlife Acts and listed on Annex II of the Habitats Directive, Frogs (*Rana temporaria*) and Newts (*Triturus vulgaris*) protected under the Wildlife Acts and Kingfishers (*Alcedo atthis*) protected under the Wildlife Acts and listed on Annex I of the Birds Directive (Council Directive 79/409 EEC).

One of the main threats identified in the threat response plan for otter is habitat destruction (see www.npws.ie/sites/default/files/publications/pdf/2009_Otter_TRP.pdf ).

In addition a 15m riparian buffer on both banks of a waterway is considered to comprise part of the otter habitat. Therefore any proposed development should be located at least 15 m away from the waterway.

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A suitable riparian habitat should be left along each watercourse. Construction work should not be allowed impact on water quality and measures should be detailed in the assessment to prevent sediment and/or fuel runoff from getting into watercourses which could adversely impact on aquatic species.

IFI should be consulted with regard to impacts on fish species and the applicant may find it useful to consult their publication entitled "Planning for watercourses in the urban environment" which can be downloaded from their web site at http://www.fisheriesireland.ie/fisheries-management-1/86-planning-for-watercourses-in-the-urban-environment-1/file .

Bridges and Flora

Masonry bridges are a valuable habitat for a myriad of saxicolous vascular, bryophyte and lichen species. Many species have as their preferred habitat such structures whilst a smaller, restricted number of rarer species are dependant solely on such structures (usually on the mortar between the masonry). There is a very good chance that cleaning the mosses off bridges and walls could have a real impact on Irish biodiversity. The recommendations below are made in the interests of maintaining this aspect of Ireland's biodiversity (recently highlighted in the publication of 'The Rare and Threatened Bryophytes of Ireland'.

Only lime mortar should be used for repointing, grouting etc. (as per NRA guidelines as stated)

The "Removal of vegetation from the bridge surface, parapets and embankments", should be carried out judiciously so as to avoid the wholesale removal of small vascular plants, bryophytes and lichens – their removal should be deemed only necessary for imperatives reasons of engineering integrity.

**Note**: however that a bat survey should be carried out before any pointing or grouting.

**Licences**

Where there are impacts on protected species and their habitats, resting or breeding places, licenses may be required under the Wildlife Acts or derogations under the Habitats Regulations. In particular bats and otters and cetaceans are strictly protected under annex IV of the Habitats Directive. A copy of Circular Letter NPWS 2/07 entitled "Guidance on Compliance with Regulation 23 of the Habitats Regulations 1997 – strict protection of certain species/applications for derogation licences" can be found on the Departmental web site at

www.npws.ie/sites/default/files/general/circular-npws-02-07.pdf. It should be noted however that the Regulations of 1997 have since been revoked and that Part 6 of the European Communities (Birds and Natural Habitats) Regulations 2011-2015 is now the relevant part

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dealing with the protection of flora and fauna. In particular reference to Regulation 23 in the circular letter should be taken to mean Regulation 51 in the current Regulations.

In addition the applicant and the planning authority will be required to take account of species protected under sections 21, 22 and 23 of the Wildlife Acts if there are any impacts on other protected species or their resting or breeding places, such as on protected plants, or birds' nests. They will also need to be cognisant of article 5 (d) of the Birds Directive. For that reason vegetation, including hedges and trees, should not be removed during the nesting season (i.e. March 1st to August 31st).

In order to apply for any such derogations as mentioned above the results of a survey should be submitted to the National Parks and Wildlife Service of this Department. Such surveys are to be carried out by appropriately qualified person/s at an appropriate time of the year. Details of survey methodology should also be provided.

**Underwater Archaeology**

It is recommended that an Underwater Archaeological Impact Assessment, as described below, shall be undertaken to assess the impact on known or potential archaeology in the area of the proposed works.

**Underwater Archaeological Impact Assessment should be compiled as follows:**

1. The applicant is required to engage the services of a suitably qualified archaeologist to carry out an underwater archaeological assessment - to include an assessment of the river banks within the area of the proposed development. All of the surveys shall be undertaken to the specifications advised by the Department of Housing, Local Government & Heritage.
2. The archaeologist should carry out any relevant documentary research and inspect the site and undertaken a dive survey with metal detection.
3. The archaeologist should be licensed under the National Monuments Acts 1930-2004. Diving operations should be undertaken to the Health and Safety Authority's Rule under the Health and Safety at Work (Diving Operations) Regulations 1981 SI 422. and to include that the proper qualifications are held by the dive team and the proper commercial dive insurance is in place
4. Having completed the work, the archaeologist shall submit a written report to the Department of Housing, Local Government & Heritage. Where archaeological material/features are shown to be present, preservation *in situ*, preservation by record (excavation), avoidance or monitoring may be required. This Department shall advise should such matters arise.

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5. No decision shall be made until this Department has had the opportunity to evaluate the Archaeological Assessment. This Department will forward a recommendation based on the Archaeological Assessment to the Local Authority.

You are requested to send further communications to the Development Applications Unit (DAU) at **manager.dau@chg.gov.ie**, or to the following address:

The Manager
Development Applications Unit (DAU)
Government Offices
Newtown Road
Wexford
Y35 AP90

Is mise, le meas

**Diarmuid Buttimer**
**Development Applications Unit**

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