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Ballycunneen Solar and Battery Energy Storage System

Appropriate Assessment Screening & Natura Impact Statement

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Contents

1.	Introduction	2
1.1	Project Summary	2
1.2	Statement of Authority	4
2.	Appropriate Assessment Methodology.....	6
2.1	Legislative Context	6
2.2	Stages Involved in the Appropriate Assessment Process	7
2.3	Legislation and Guidance.....	8
2.4	Definitions	8
3.	Methodology.....	10
3.1	Desktop Study and Information Sources	10
3.2	Ecological Field Survey Area	11
3.2.1	<i>Multidisciplinary ecological field surveys.....</i>	<i>11</i>
3.2.2	<i>Volant Mammals (Bats).....</i>	<i>11</i>
3.2.3	<i>Birds.....</i>	<i>12</i>
3.3	Zone of Influence Methodology.....	12
4.	Description of the Proposed Project	14
5.	Receiving Environment	16
5.1	Desk Study Results	16
5.1.1	<i>Habitats and Flora.....</i>	<i>16</i>
5.1.2	<i>European Sites.....</i>	<i>23</i>
5.2	Field Survey Results	23
5.2.1	<i>Habitats and Flora.....</i>	<i>23</i>
5.2.2	<i>Fauna.....</i>	<i>27</i>
6.	Overview of Potential Impacts	31
6.1	Construction Phase	31
6.1.1	<i>Habitat Loss and Fragmentation</i>	<i>31</i>
6.1.2	<i>Habitat Degradation.....</i>	<i>32</i>
6.1.3	<i>Disturbance - Noise & Vibration.....</i>	<i>33</i>
6.2	Operational Phase	33
6.2.1	<i>Disturbance.....</i>	<i>34</i>
6.2.2	<i>Risk of Water Quality Impacts.....</i>	<i>34</i>
6.3	Decommissioning Phase	35

7.	Stage One Screening for Appropriate Assessment	36
7.1	Overview	36
7.2	Assessment of Likely Significant Effects on European Sites	36
7.3	Potential In-Combination Effects	47
7.3.1	Assessment of Plans	47
7.3.2	Assessment of Projects	49
7.4	Screening Assessment Conclusion	51
8.	Natura Impact Statement	53
8.1	DESCRIPTION OF EUROPEAN SITES AND ASSESSMENT OF POTENTIAL ADVERSE EFFECTS	53
8.1.1	<i>The Lower River Shannon SAC</i>	53
8.1.2	<i>River Shannon and River Fergus Estuaries SPA</i>	62
8.1.3	<i>Ratty River Cave SAC</i>	70
8.2	Assessment of Adverse Effects on Site Integrity	72
8.2.1	<i>Potential Impacts on QIs and SCIs</i>	72
8.2.2	<i>Conservation Objectives of the European Sites</i>	72
8.3	In Combination Effects	80
8.3.1	<i>Overview</i>	80
8.3.2	<i>Assessment of In-Combination Effects: BNRG Project and Nearby Solar Developments (Planning Refs: 25260, 1731, 18585)</i>	80
8.4	Mitigation Measures	81
8.4.1	<i>Habitats and Protected Fauna</i>	82
8.4.2	<i>Protection of Aquatic Habitats – Sediment Control</i>	83
8.4.3	<i>Protection of Habitats – Pollution Control</i>	84
8.4.4	<i>Dust and Air Pollution Control</i>	85
8.4.5	<i>Noise Management</i>	85
8.4.6	<i>Monitoring</i>	86
8.4.7	<i>Biosecurity Measures</i>	86
8.4.8	<i>Mitigation Specific to Horizontal Directional Drilling</i>	87
8.4.9	<i>Management of Material Disposal</i>	88
8.5	MITIGATION EFFECTIVENESS	88
9.	CONCLUSION	89
10.	REFERENCES	90
APPENDIX A.	Biodiversity Enhancement Management Plan	94
APPENDIX B.	Eire Ecology Bat Report	95

List of Tables

Table 5.1: Relevant Biodiversity Records – Bird Species	17
Table 7.1: Assessment of European sites within the Potential Zol of the Proposed Project.....	39
Table 8.1: Qualifying Interests, Extent of Habitat and Conservation Objectives for the Lower River Shannon SAC and Potential for Effect.....	55
Table 8.2 Potential for Effects on the SCIs of the River Shannon and River Fergus Estuaries SPA	63
Table 8.3 Potential for Effects on the QIs of Ratty River SAC.....	71
Table 8.4: Evaluation of Potential Adverse Effects on the Conservation Objectives of the Lower River Shannon SAC as a Result of the Proposed Project.....	74
Table 8.5 Evaluation of Potential Adverse Effects on the Conservation Objectives of the River Shannon and River Fergus Estuaries SPA as a Result of the Proposed Project.....	78
Table 8.6 Evaluation of Potential Adverse Effects on the Conservation Objectives of the Ratty River Cave SAC as a Result of the Proposed Project	79

List of Figures

Figure 1.1: Proposed Project.....	3
Figure 5.1: WFD Catchment and Subcatchments relative to the Proposed Project and Townlands.....	20
Figure 5.2: Proposed Project relative to WFD river bodies	21
Figure 5.3: WFD Groundwater Bodies at the Proposed Project	22
Figure 5.4: Multidisciplinary survey results: Parcel 1, Parcel 2 and Adjacent Areas.....	24
Figure 5.5: Multidisciplinary survey results: Parcel 3, Parcel 4 and Adjacent Areas.....	25
Figure 5.6: Multidisciplinary survey results: Underground Cable	26
Figure 5.7 Lesser Horseshoe Bat Recordings Locations	29
Figure 7.1: European Sites within the Potential Zone of Influence of the Proposed Project	38

1. INTRODUCTION

BNRG is proposing to develop a Solar Farm with an associated Battery Energy Storage System (BESS), grid connection, and a 38kV substation, in the townlands of Ballycunneen, Drumline, Ballycasey More, Clonmoney West, Firgrove, and Ard Kyle, Co. Clare. The development is referred to hereafter as the proposed project.

This report was prepared by TOBIN, on behalf of BNRG, and includes a Stage One Screening for Appropriate Assessment (AA) and a Stage Two Natura Impact Statement (NIS) for the proposed project. The purpose of this report is to inform the AA process, which is carried out by the competent authority (in this case Clare County Council).

This combined AA Screening and NIS (AASR-NIS) report has been prepared alongside a Planning Environmental Considerations Report (PECR) to accompany the planning application to Clare County Council for the proposed project. This AASR-NIS report and the PECR has been informed by a combination of desktop studies and directed ecological field surveys.

A short of summary of the proposed project is provided in Section 1.1 with full project details provided in Section 4.

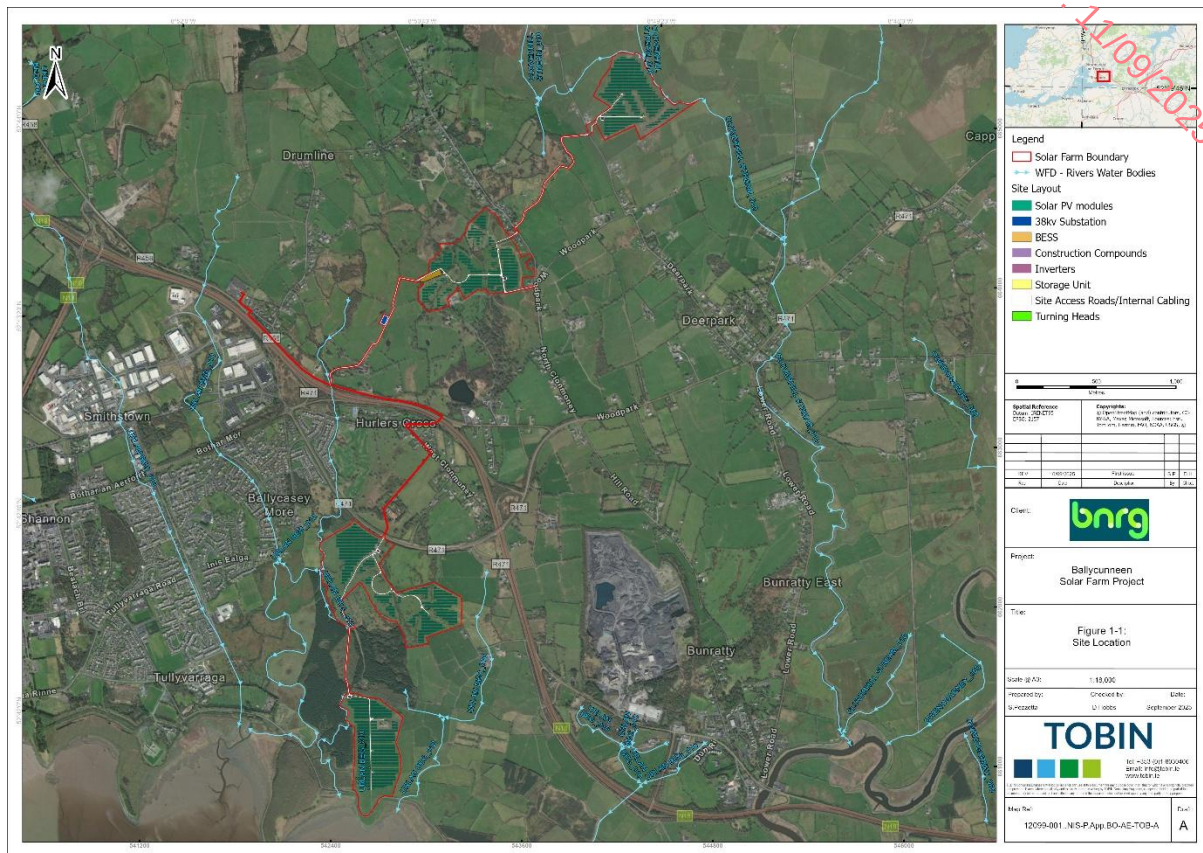
1.1 PROJECT SUMMARY

The proposed project includes the installation of PV panels at four distinct land parcels, labelled 1 to 4, are shown in Figure 1.1. The land parcels have a combined area of 98ha. The northernmost land parcel, labelled 1, is located in the townland of Ard Kyle, with an additional land parcel 2 further south in the townlands of Ballycunneen and Firgrove, and the southernmost land parcels 3 and 4 situated in Clonmoney West. These parcels are strategically located on both sides of the N18 National Road and R458 Regional Road and are interconnected via underground cabling.

Electricity generated by the PV panels will be converted from DC to AC by MV stations distributed within the parcels, ensuring efficient energy conversion close to the point of generation. The location of MV stations are shown in Figure 1.1. The AC electricity will then be transmitted through the internal underground network to the onsite 38 kV substation located at Firgrove, before being exported to the 110kV substation at Drumline. The proposed internal network of underground cabling, the location of the onsite 38 kV substation at Firgrove, and the interconnecting cable to the 110kV substation at Drumline are shown in Figure 1.1. Along the cable route, horizontal directional drilling (HDD) will be used to cable under the Urlan Beg_010 WFD RWB (IE_SH_27U010950) to north of land parcel 3 and also under the N18 road. The locations of the HDD points are shown in Figure 1.1.

The southern limit of the project redline is located approximately 3m from the Lower River Shannon Special Area of Conservation (SAC; Site Code: 002165) and around 4m from the River Shannon and River Fergus Estuaries Special Protection Area (SPA; Site Code: 004077). All proposed infrastructure has been set back a further 72 m to the north, providing a protective buffer between construction activities and the boundaries of these designated conservation site.

Figure 1.1: Proposed Project



1.2 STATEMENT OF AUTHORITY

This report was prepared by Ciara Byrne B.Sc. (Hons) Ecologist with TOBIN, and senior reviewed by Dr. James Forde (B.Sc. (Hons), M.Sc., Ph.D., MCIEEM).

Ciara completed her degree in Wildlife Biology with Munster Technological University, Kerry. Ciara has been with TOBIN for over 2 years where she has carried out various ecological surveys for protected habitats and species. Ciara has experience managing and analysis data in addition to producing ecological reports on topics such as winter and breeding bird surveys, Invasive Species Management Plans (ISMP), Feasibility studies, Preliminary Ecological Assessment (PEA), Appropriate Assessment Screening Reports (AASR) and Natura Impact Statements (NIS). Ciara also assists within Environmental Impact Assessment Reports (EIARs).

James is Senior Ecologist and Technical Director of the TOBIN Environment & Planning (E&P) division. James holds a B.Sc. (Hons) and M.Sc. degrees in marine ecology, and a Ph.D. in ecology. James is also a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM). James has almost 20 years' academic and environmental consultancy experience. He has an extensive understanding of ecology and appreciation of the objectives and mechanisms of national and international environmental legislation and policy. He has significant experience in preparing and reviewing ecological reports including PECRs, AA screening, NIS and Ecological Impact Assessment (EclA) reporting, and EIARs. James has provided strategic technical and environmental advice for developments across a wide range of sectors, including onshore and offshore renewables, telecommunications, flood relief schemes, port and harbour developments, energy generation and transmission.

The baseline ecological surveys used to inform this assessment of likely significant effects on biodiversity were conducted by a team of qualified ecologists with the relevant skills and experience to undertake the required surveys.

TOBIN ecologists undertook all terrestrial ecological surveys, including habitat mapping, assessments of flora and non-volant mammal species (e.g. badger, otter), and general ecological fieldwork. The TOBIN ecologists responsible for undertaking the multidisciplinary walkover surveys used to inform for the proposed project were:

- Úna Butler (B.A. Hons, M.Sc.)
- Ciara Byrne (B.Sc. Hons)
- Joe Freijser (B.A. Hons, M.Sc.)
- Eoghan Phelan (B.Sc. Hons)

Other external collaborators included:

- John Curtin (B.Sc. Hons), Consultant Ecologist with Éire Ecology, was responsible for the design, implementation, analysis, and reporting of all bat-related ecological surveys and assessments undertaken in relation to the proposed project. His remit encompassed the formulation of survey methodologies, coordination and execution of fieldwork, and the preparation of mitigation and enhancement measures specific to bat conservation. His work included static detector surveys, dusk emergence and dawn re-entry surveys, ground-level assessments of features with potential to support roosting bats, and the evaluation of potential impacts on bat species in accordance with current best practice guidelines (e.g. Collins, 2016/2023).



- Michael O'Clery (B.A. Hons), Ornithologist with Goldcrest Environmental, undertook all avian transect surveys, breeding bird surveys, and wintering bird assessments. His work informed the assessment of potential impacts on bird species of conservation concern, in line with national and international guidance for ornithological impact assessments.



2. APPROPRIATE ASSESSMENT METHODOLOGY

2.1 LEGISLATIVE CONTEXT

The Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora, better known as the ‘Habitats Directive’, provides legal protection for habitats and species of European importance. Articles 3 to 9 provide the legislative means to protect habitats and species of community interest through the establishment and conservation of an EU-wide network of sites known as Natura 2000 network.

Articles 6(3) of the Habitats Directive set out the decision-making tests for plans and projects likely to affect European sites (Annex 1.1). Article 6(3) establishes the requirement for AA:

‘Any plan or project not directly connected with or necessary to the management of the [Natura 2000] site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subjected to appropriate assessment of its implications for the site in view of the site’s conservation objectives. In 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.’

The provision for an AA is transposed into Irish law by Part XAB of the Planning and Development Act 2010 (as amended). Section 177U (4) of the said Acts provides for screening for Appropriate Assessment as follows:

‘The competent authority shall determine that an appropriate assessment of [...] a proposed development [...] is required if it cannot be excluded, on the basis of objective information, that the [...] proposed development, individually or in combination with other plans or projects, will have a significant effect on a European site.’

Section 177U (5) provides as follows:

‘The competent authority shall determine that an appropriate assessment of a [...] proposed development, [...], is not required if it can be excluded, on the basis of objective information, that the [...] proposed development, individually or in combination with other plans or projects, will have a significant effect on a European site.’

An AA should be based on best scientific knowledge and the competent authority should ensure that expertise such as ecological, geological, and hydrological are utilised, where relevant.

The Court of Justice of the European Union (CJEU) has made several rulings in relation to AA, regarding when it is required, its purpose, and the standards it should meet. Consideration has been given to the evolution in interpretation and application of directives and national legislation arising from jurisprudence of the European and Irish courts, in respect of Article 6 of the Habitats Directive.

2.2 STAGES INVOLVED IN THE APPROPRIATE ASSESSMENT PROCESS

There are four potential stages in the AA process; the result of each stage determines the requirement for assessment under the next.

Stage 1: Screening

This process identifies the likely significant effects upon a European site from a proposed project or plan. Its purpose is to determine, on the basis of a preliminary assessment and objective criteria, whether a plan or project which is not directly connected with or necessary to the management of the site as a European site, individually or in-combination with other plans or projects is likely to have a significant effect upon the European site, in view of its conservation objectives. A project may be 'screened-in' if there is a possibility or uncertainty of possible effects upon the European site, requiring a Stage Two AA. If there is no evidence to suggest significant effects due to the proposed plan or development the project is 'screened-out' from further assessment.

Stage 2: Appropriate Assessment

In this stage, consideration is given to ascertain whether the plan or project would adversely affect the integrity of a European site(s), either alone or in-combination with other plans or projects, with respect to the European site's structure and function and its conservation objectives. This stage of the assessment is carried out by the consenting authority and is informed by a NIS. A NIS is required where there is uncertainty as to whether or not an adverse effect arises, uncertainty of the effect itself, or a potential effect has been defined which requires further procedures/mitigation to remove uncertainty of a defined impact (i.e. significant effects cannot be excluded). Where there are adverse effects, an assessment of the potential mitigation to ameliorate those effects is required. If the assessment results in a negative conclusion, i.e. adverse effects on the integrity of a site cannot be excluded (by design or mitigation) or there is uncertainty as to whether an adverse impact arises, then the process must consider alternatives (Stage 3) or proceed to Stage 4.

Stage 3: Assessment of Alternatives

This stage of the potential process arises where adverse effects on the integrity of a European site cannot be excluded and examines alternative ways of achieving the objectives of the project or plan that avoid adverse impacts on the integrity of the European site. However, in circumstances where there will not be any adverse effects on any European site, the developer places no reliance upon this third stage of the process in the context of this application for planning permission for the proposed project.

Stage 4: Assessment Where Adverse Effects Remain

This is the derogation process of Article 6(4), which examines whether there are imperative reasons of overriding public interest [IROPI] for allowing a project to proceed where adverse effects on the integrity of a European site have been predicted. Compensatory measures must be proposed and assessed as part of this stage and the EU Commission must be informed of the compensatory measures. Again, the developer places no reliance upon this stage of the process in the context of the application for planning permission for the proposed project.

This report details a Stage One: Screening and Stage Two: Appropriate Assessment (NIS), to assist the competent authority in carrying out its AA for the proposed project.

2.3 LEGISLATION AND GUIDANCE

This report has been carried out in accordance with the following legislation and guidance:

Legislation

- European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. No. 477 of 2011)
- Planning and Development Acts 2000 to 2024, as amended, including Part XAB

European Commission Guidance

- European Commission (EC, 2000). Communication from the Commission on the Precautionary Principle
- European Commission (EC, 2006). Nature and biodiversity cases: Ruling of the European Court of Justice. Office for Official Publications of the European Communities, Luxembourg
- European Commission (EC, 2013). Interpretation Manual of European Union Habitats. Version EUR 28
- European Commission (EC, 2019). Managing Natura 2000 Sites – The provisions of Article 6 of the Habitats Directive 92/43/EEC
- European Commission (EC, 2021). Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC. Office for Official Publications of the European Communities, Luxembourg

Irish Guidance

- Appropriate Assessment of Plans and Projects in Ireland, Guidance for Planning Authorities, Department of the Environment, Heritage and Local Government (DoEHLG, 2010)
- Applications for Approval for Local Authority Developments made to An Bord Pleanála under 177AE of the Planning and Development Act, 2000, as amended (Appropriate Assessment) – Guidelines for Local Authorities (An Bord Pleanála, 2013)
- Office of the Planning Regulator (OPR, 2021). Appropriate Assessment Screening for Development Management

2.4 DEFINITIONS

Definitions of conservation status, integrity and significance used in this assessment are defined in accordance with '*Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC*' (EC, 2018):

- Favourable conservation status (FCS) can only be defined and achieved at the level of the natural range of a species or a habitat type. A broad conservation objective aiming at achieving FCS can therefore only be considered at an appropriate level, such as for example the national, biogeographical or European level. The conservation measures have to correspond to the ecological requirements of the natural habitat types in Annex I and of the species in Annex II present on the site. The ecological requirements of those natural habitat types and species involve all the ecological needs which are deemed necessary to ensure the conservation of the habitat types and species. They can only be defined on a case-by-case basis and using scientific knowledge.

- The integrity of a European site is defined as the coherent sum of the site's ecological structure, function, and ecological processes, across its whole area, which enables it to sustain the habitats, complex of habitats and/or populations of species for which the site is designated.
- Significant effect should be determined in relation to the specific features and environmental conditions of the protected site concerned by the plan or project, taking particular account of the site's conservation objectives and ecological characteristics.

3. METHODOLOGY

3.1 DESKTOP STUDY AND INFORMATION SOURCES

A desktop study for the proposed project was undertaken in June 2025. The following briefly outlines the key datasets and information sources used for the desktop study while findings are detailed in Section 5.1:

- A detailed review of European sites within the zone of influence (Zol) of the proposed project was undertaken to identify potential pathways/links between the project site and European sites and/or supporting habitats. This included examination of NPWS¹ resources, including site synopses reports, Natura 2000 data forms, site specific conservation objectives (SSCOs) documents, mapping, and available supporting reports, for the relevant Qualifying Interests (QIs) of SACs and Special Conservation Interests (SCIs) of SPAs.
- NPWS Article 17² reporting and mapping on Annex I habitats and Annex II species
- A detailed review of the NPWS website.
- Review of available literature and web data on the National Biodiversity Data Centre (NBDC) website³ including published data and documents from Bat Conservation Ireland, BirdWatch Ireland, Mammal Atlas, Irish Butterflies and Botanical Society of Britain and Ireland.
- Environmental Protection Agency (EPA) mapping database⁴ to support AA.
- EPA website on Water Framework Directive (WFD) reporting⁵.
- Review of Inland Fisheries Ireland (IFI) research data⁶ including Fish Stock Survey of Transitional Waters in the Shannon International River Basin District 2017⁷.

In addition, aerial photography (Google Maps, Bing Maps) and mapping (Geological Survey Ireland) were used to identify non-designated habitats such as rivers, woodlands, and hedgerows which may provide connectivity/corridors to surrounding habitats or designated sites.

The desk study identified ecological features relevant to AA potentially affected by the proposed project and informed the scope of field surveys undertaken. Section 3.2 below briefly outline the field surveys undertaken while survey results are detailed in Section 5.2.

The data collected during the field surveys were robust and allowed TOBIN to draw accurate, definitive and coherent conclusions on the possible effects of the proposed project.

¹ Accessed June 2025 via <https://www.npws.ie/protected-sites>.

² Accessed June 2025 via <https://www.npws.ie/publications/article-17-reports> and <https://www.npws.ie/maps-and-data/habitat-and-species-data/article-17-gis-and-metadata-downloads>.

³ Accessed June 2025 via <https://maps.biodiversityireland.ie/Map>.

⁴ Accessed June 2025 via <https://gis.epa.ie/EPAMaps/AAGeoTool>.

⁵ Accessed June 2025 via <https://www.catchments.ie/guide-water-framework-directive/>.

⁶ Accessed June 2025 via <http://wfdfish.ie/index.php/category/river-surveys->.

⁷ Accessed June 2025 via https://www.fisheriesireland.ie/sites/default/files/2023-02/wfd_tw_survey_shannon_report_2017.pdf



3.2 ECOLOGICAL FIELD SURVEY AREA

The study area for the ecology surveys undertaken to inform the biodiversity assessment for the proposed project included the four land parcels of the proposed project, the intervening lands between the parcels that will feature underground cabling, the proposed grid connection route along the public roads, the underground cabling to the Drumline 110 kV substation, plus the wider surrounding hinterland.

3.2.1 Multidisciplinary ecological field surveys

Multidisciplinary ecological field surveys were undertaken by qualified and experienced TOBIN ecologist. The aim of the surveys was to determine the presence or absence of protected habitats and species, including Habitats Directive Annex I habitats and Annex II species (with the exception of Annex II bat species which were surveyed using directed/targeted surveys (see summary in Section 3.2.2). The multidisciplinary field surveys also assessed the suitability of the habitats within the proposed project site to support protected species. The multidisciplinary walkover surveys were undertaken at representative and significant habitats within the proposed project site and its immediate surroundings over 3 days by a team of TOBIN ecologists. These multidisciplinary surveys were conducted on the May 1st and 2nd, 2025 and July 8th, 2025

- Multidisciplinary surveys were undertaken at the proposed project site following the methodologies outlined in Best Practice Guidance for Habitat Survey and Mapping (Smith et al., 2011) and Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (NRA, 2009). The surveys specifically assessed Annex I habitats and targeted Annex II species (with the exception of bats) of the Habitats Directive. The data were recorded, and the habitats encountered during the surveys were classified in accordance with Fossitt (2000), with reference to the Interpretation Manual of EU Habitats (EC, 2013) as appropriate.
- The multidisciplinary surveys also included species protected under the Flora (Protection) Order, 2022 (S.I. No. 235/2022), as well as species listed in the Irish Red Data List of Irish Plants.
- The proposed project site was also searched for evidence of invasive non-native species (INNS) listed in Part 1 of the Third Schedule of S.I. No. 477/2011 and S.I. No. 374/2024, as well as other species of concern under the European Union (Invasive Alien Species) Regulations 2024.

3.2.2 Volant Mammals (Bats)

To assess the presence and activity of bats within the proposed project area, Eire Ecology carried out the following a series of bat surveys including:

- Ground level preliminary roost assessment of trees and buildings at the proposed project site on February 11th and 14th, 2025.
- Bat activity emergence surveys at buildings within the proposed project site on the 3rd and 21st of July 2025 to examine for roosting bats that could be impacted by the project, observe bat interactions such as commuting routes, feeding areas, and examine if there are current impediments to bats within the surrounding environment. The surveys were conducted using full-spectrum detectors, thermal imaging, and night-vision equipment. Each bat encounter was recorded and identified to species where possible. Surveys

measured activity, not abundance, and were carried out during the active season under suitable weather conditions.

- Static bat detector surveys across the proposed project site during the spring and summer bat seasons of 2025 to record species and activity. Initial deployment occurred from 16th of April for 20 nights, with a second deployment on the 11th of July for 10 nights, concluding on 21st July.

All bat surveys were carried out in accordance with Irish Wildlife Manual No. 134. Bat Mitigation Guidelines for Ireland- V2 (Marnell, et al., 2022) and Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th edition) The Bat Conservation Trust, London (Collins, 2023).

3.2.3 Birds

Michael O'Clery (B.A. Hons), Ornithologist with Goldcrest Environmental, undertook bird monitoring for the proposed project. Surveys were undertaken between January and August 2025 along established transects designed to provide comprehensive coverage of the project site. Monthly monitoring established patterns of species diversity and seasonal habitat use. The surveys recorded bird species presence, abundance, and behaviour, providing baseline of site utilisation by avifauna, with particular attention to species potentially associated with the adjacent River Shannon and River Fergus Estuaries SPA (Site code: 004077).

3.3 ZONE OF INFLUENCE METHODOLOGY

The identification of European sites within the zone of influence (Zoi) of the proposed project was evaluated on a case-by-case basis with reference to the nature, size and location of the proposed project, and the sensitivities of the ecological receptors, and the potential for in-combination effects with other plans or projects.

Using the source-pathway-receptor model (OPR, 2021) an examination of the potential effects of the proposed project was also undertaken (alone and / or in-combination) to identify what European sites, and which of their QIs or SCIs are potentially at risk. This conceptual model is a standard tool in environmental assessment. In order for an effect to occur, all three elements of this mechanism must be in place. The absence or removal of one of the elements of the mechanism means there is no likelihood for the effect to occur. In the context of the proposed project, the model comprises:

- Source (s) – potential impacts from the proposed project, e.g. loss of habitat, direct emissions (water, air, noise and light);
- Pathway (s) – hydrological, physical or ecological connectivity between the proposed project and the European site; (e.g. water bodies and proximity); and
- Receptor (s) – QIs and/or SCI of the European sites.

The existence of a pathway is a crucial element in the screening process as, if no pathway can be identified between the 'source' and the 'receptor', then no effect can be anticipated on the receptor (OPR, 2021). Therefore, the identification of relevant European sites (i.e. European sites connected with the proposed project through an identified pathway) is fundamental in an AA.

The Chartered Institute of Ecology and Environmental Management (CIEEM) defines the Zol of a project as the area(s) over which ecological features may be affected by the biophysical changes caused by the proposed project and associated activities (CIEEM, 2018).

In order to establish the Zol of the proposed project, the likely key biophysical changes associated with the works were determined having regard to the proposed project characteristics set out in Section 6.1 through Section 6.3 of this report.

4. DESCRIPTION OF THE PROPOSED PROJECT

The Proposed Development comprises a Solar Photovoltaic (PV) Solar Farm, Battery Energy Storage System (BESS), 38kV Substation and associated Grid Connection to the existing Drumline 110kV Substation.

The solar farm will provide up to 60 MW of energy which will supply approximately 11,700 homes locally. BNRG is applying for the proposed solar farm to have planning permission that is effective for 10 years (and an operational period of 40 years).

The development will be the subject of a Planning Application to Clare County Council.

The proposed project will include solar panels, internal access tracks, MV stations, BESS, storage containers, hard standings, material storage, internal electrical and communications cabling, CCTV, temporary construction compound, drainage infrastructure and all associated works related to the construction of the solar farm as well as measures designed to protect and enhance existing habitats.

The proposed project will consist of the construction of the following:

- Linear arrays of solar PV panels on ground mounted steel supported structures with associated cabling and ducting (including underground cable grid connection to the Drumline 110kV substation);
- 2 no. Horizontal Directional Drilling (HDD) locations associated with interconnecting cable routes
- 11 no. proposed single storey MV stations;
- A BESS installation (including 20 No. containers with cells and 5no. containers with PCS MV stations);
- Perimeter fencing;
- Palisade double security gates at all temporary (3No.) and permanent (3 no). site entrances;
- 2 no. temporary construction compound/carpark/material storage areas with associated temporary site offices, parking areas and security fencing;
- 8 no. steel storage containers;
- 5 no. turning bays;
- On-site pole mounted CCTV cameras;
- 3 no. temporary construction stage wheel wash systems;
- Temporary soil storage areas; and

A temporary sealed below ground wastewater storage tank will be constructed on site to hold wastewater generated by toilets in the temporary staff building during the construction phase. It will have a high-level alarm to alert when it should be emptied, and its content transported offsite for treatment at a licenced facility.

All solar MV stations and the energy storage containers will sit on a reinforced concrete slab.

The proposed solar panels (modules) will be fixed in position with galvanised steel framing pile driven into the ground, so there will be no moving parts. The solar PV panels are to be arranged in south facing rows, approximately 4m apart, within the existing field boundaries, will be fenced. A 5 m buffer between the field boundaries/hedgerows and fencing is proposed.

The proposed solar panels are typically set 0.6 m above ground level at the lowest point increasing to a maximum height above ground level of 3 m. The panels will be mounted typically at 5-25 degrees to the horizontal, but this may be adjusted to suit local conditions.

Each land parcel will be accessed via existing site entrances off both local and regional road networks. In the case of the southernmost parcel (No. 4) this will be accessed through parcel No. 3 using an existing track running through woodland.

Internal access tracks (approx. 3.5m wide) will be required for construction and maintenance. A road crossing (via Horizontal Directional Drilling - HDD) will be required across the N18 road that divides the site in order to access the northern and southern land parcels and at Arkdyle to connect parcels No.1 and No.2.

Access gates, for security purposes, will be provided as part of the development. Gates will be located at a setback distance of 4.5 m from the road to allow vehicles to pull in from the main carriageway to access the gates. The security gates will be located at the main entrances to the site and will be screened by planting. Other gates required internally that separate land parcels will be provided and will be similar to the existing agricultural gates on the lands.

The proposed solar panels are typically set 0.6–0.8 m above ground level at the lowest point increasing to a height above ground level of 3 m. The panels will be mounted typically at 25 degrees to the horizontal, but this may be adjusted to suit local conditions. The final arrangement would be subject to detailed design and will be submitted to the Planning Authority prior to the commencement of development

All 11no. MV stations will sit on a 200 mm reinforced concrete slab. The typical MV stations, measuring approximately 6m (length) x 2.5m (width) x 3m (height), will be lifted into place. It should be noted the final appearance of inverters may alter due to detailed design requirements; flexibility of the design is required for tendering purposes. It should also be noted that this layout represents a worst-case scenario, and any post planning design changes (during detailed design) will only reduce any impacts/effects.

It is proposed to connect the Ballycunneen Solar Farm 38kV Substation to the existing 110 kV ESB/EirGrid substation located at Drumline via an underground cable. This will be undertaken using a 38 kV cable to connect back to the substation and 33 kV cable to connect between the parcels.

The construction phase will be short term in nature. It is anticipated that the construction phase will be limited to between 10 -12 months in total. Works will be restricted to standard day-time operational hours i.e. 07:00 to 19:00, Monday to Friday and 08:00 to 14:00 on Saturdays. No work will be undertaken on Sundays or Bank Holidays.

5. RECEIVING ENVIRONMENT

5.1 DESK STUDY RESULTS

The following section provides a summary of the results obtained from the desk study undertaken to inform the ecological assessment. The desk study involved the collection, collation, and review of existing ecological data relevant to the proposed project site and its surrounding area. The sources consulted are outlined in Section 3.1 above. The purpose of the desk study was to:

- Identify designated sites of conservation interest (e.g. SACs, SPAs) within the Zol of the proposed project;
- Determine the presence or potential occurrence of species and habitats listed under the EU Habitats Directive (Annex I habitats and Annex II species), EU Birds Directive (Annex I bird species);
- Review records of rare, protected, or notable flora and fauna in proximity to the proposed project;
- Establish baseline information on hydrology, land use, and connectivity of habitats relevant to the project site and surrounding environment.

The results of the desk study are presented in the following subsections and are used in conjunction with findings from field surveys to provide a comprehensive ecological baseline for assessment.

5.1.1 Habitats and Flora

Records of Annex I habitats and Annex II species of the Habitats Directive recorded at NPWS Article 17⁸ 10km grid squares encompassing the proposed project site are presented in Section 5.1.1.1 while Section 5.1.1.2 outlines records of Annex I species of the Birds Directive, and Habitats Directive Annex II species included on the NBDC database⁹ for the 2 km Irish grid squares R46F, R46G, and R46H, which encompass the proposed project site.

5.1.1.1 NPWS Article 17 Mapping

5.1.1.1.1 Protected Annex I Habitats

The NPWS Article 17 Map Viewer shows records of 15 Annex I Habitats within the grid squares encompassing the proposed project site. These include:

- Estuaries [1130]
- Tidal mudflats and sandflats [1140]
- Reefs [1170]
- Atlantic salt meadows [1330]
- Mediterranean salt meadows [1410]
- Hard water lakes [3140]
- Rich pondweed lake habitat [3150]
- Vegetation of flowing waters [3260]
- Wet heaths [4010]
- Dry heaths [4030]

⁸ <https://storymaps.arcgis.com/collections/1a721520030d404f899d658d5b6e159a>

⁹ <https://maps.biodiversityireland.ie/>. Accessed in July 2025



- Transition mires [7140]
- *Cladium fens** [7210]
- Alkaline fens [7230]
- Caves [8310]
- Old oak woodland [91A0]

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5.1.1.1.2 Protected Annex II Species

The NPWS Article 17 Map Viewer shows records of eight Annex II Species within the grid squares encompassing the proposed project site. These include:

- Marsh fritillary *Euphydryas aurinia* [1065]
- White-clawed crayfish *Austropotamobius pallipes* [1092]
- Sea lamprey *Petromyzon marinus* [1095]
- Brook lamprey *Lampetra planeri* [1096]
- Atlantic salmon *Salmo salar* [1106]
- Lesser horseshoe bat *Rhinolophus hipposideros* [1303]
- Otter *Lutra lutra* [1355]
- Pine marten *Martes martes* [1357]

5.1.1.2 National Biodiversity Data Centre Records

5.1.1.2.1 Birds and Volant Mammals

A search of the NBDC database for species listed under Annex I of the Habitats Directive, and Annex I and Annex II of the Birds Directive was conducted for the 2 km Irish grid squares R46F, R46G and R46H, which encompass the proposed project site.

The review identified three species listed under the Bird Directive (see Table 5.1):

- Lapwing (*Vanellus vanellus*), recorded in R46F
- Little egret (*Egretta garzetta*), recorded in R46F
- Curlew (*Numenius arquata*), recorded in R46G

The above species have the potential to occur within the proposed project site.

No other Bird Directive Annex I species were recorded. No records of Annex II species, including the lesser horseshoe bat, other mammals, fish, amphibians, invertebrates, or protected plants, were found in the NBDC database for the 2 km Irish grid squares R46F, R46G and R46H.

Table 5.1: Relevant Biodiversity Records – Bird Species

Common Name NBDC	Scientific Name	Record Count	Last Record	Designation
Birds				
R46F				
Lapwing	<i>Vanellus vanellus</i>	1	31/12/2011	Birds Directive Annex II
Little Egret	<i>Egretta garzetta</i>	2	31/12/2011	Birds Directive Annex I
R46G				
Curlew	<i>Numenius arquata</i>	1	19/12/2021	Birds Directive Annex II



5.1.1.3 Hydrology and Hydrogeology

5.1.1.3.1 Hydrology

Catchment

Hydrologically, the proposed project, which comprises four land parcels interconnected via underground cabling, are situated within the Shannon Estuary North WFD Catchment (Catchment code: 27) (see Figure 5.1).

Subcatchments

The northern-most land parcel at Ard Kyle (land parcel 1) is located in the owenogarney_SC_020 (WFD code: 27_12) while the land parcels 2, 3 and 4 are situated within the Ballygreen_SC_010 (WFD code: 27_10) (see Figure 5.1).

WFD River Water Bodies (RWB)

The northern-most land parcel (land parcel 1) is bordered to the north and east by the Cloverhill Stream 010 WFD River Water Body (RWB) (IE_SH_27C100600) (see Figure 5.2).

No WFD river water bodies intersect the land parcels at Ballycunneen and Firgrove (land parcels 2) within the Ballygreen_SC_010. Similarly, the underground cabling connecting the Ard Kyle land parcel 1 with the land parcel 2 at Ballycunneen and Firgrove parcel, as well as the 38kV Substation, does not intersect any WFD RWBs. Likewise the underground cabling extending south from the 38kV Substation to the R458 also does not intersect any WFD RWBs. At the R458, however, the underground cabling follows the road alignment which crosses the Urlan Beg_010 WFD RWB (IE_SH_27U010950) (see Figure 5.2).

The land parcels 3 and 4 at Clonmoney West are bordered on the western side and intersect with the Urlan Beg_010 WFD river water body (IE_SH_27U010950) which flows south (see Figure 5.2).

WFD Water Quality Status

The latest WFD water quality status of the Urlan Beg_10 (IE_SH_27U010950) WFD RWB have been reported as *Moderate*.

5.1.1.3.2 Hydrogeology

Hydrogeologically, the proposed project lies on the Tulla-Newmarket on Fergus WFD groundwater body (GWB) (IE_SH_G_229) (Figure 5.3).

This GWB is a moderately productive bedrock aquifer situated within the Shannon Estuary North catchment. This groundwater body is classified with Good water quality status, meeting the ecological standards set out under the WFD. The GWB WFD risk is currently classified as Not at Risk.

This GWB is a moderately productive bedrock aquifer situated within the Shannon Estuary North catchment. This groundwater body is classified with Good water quality status, meeting the ecological standards set out under the WFD. The GWB WFD risk is currently classified as Not at Risk.

The groundwater flow direction in the GWB is likely to follow the natural topographic gradient of the area, flowing from the higher inland area towards the lower-lying discharge areas near the Shannon Estuary. Specifically, groundwater moves predominantly southwest to westward

or towards the Shannon Estuary, driven by gravity through fractured bedrock and karst features.

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Figure 5.1: WFD Catchment and Subcatchments relative to the Proposed Project and Townlands



Figure 5.2: Proposed Project relative to WFD river bodies

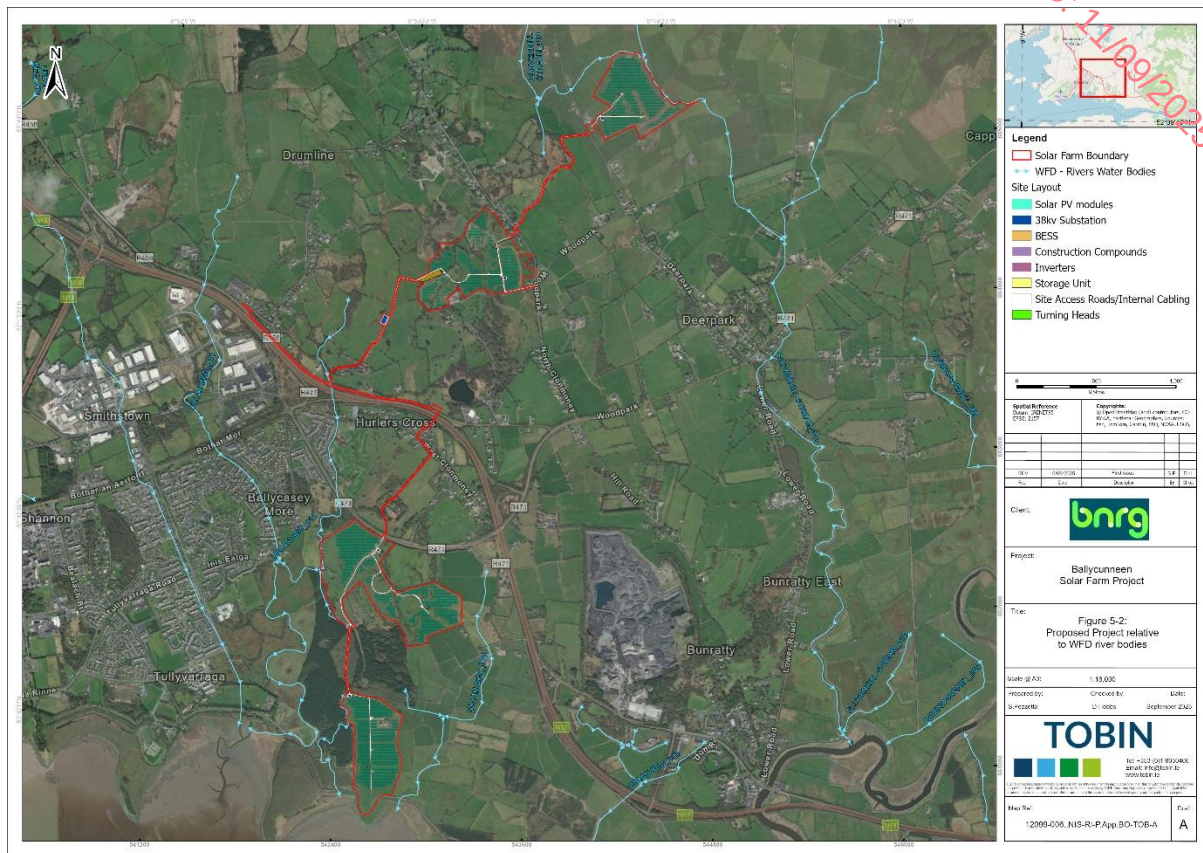
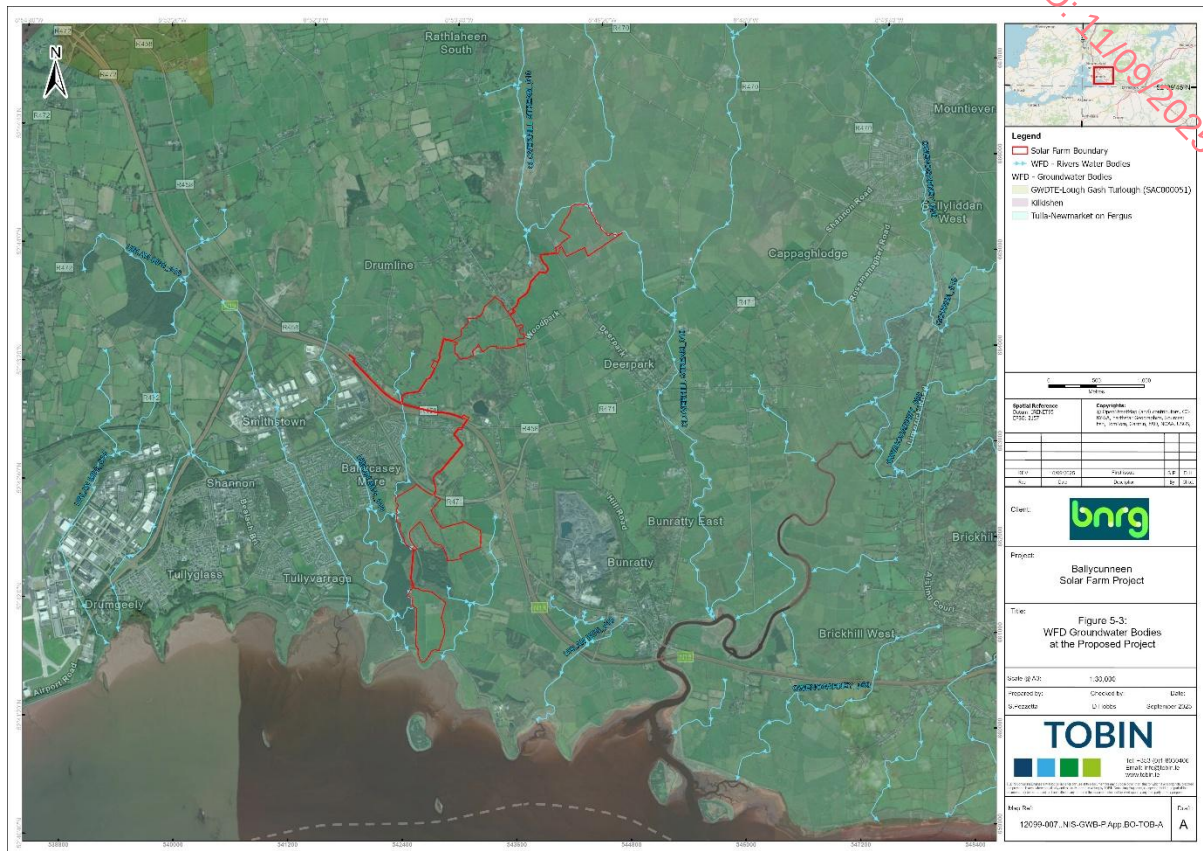


Figure 5.3: WFD Groundwater Bodies at the Proposed Project



5.1.2 European Sites

The southern limit of the project redline is located approximately 3m from the Lower River Shannon Special Area of Conservation (SAC; Site Code: 002165) and around 4m from the River Shannon and River Fergus Estuaries Special Protection Area (SPA; Site Code: 004077). While all proposed infrastructure has been set back a further 72 m to the north, providing a protective buffer between construction activities and the boundaries of these designated sites, there remains potential pathways for impacts on these European sites.

Potential impacts may include sediment runoff, changes in water quality, disturbance to habitats, and effects on species foraging or commuting within ecologically connected areas. The proximity of the proposed project site to these European sites means that careful assessment of potential direct and indirect effects is required to ensure that the conservation objectives of the SAC and SPA are not compromised.

Further detailed information on the Lower River Shannon Barrow SAC and the River Shannon and River Fergus Estuaries SPA and other the European sites potentially within the ZOI of the proposed project, including their qualifying interests, habitats, and species, is provided in the Stage One Screening for Appropriate Assessment presented in Section 7 below. Section 6 provides a summary of potential impacts associated with the proposed project that could affect European sites.

5.2 FIELD SURVEY RESULTS

5.2.1 Habitats and Flora

During the multidisciplinary walkover survey, the dominant habitat within the proposed project site was improved agricultural grassland (GA1). Other occasionally occurring habitats included

- BL3 - Buildings and artificial surfaces
- ED1 - Exposed sand, gravel or till
- FS1 - Reed and large sedge swamps
- FW1 - Eroding/ upland rivers
- FW4 - Drainage ditches
- GM1 - Marsh
- GS2 - Dry meadows and grassy verges
- GS4 - Wet grassland
- WD1 - (Mixed) broadleaved woodland
- WD2 - Mixed broadleaved/ conifer woodland
- WD4 - Conifer plantation
- WL1 - Hedgerows
- WL2 - Treelines
- WS1 - Scrub

Figure 5.4 through Figure 5.6 illustrate the habitats within the proposed project site.

No Third Schedule S.I. 477 invasive plant species were recorded within the proposed project site.

Figure 5.4: Multidisciplinary survey results: Parcel 1, Parcel 2 and Adjacent Areas

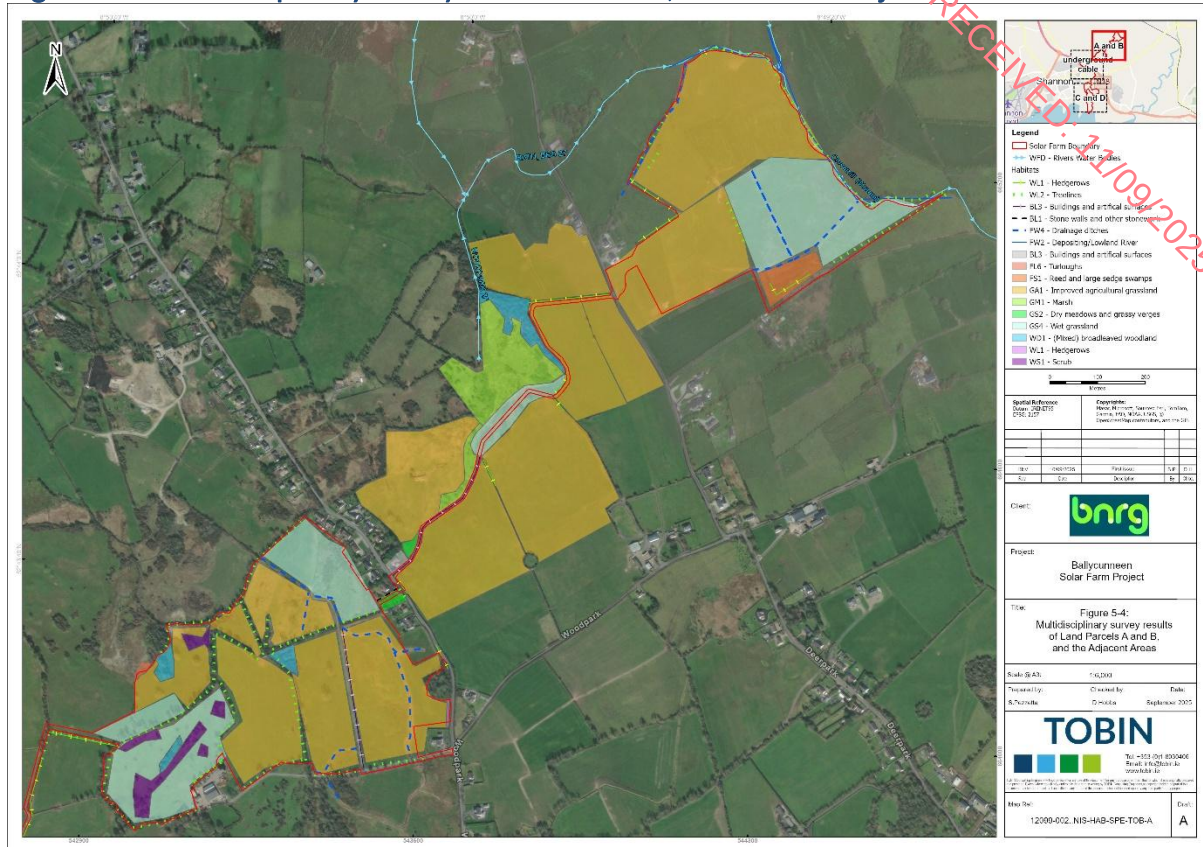


Figure 5.5: Multidisciplinary survey results: Parcel 3, Parcel 4 and Adjacent Areas

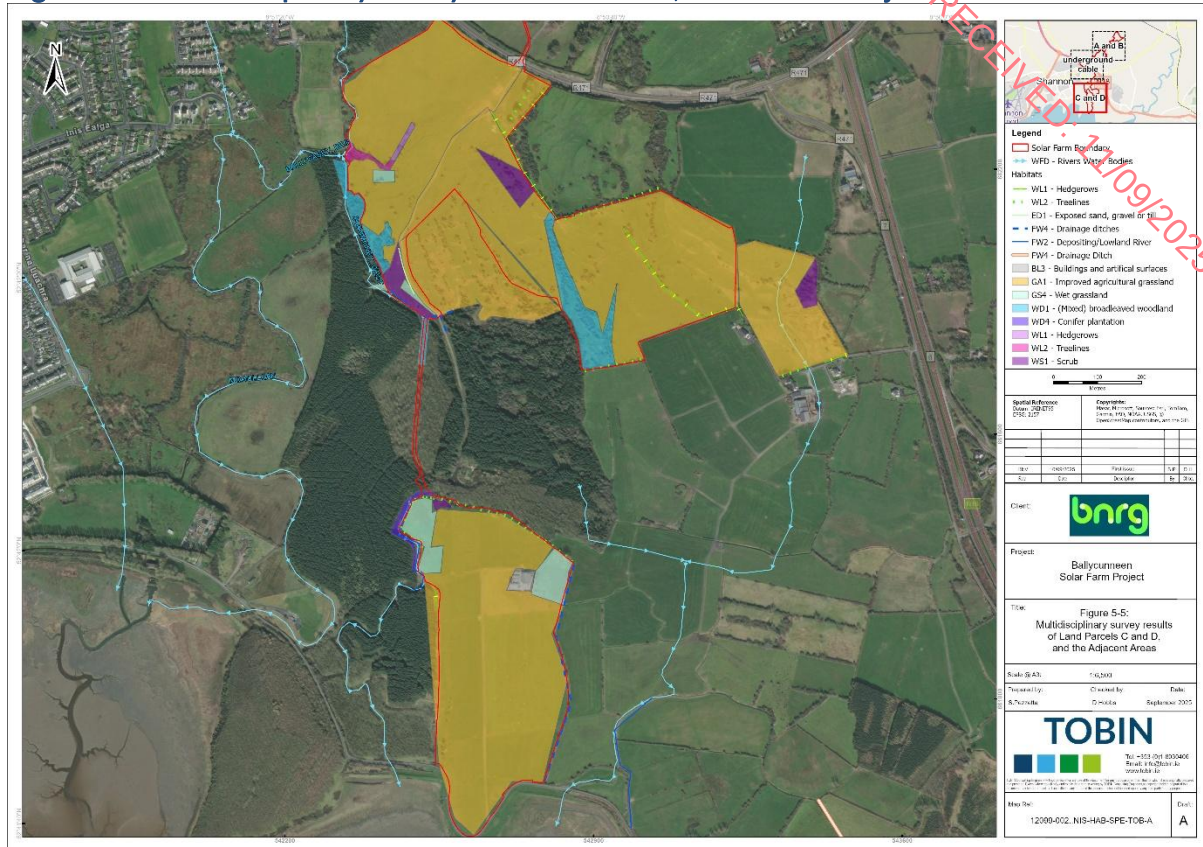


Figure 5.6: Multidisciplinary survey results: Underground Cable



5.2.2 Fauna

5.2.2.1 Habitat Directive Annex II Species

No Annex II Habitat Directive species were recorded during the ecological survey of the proposed project site.

The Lower River Shannon SAC is designated for the following Annex II fauna species (NPWS, 2012a):

- Freshwater pearl mussel (*Margaritifera margaritifera*),
- Sea lamprey (*Petromyzon marinus*),
- Brook lamprey (*Lampetra planeri*),
- River lamprey (*Lampetra fluviatilis*),
- Salmon (*Salmo salar*),
- Otter (*Lutra lutra*)
- Common bottlenose dolphin (*Tursiops truncatus*).

Although, no signs of otter were recorded during the survey of the proposed project site, it is considered that the habitats within and adjacent to the proposed project site are suitable to support this species. Otter which are present in the vicinity of the proposed project site are likely to be connected to the QI population associated with the Lower River Shannon SAC.

There is no record of brook, river or sea lamprey within the surface water features in the proposed project site. However, there is potential for suitable habitat within the Urlan Beg_010 River and the Cloverhill Stream_010. Lamprey species within the vicinity of the proposed project site are likely to be connected to the QI population associated with the Lower River Shannon SAC.

There are no records of freshwater pearl mussel within the proposed project site. According to the NPWS conservation objectives the QI only applies to the freshwater pearl mussel population in the Cloon River, Co. Clare. The Cloon population is confined to the main channel and is distributed from Croany Bridge to approx. 1.5km upstream of Clonderalaw Bridge (NPWS, 2012a) which is 30km west of the proposed project site.

There is no record of salmon within the surface water features in the proposed project site. However, there is potential for suitable habitat within the Urlan Beg_010 River and the Cloverhill Stream_010. Salmon within the vicinity of the proposed project site are likely to be connected to the QI population associated with the Lower River Shannon SAC. The Shannon transitional waterbody is considered an area of international importance for commuting and nursery habitat for salmon and other marine species.

There are no habitats suitable to support this species within the proposed project site. There is no potential for common bottlenose dolphin to be present within the proposed project site.

To establish a baseline of bat species assemblages, as well as the spatial and temporal distribution of species activity within the proposed project site a series of directed bat surveys were undertaken including:

- Ground-level assessment of trees and hedge clusters, and structures was undertaken on the 11th and 14th February 2025 to evaluate potential bat roosts.

- Nighttime roost surveys and emergence surveys were conducted on the 3rd July and 21st July 2025.
- Static detector surveys were carried out from the 16th April for 20 nights and redeployed from 11th July for ten nights.

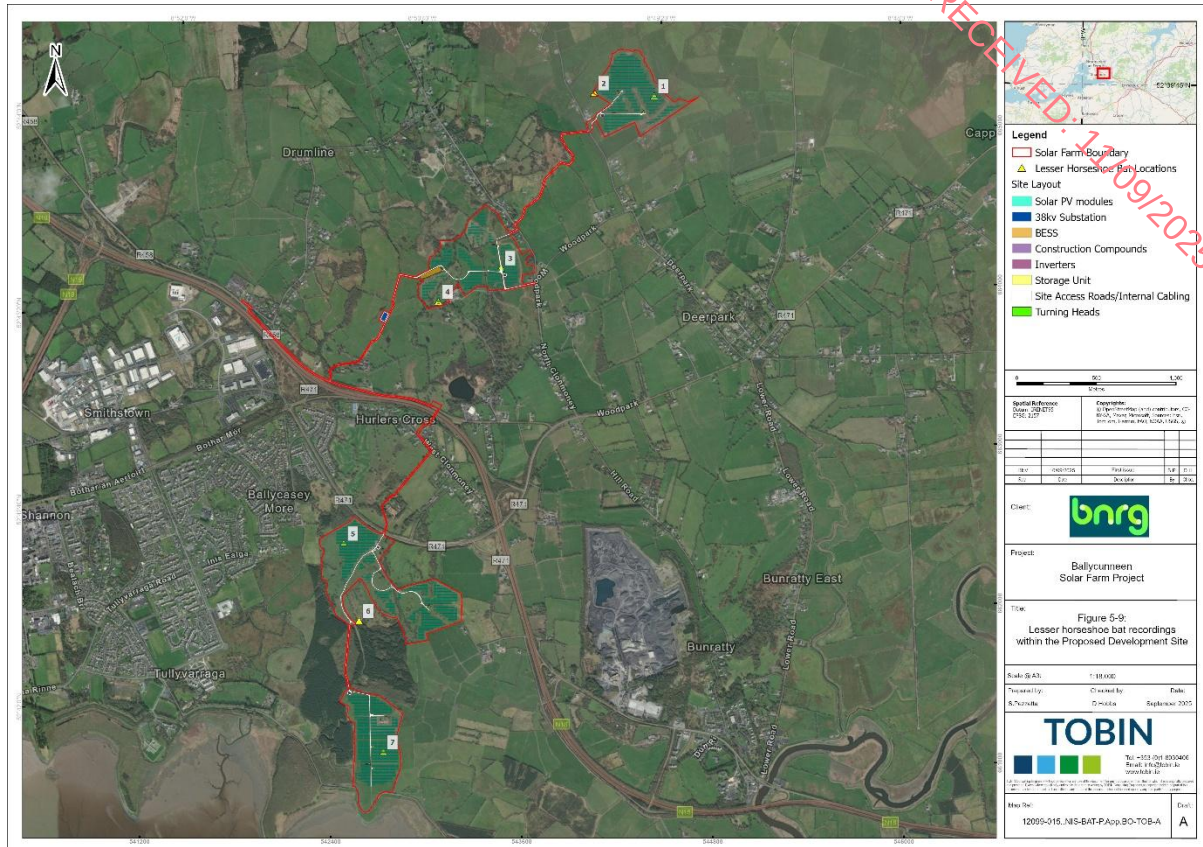
Full details of these surveys undertaken can be found in Eire Ecology's Bat report in APPENDIX B.

The Annex II species, lesser horseshoe bat is a QI of the Ratty River Cave SAC (0002316) which is an important roosting location for bats, providing shelter and breeding opportunities for the species. The SAC is located approximately 4.10km from the project site. The SSCO document for the SAC provides a 2.5km buffer surrounding the site within which is considered the core sustenance zone (CSZ) for species using the roosts. The proposed project site which lies a further 1.6km outside this zone includes a network of hedgerows, treelines and woodlands provide connectivity for the species.

There are 19 known roosts located within a 6km buffer of the project site, 13 of which contain lesser horseshoe bats.

During the static surveys, 20 registrations of lesser horseshoe bat were recorded at three of the seven detectors deployed, these detectors were located within both open and edge habitats within the proposed project site. (Figure 5.7)

Figure 5.7 Lesser Horseshoe Bat Recordings Locations



5.2.2.2 Birds Directive Annex I Species

The River Shannon and River Fergus Estuaries SPA is designated under the EU Birds Directive to protect important populations of waterbirds and wetland species. The SPA is designated for 23 specific SCI bird species plus waterbird or wetland assemblages (Wetland and Waterbirds [A999]). The SPA supports both breeding and migratory birds, providing key feeding, roosting, and wintering habitats across estuarine and tidal mudflats, saltmarshes, and shallow waters. The SPA is hydrologically connected to the proposed project site.

The proposed project site provides suitable habitat (open farmland and wet grassland) several SCI species. The habitats present within the proposed project site are considered to be within the home range of the species associated with the SCI population of the River Shannon and River Fergus Estuaries SPA.

As outlined previously, ornithological surveys were conducted monthly between January and August of 2025. A total of nine bird species were recorded during these field surveys. Of these, curlew was the only SCI species of the River Shannon and River Fergus Estuaries SPA recorded in the proposed project area. During the February transect surveys, a single flock of 51 Curlew was observed feeding on grasslands in the southern section of the proposed project site (land parcel 4). In addition, four Curlew were recorded in flight approximately 400 m from the project area during the same survey period.

Although not recorded during surveys at the proposed project site, the presence of open farmland and wet grassland provides suitable supporting habitat for several SCI species of the River Shannon and River Fergus Estuaries SPA. These habitats may offer important foraging and loafing opportunities, particularly during the winter months when migratory waterbirds rely on agricultural grasslands, damp pastures, and wet grasslands in proximity to estuarine roost sites.

Species that may potentially utilise such habitats include; Whooper Swan (*Cygnus cygnus*) and Light-bellied Brent Goose (*Branta bernicla hrota*), which are known to forage in improved and semi-improved grasslands adjacent to the estuary. Golden Plover (*Pluvialis apricaria*) and Lapwing (*Vanellus vanellus*) frequently exploit open farmland and wet grasslands for feeding and roosting, while Black-tailed Godwit (*Limosa limosa*) may also use damp pasture and flooded fields as supplementary foraging areas. While no individuals of these species were recorded within the proposed project site during surveys, the suitability of these habitats indicates that occasional or opportunistic use by SCI species cannot be ruled out, particularly during periods of cold weather or high tide when alternative foraging areas may be limited.

6. OVERVIEW OF POTENTIAL IMPACTS

6.1 CONSTRUCTION PHASE

It is anticipated that construction activities during the construction phase will be limited to between 10 - 12 months in total. Works will be restricted to standard day-time operational hours i.e. 07:00 to 19:00, Monday to Friday and 08:00 to 14:00 on Saturdays, with no works undertaken on Sundays or Bank Holidays.

Works during the construction phase may result in the following:

- Disturbance of wildlife within the immediate environs
- Fragmentation of wildlife corridors due to installation of fencing
- Loss of habitat used by wildlife for resting, foraging and commuting
- Loss of resting or breeding places and/or mortality
- Water quality and habitat degradation impacts due to construction runoff or contamination.
- Dust from construction and earthworks may settle on vegetation, soil, or waterbodies, potentially reducing habitat quality and disturbing foraging or roosting species.

Potential construction phase impacts associated with the proposed project are discussed hereunder. The key impact mechanism are:

1. Habitat Loss and Fragmentation- arising from installation of infrastructure
2. Habitat Degradation - arising from water quality, air quality, and the potential introduction of IAPS
3. Disturbance - arising from noise and vibration

6.1.1 Habitat Loss and Fragmentation

Permanent habitat loss at the project site will occur for the installation of access tracks and handstanding areas for MV stations and BESS. The area of solar panels within this site totals approximately 40ha. The internal cabling will be installed underground with land reinstatement completed afterward. The area beneath the PV panels them will remain accessible for sheep grazing, and for foraging and commuting wildlife species. Temporary disturbance to adjacent habitats may also occur during construction activities, but the majority of the site will continue to support terrestrial habitats, including grasslands, treeline, hedgerows, woodland and scrub.

The majority of habitats over which the ground-mounted panels will be installed are of lower ecological value at a local scale, consisting predominantly of improved agricultural grassland (GA1). While these areas are not part of, and are unlikely to provide essential functional support to, the conservation objectives of any European site, they may still offer some foraging opportunities for Annex I bird species. Consequently, the reduction in available foraging habitat could potentially influence local feeding behaviour and overall fitness of these species.

A smaller proportion of habitats within the proposed project site that will be lost are of higher ecological value. While these areas are not designated features in their own right, they may provide potential supporting functions (e.g. foraging) for Annex I species under the Birds Directive. The areas may also provide potential supporting functions for Habitats Directive Annex II species including lesser horseshoe bat and otter.

For the Annex II species including lesser horseshoe bat certain habitats within the site to be removed may function as commuting corridors and foraging grounds for the species. These

features act as commuting corridors between roosting and feeding areas, providing essential ecological connectivity that enables bats to navigate the landscape safely while accessing food resources.

Fencing around the solar panel infrastructure, tracks, and MV stations incorporates ecological considerations, with small mammal gates installed at 100m intervals and all fencing maintaining a minimum clearance of 0.1m above ground level. This design allows for the unimpeded movement of mammals, including species such as badgers, ensuring connectivity across the site and preventing habitat fragmentation. The strategic placement and design of the enclosure fencing mean that any ecological impacts are anticipated to be negligible within the local context.

Cabling between panels will result in excavation of minor cable routes/channels that will result in direct disturbance to the surface of the ground. The grassland habitat will remain intact underneath the solar panels. These construction requirements will be within the context of improved agricultural grassland and are evaluated as imperceptible in the local context.

In the case of the Habitats Directive Annex II species otter, no instream works will take place within the Urlan Beg_010 River or the Cloverhill Stream_010, and as such, there will be no direct loss of aquatic foraging habitat. However, certain terrestrial habitat features within the site that will be removed may function as commuting corridors for otter, supporting connectivity between resting, breeding, and feeding locations.

6.1.2 Habitat Degradation

6.1.2.1 Water Quality Impacts

It will be necessary to progressively clear topsoil and subsoil across the proposed project site to facilitate construction activities. Volumes of soil will be removed to accommodate the construction of solar panel hardstand areas, access tracks, underground cable trenches, and construction compounds. If not properly managed, site clearance, excavation, and material stockpiling have the potential to generate runoff of sediment and nutrients into the Urlan Beg_010 River and the Cloverhill Stream_010, both of which flow adjacent to or through the proposed site. These watercourses are hydrologically connected to the River Shannon, and increased suspended solids or nutrient deposition could lead to water quality deterioration and habitat degradation downstream.

There is also a risk of spills or leaks of oils, fuels, and chemicals, including the release of cement-based products, which could directly impact aquatic habitats within the Urlan Beg_010 River and the Cloverhill Stream_010 at the project site, as well as downstream habitats within the River Shannon.

To install the internal connection cable between land parcels 3 and 4, horizontal directional drilling (HDD) will be used to underneath the Urlan Beg_010 RWB. During HDD, there is a risk of structural fracturing or collapse of the river channel, as well as potential “frac-out” of drilling lubricants (e.g., bentonite), which could introduce fine suspended solids into the watercourse, potentially impacting water quality and aquatic habitats at the River Shannon.

For the interconnection cable HDD will be carried out beneath the N18. There are no waterbodies adjacent to these works, and the HDD location is not hydrologically connected to any European site; therefore, there is no hydrological pathway impacts.

6.1.2.2 Air Quality Impacts

Excavation activities have the potential to generate temporary dust emissions in the vicinity of the works. The Institute of Air Quality Management provides guidelines (Holman et al., 2014) which define potential dust emission risk classes for ecological receptors. These guidelines indicate that an assessment is required where ecological receptors occur within 50 m of the site boundary or of routes used by construction vehicles.

Dust generated due to construction activities associated with the proposed project, including solar panel installation, erection of ground-mounted structures, construction of hardstand areas and access tracks, excavation, earthworks, operation of machinery and vehicles, and use of tools and equipment, have the potential to affect habitats supporting Annex I bird species and Annex II species in the area. Such dust emissions could reduce the quality of habitats, potentially impacting foraging, commuting, or roosting opportunities for these species.

6.1.2.3 Potential Introduction of Invasive Alien Plant Species

No Third Schedule listed IASP were recorded within the proposed project site during the ecological surveys. However, it is possible that the movement of construction vehicles and material to and from the site may result in the introduction of invasive species if not appropriately managed. Invasive species may also travel via watercourses if sufficient measures or buffers are not established from the riparian zone to prevent transfer of IAPS to courses. Colonisation of invasive species to an area can inhibit growth and crowd out native plant species, alongside reducing the overall biodiversity of an area.

6.1.3 Disturbance - Noise & Vibration

The installation of solar panel arrays will generate a temporary, intermittent source of noise during the construction phase, primarily when installing the ground-mounted frames for the panels. Additional noise will arise from the operation of construction vehicles and machinery, including excavators, driven piles/screw pile drivers, and other equipment used to install the mounting system. An increase in personnel and traffic movements to and from the site is also expected. Increases in noise, vibration, during construction may result in disturbance to wildlife, including species Annex I birds of the Birds Directive and Annex II species of the Habitats Directive, within the immediate vicinity of the proposed project.

Rock breaking is not anticipated and no blasting is planned. In the unlikely event that rock breaking is required following detailed site investigation, the activity could generate intermittent noise and vibration, and measures will be implemented to minimise impacts.

Temporary construction lighting may also be required during certain phases. Fugitive lighting could deter wildlife movement in and around the site, in particular the Habitats Directive Annex II species lesser horseshoe bat.

6.2 OPERATIONAL PHASE

Potential operational phase impacts associated with the proposed project are discussed hereunder.

The proposed project is expected to remain operational for at least 40 years. During the operational phase, there will be no additional loss of habitats. Intermittent maintenance of the site will be required throughout the lifetime of the project, with ongoing agricultural use, such



as sheep grazing, continuing across the site. Some localised noise may arise from operational infrastructure, such as MV stations and substation equipment, as well as from routine maintenance activities. The solar panels and their mountings are designed to withstand excessive wind speeds and other forces of nature without movement or creation of noise. Maintenance activities will be confined to infrastructure areas, including solar panels, MV stations, substations, and other hardstanding surfaces, and will not require any further habitat clearance. Maintenance will also include routine activities across the site, including minor maintenance of hedgerows. It should be noted that no operational lighting will be required during the operational phase.

The operational phase may result in the following:

- Disturbance due to noise from operational infrastructure.
- Minor disturbance from periodic maintenance activities and associated traffic.
- Risk of accidental pollution incidents during maintenance works (e.g., small-scale fuel or oil spills).

The key impact mechanisms associated with the operational phase are:

1. Disturbance (Infrastructure Noise & Maintenance Activities)
2. Risk of Water Quality Impacts (pollution incidents)

Potential operational phase impacts associated with the proposed project are discussed hereunder.

6.2.1 Disturbance

6.2.1.1 Infrastructure Noise

During the operational phase, infrastructure noise may have the potential to interact with species protected under the Birds Directive (Annex I) and the Habitats Directive (Annex II). Localised noise from MV stations fans and routine maintenance may temporarily disturb birds and mammals, potentially influencing their foraging, commuting, or roosting behaviour.

The solar panels themselves will generate no noise during the operational phase, ensuring minimal disturbance to wildlife. The MV stations will produce low-level operational sounds; however, these are not expected to significantly affect local fauna.

6.2.1.2 Maintenance Activities

Minor noise disturbance may also arise from traffic and human activity associated with site visits and routine maintenance, which could potentially affect Birds Directive Annex I species and Habitats Directive Annex II species using habitats within or adjacent to the site.

6.2.2 Risk of Water Quality Impacts

There is a potential for accidental pollution incidents during maintenance works, such as small-scale fuel, oil, or chemical spills, which could enter soil or nearby drainage features. As outlined in Section 6.1.2.1 release of these substances have the potential to contaminate local watercourses, affecting water quality and potentially impacting aquatic habitats and the species both at the project site and hydrologically connected areas.

Water is required as part of the operational phase of the proposed project for the washing of the solar panels when required. This activity is only expected to be carried out occasionally

(panels typically need to be washed 1-3 times per year depending on the soiling condition on the panels) and require approximately 1500 litres per MW. It is proposed to provide water via a mobile tanker rather than drill a borehole well in each land parcel or to use water from the local public water supply. The water will percolate to the ground immediately after washing. The washing will only require water and will not require the use of any chemicals

6.3 DECOMMISSIONING PHASE

Decommissioning will involve disconnecting the BESS facility from the power grid, shipping electrical equipment to recycling facilities for material recovery, and having a waste management company remove the batteries. It will also include the removal of concrete bases, re-levelling the ground to its original contours using imported soil where necessary, and reseeded with grass. Security systems, CCTV, associated supports, wiring, and fencing will be dismantled and recycled.

Impacts on habitats during the decommissioning phase are expected to be less extensive and of lower magnitude than those during the construction phase, and the duration of activities will be shorter.

7. STAGE ONE SCREENING FOR APPROPRIATE ASSESSMENT

7.1 OVERVIEW

Stage One Screening for AA identifies any likely significant effects on European sites (i.e. SACs and SPAs) within the Natura 2000 network arising from the proposed project, either alone or in combination with other plans or projects. The specific tests at the screening stage are to determine:

1. whether a plan or project can be excluded from AA requirements because it is directly **connected with, or necessary to, the management of a European site**; and
2. whether the plan or project **is likely to have a significant effect** on a European site, either alone or in combination with other plans or projects, in view of the site's conservation objectives, or where residual uncertainty exists regarding potential impacts.

Test 1 – Connection to management of European sites

The proposed project is not directly connected with or necessary to the management of European sites. Having regard to Article 6 of the Habitats Directive, it is therefore appropriate that the proposed project is subjected to Stage One Screening for AA.

Test 2 – Likelihood of significant effects

The test of the screening is to determine whether the proposed project, alone or in combination with other plans or projects, is likely to have a significant effect on the integrity of any European site, in view of the site's conservation objectives. If the screening concludes that no likely significant effects are expected, the project can be excluded from further Appropriate Assessment. Conversely, where potential impacts or uncertainty remain, the project would proceed to Stage Two NIS to assess potential effects in detail.

An assessment of likely significant effects of the proposed project on European sites and their associated QIs and SCIs is presented in Section 7.2 below. The assessment considers potential pathways for impacts, including habitat loss, disturbance, water quality changes, or disruption of species movement.

A cumulative effects assessment, considering the potential in-combination effects of the proposed project in combination with other existing or planned projects, is presented in Section 7.3.

7.2 ASSESSMENT OF LIKELY SIGNIFICANT EFFECTS ON EUROPEAN SITES

An overview of potential impacts of the construction, operation and decommissioning phases of the proposed project is presented in Section 6 above. In summary, the potential impacts are habitat loss, habitats degradation and disturbance. Considering the potential impacts, the SACs and SPAs considered with the Zol of the proposed project are:

- Lower River Shannon SAC (002165) (NPWS, 2012a)
- River Shannon and River Fergus Estuaries SPA (004077) (NPWS, 2012b)
- Ratty River Cave SAC (0002316) (NPWS, 2018a)
- Kilkishen House SAC (02319) (NPWS, 2018b)
- Curraghchase Woods SAC (000174) (NPWS, 2023)
- Poulmagordon Cave (Quin) SAC (000064) (NPWS, 2018c)

- Danes Hole, Poulnalecka SAC (000030) (NPWS, 2018d)
- Lough Gash Turlough SAC (000051) (NPWS, 2017)
- Old Domestic Building (Keevagh) SAC (002010) (NPWS, 2018e)
- Newhall and Edenvale Complex SAC (002091) (NPWS, 2018f)
- Newgrove House SAC (002157) (NPWS, 2018g)

Table 7.1 below presents an assessment of whether the abovementioned impacts could result in likely significant effects on the QIs and SCIs of the European sites in view of their conservation objectives.

Figure 7.1: European Sites within the Potential Zone of Influence of the Proposed Project

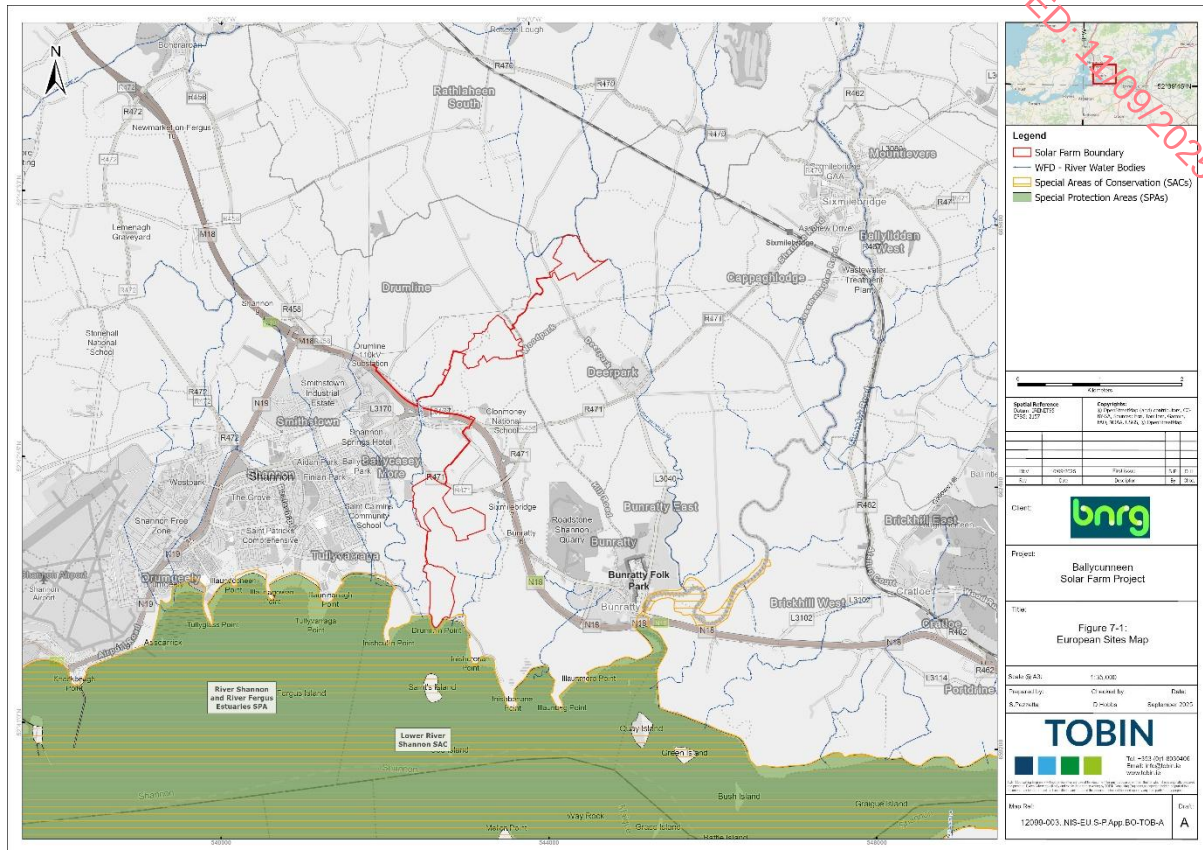


Table 7.1: Assessment of European sites within the Potential Zol of the Proposed Project

European Site	Qualifying Interests /Special Conservation Interests	Source-Pathway-Receptor Link	Possibility for Likely Significant Effects
Lower River Shannon SAC (002165) (NPWS, 2012a)	- Common Bottlenose Dolphin (<i>Tursiops truncatus</i>) [1349] - Freshwater Pearl Mussel (<i>Margaritifera margaritifera</i>) [1029] - Sea Lamprey (<i>Petromyzon marinus</i>) [1095] - Brook Lamprey (<i>Lampetra planeri</i>) [1096] - River Lamprey (<i>Lampetra fluviatilis</i>) [1099] - Otter (<i>Lutra lutra</i>) [1355] - Atlantic Salmon (<i>Salmo salar</i>) [1106] - Estuaries [1130] - Mudflats and sandflats not covered by seawater at low tide [1140] <i>Salicornia</i> and other annuals colonizing mud and sand [1310] - Atlantic salt meadows (<i>Glaucopuccinellietalia maritimae</i>) [1330] - Sandbanks which are slightly covered by sea water all the time [1110] - Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] - Coastal lagoons [1150] - Water courses of plain to montane levels with the <i>Ranunculon fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] - Large shallow inlets and bays [1160] - Reefs [1170] - Perennial vegetation of stony banks [1220]	Physical: The temporary generation of dust at the proposed project area is expected during the Construction Phase due to activities such as vehicle and machinery movements, road upgrade works, vegetation clearance, HDD operations, and excavation. As some works are located within 50 m of Urlan Beg_010 River and the Cloverhill Stream_010 watercourses that connect to the SAC, there is potential for dust deposition to indirectly affect the designated site. There is potential that dust may indirectly affect fauna from the SAC using the project area that rely on these habitats for roosting and foraging. Hydrological: There is a hydrological connection between the proposed project and this SAC via Urlan Beg_010 River and the Cloverhill Stream_010. The proposed project has the potential to result in a degradation of water quality of the watercourses and downstream hydrologically connected SAC. There is potential for indirect or direct impacts on the SAC which is designated for QIs due to changes in water quality. Hydrogeological: The proposed project site partially overlaps with the Tulla-Newmarket on Fergus GWB. However, the SSCO document for the SAC identifies the only Groundwater Dependent Terrestrial Ecosystem (GWDTE) QI as Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>)*. This habitat is located within a separate GWB (Limerick City East GWB). Therefore, there is no potential for either direct or indirect impacts on this QI arising from the proposed project. Ecological: The proposed project site occurs within the foraging/commuting range of otter, which is a QI species for which this SAC is designated. While no signs of otter were recorded during the ecological walkover survey, there is suitable habitat within the proposed project. Otter which are present in the vicinity of the proposed project site are likely to be connected to the QI population. Source-pathway-receptor links exist between the proposed project site and this SAC.	Yes - Viable pathways (hydrological and ecological) for effects were identified between the proposed project site and this SAC. There is potential for likely significant effects on this SAC which are assessed further (Section 8).

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European Site	Qualifying Interests /Special Conservation Interests	Source-Pathway-Receptor Link	Possibility for Likely Significant Effects
	• Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] • Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinia caerulea</i>) [6410] • Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>)* [91E0]		
River Shannon and River Fergus Estuaries SPA (Site code: 004077) (NPWS, 2012b)	• Cormorant (<i>Phalacrocorax carbo</i>) [A017] • Whooper Swan (<i>Cygnus cygnus</i>) [A038] • Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046] • Shelduck (<i>Tadorna tadorna</i>) [A048] • Teal (<i>Anas crecca</i>) [A052] • Pintail (<i>Anas acuta</i>) [A054] • Scaup (<i>Aythya marila</i>) [A062] • Ringed Plover (<i>Charadrius hiaticula</i>) [A137] • Golden Plover (<i>Pluvialis apricaria</i>) [A140] • Grey Plover (<i>Pluvialis squatarola</i>) [A141] • Lapwing (<i>Vanellus vanellus</i>) [A142] • Knot (<i>Calidris canutus</i>) [A143] • Dunlin (<i>Calidris alpina</i>) [A149] • Black-tailed Godwit (<i>Limosa limosa</i>) [A156] • Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157] • Curlew (<i>Numenius arquata</i>) [A160] • Redshank (<i>Tringa totanus</i>) [A162] • Greenshank (<i>Tringa nebularia</i>) [A164]	Physical: The temporary generation of dust within the works area is expected during the Construction Phase due to activities such as vehicle and machinery movements, road upgrade works, vegetation clearance, HDD operations, and excavation. As some works are located within 50 m of Urlan Beg_010 River and the Cloverhill Stream_010 watercourses that connect to the SAC, there is potential for dust deposition to indirectly affect the designated site. Dust can impact plant communities by reducing photosynthesis, respiration, and transpiration, potentially altering community composition. In turn, this may stunt vegetation growth and indirectly affect local fauna that rely on these habitats for roosting and foraging. Hydrological: The SPA is hydrologically connected to the proposed project site via the Urlan Beg_010 River and the Cloverhill Stream_010. Construction activities have the potential to degrade water quality in these watercourses through increased sediment loading, accidental release of hydrocarbons, or nutrient enrichment. Such water quality deterioration could extend downstream to the hydrologically connected SPA. Reduced water quality may adversely affect aquatic invertebrate populations and other prey resources, thereby diminishing the availability of suitable foraging opportunities for SCI species. Indirect impacts could arise through reduced prey abundance, altered prey distribution, and degradation of foraging habitats within the SPA. Ecological: The SPA is designated for 21 Annex I bird species. There is suitable habitat (open farmland and wet grassland) within the	Yes - Viable pathways (hydrological and ecological) for effects were identified between the proposed project site and this SPA. There is potential for likely significant effects on this SPA which will be assessed further (Section 8).



European Site	Qualifying Interests /Special Conservation Interests	Source-Pathway-Receptor Link	Possibility for Likely Significant Effects
	- Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] - Wigeon (<i>Mareca penelope</i>) [A855] - Shoveler (<i>Spatula clypeata</i>) [A857] - Wetland and Waterbirds [A999]	proposed project site for several SCI species for which the SPA is designated including, whooper swan, light-bellied brent goose, golden plover, lapwing, black-tailed godwit, black-headed gull and curlew. The SCIs may temporarily be impacted during the construction phase of the project as a result of loss of foraging habitat. Source-pathway-receptor links exist between the proposed project site and this SPA.	
Ratty River Cave SAC (Site code: 0002316) (NPWS,2018a)	- Caves not open to the public [8310] - Lesser Horseshoe Bat (<i>Rhinolophus hipposideros</i>) [1303]	Physical: The proposed project site is located 4.1km southwest of the SAC. There is no physical connectivity between the SAC and the proposed project site. The SAC is outside of the 50m Zol for dust impacts there is no potential for indirect or direct impacts i.e. habitat degradation on the QI species within the SAC. Hydrological: There is no hydrological connection between the proposed project and this SAC. Hydrogeological: The proposed project shares the same GWB, the Tulla-Newmarket on Fergus with the SAC. However, the SAC is not designated for any GWDTE therefore there is no potential for indirect or direct impacts on the QI of the SAC. Ecological: The SAC is designated for lesser horseshoe bat. The proposed project site is outs of their foraging/ commuting range of the lesser horseshoe bat (2.5km). However, the species is known to travel further than 6km from the roost, as the proposed project site is connected to the summer roost for this SAC via. a network of hedgerows, treelines, and woodlands. Therefore, there is potential for indirect or directs impacts on the QI species within the SAC. Source-pathway-receptor links exist between the proposed project site and this SAC.	Yes - Viable ecological pathway for effects were identified between the proposed project site and this SAC. There is potential for likely significant effects on the SCI, lesser horseshoe bat which will be assessed further (Section 8).
Kilkishen House SAC (Site code: 02319) (NPWS,2018b)	Lesser Horseshoe Bat (<i>Rhinolophus hipposideros</i>)[1303]	Physical: The proposed project site is located 8.3km southwest of the SAC. There is no physical connectivity between the SAC and the proposed project site. The SAC is outside of the 50m Zol for dust impacts there is no potential for indirect or direct impacts i.e. habitat degradation on the QI species within the SAC.	No - No pathway for effects were identified between the proposed project site and this SAC. There is no potential

European Site	Qualifying Interests /Special Conservation Interests	Source-Pathway-Receptor Link	Possibility for Likely Significant Effects
		Hydrological: There is no hydrological connection between the proposed project and this SAC. Therefore, there is no potential for indirect or direct impacts on the SACs QIs. Hydrogeological: The proposed project site is located within a separate GWB, therefore there is no potential for indirect or direct impacts on the QI of the SAC. Ecological: The SAC is designated for lesser horseshoe bat. The proposed project site is outside of the foraging/commuting range of the lesser horseshoe bat (2.5km). While a network of hedgerows, treelines and woodlands provide some connectivity, given the distance, there is no potential for indirect or direct impacts on the QI species within the SAC. No Source-pathway-receptor links exist between the proposed project site and this SAC.	for likely significant effects on this SAC.
Curraghchase Woods SAC (Site code: 000174) (NPWS, 2023)	- Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0] <i>Taxus baccata</i> woods of the British Isles [91J0] - Desmoulin's Whorl Snail (<i>Vertigo moulinsiana</i>) [1016] - Lesser Horseshoe Bat (<i>Rhinolophus hipposideros</i>) [1303]	Physical: The proposed project site is located 8.6km north of the SAC. There is no physical connectivity between the SAC and the proposed project site. The SAC is outside of the 50m ZoI for dust impacts there is no potential for indirect or direct impacts i.e. habitat degradation on the QI species within the SAC. Hydrological: There is no hydrological connection between the proposed project and this SAC. Therefore, there is no potential for indirect or direct impacts on the SACs QIs. Hydrogeological: The proposed project site is located within a separate GWB, therefore there is no potential for indirect or direct impacts on the QI of the SAC. Ecological: The SAC is designated for lesser horseshoe bat and Desmoulin's Whorl Snail. The proposed project site lies beyond the typical foraging and commuting range of the lesser horseshoe bat (2.5 km) and is situated on the opposite, southern side of the River Shannon. In addition, there is not connectivity to the aquatic and riparian habitats required to support Desmoulin's Whorl Snail. Consequently, there is no functional ecological connectivity between the proposed project and the QI species of the SAC. As a result, there	No - No pathway for effects were identified between the proposed project site and this SAC. There is no potential for likely significant effects on this SAC.

European Site	Qualifying Interests /Special Conservation Interests	Source-Pathway-Receptor Link	Possibility for Likely Significant Effects
		is no functional ecological connectivity between the project site and the SAC for the QI species. No Source-pathway-receptor links exist between the proposed project site and this SAC.	
Poulnagordon Cave (Quin) SAC (Site code: 000064) (NPWS,2018c)	- Caves not open to the public [8310] - Lesser Horseshoe Bat (<i>Rhinolophus hipposideros</i>) [1303]	Physical: The proposed project site is located 8.7km south of the SAC. There is no physical connectivity between the SAC and the proposed project site. The SAC is outside of the 50m ZoI for dust impacts there is no potential for indirect or direct impacts i.e. habitat degradation on the QI species within the SAC. Hydrological: There is no hydrological connection between the proposed project and this SAC. Therefore, there is no potential for indirect or direct impacts on the SACs QIs. Hydrogeological: The proposed project site is located within a separate GWB, therefore there is no potential for indirect or direct impacts on the QI of the SAC. Ecological: The SAC is designated for lesser horseshoe bat. The proposed project site lies beyond the typical foraging and commuting range of the lesser horseshoe bat (2.5 km). While a network of hedgerows, treelines and woodlands provide some connectivity, given the distance, there is no potential for indirect or direct impacts on the QI species within the SAC. No Source-pathway-receptor links exist between the proposed project site and this SAC.	No - No pathway for effects were identified between the proposed project site and this SAC. There is no potential for likely significant effects on this SAC.
Danes Hole, Poulnalecka SAC (Site code: 000030) (NPWS,2018d)	- Caves not open to the public [8310] - Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] - Lesser Horseshoe Bat (<i>Rhinolophus hipposideros</i>) [1303]	Physical: The proposed project site is located 10km southwest of the SAC. There is no physical connectivity between the SAC and the proposed project site. The SAC is outside of the 50m ZoI for dust impacts there is no potential for indirect or direct impacts i.e. water pollution and habitat degradation on the QI species within the SAC. Hydrological: There is no hydrological connection between the proposed project and this SAC. Therefore, there is no potential for indirect or direct impacts on the SACs QIs. Hydrogeological: The proposed project shares the same GWB, the Tulla-Newmarket on Fergus with the SAC. However, the SAC is not	No - No pathway for effects were identified between the proposed project site and this SAC. There is no potential for likely significant effects on this SAC.

European Site	Qualifying Interests /Special Conservation Interests	Source-Pathway-Receptor Link	Possibility for Likely Significant Effects
		designated for any GWDTE therefore there is no potential for indirect or direct impacts on the QI of the SAC. Ecological: The SAC is designated for lesser horseshoe bat however the proposed project site is outside of their foraging/commuting range of the lesser horseshoe bat (2.5km). While a network of hedgerows, treelines and woodlands provide some connectivity, given the distance, there is no potential for indirect or direct impacts on the QI species within the SAC. No Source-pathway-receptor links exist between the proposed project site and this SAC.	
Lough Gash Turlough SAC (Site code: 000051) (NPWS,2017)	- Turloughs [3180] - Rivers with muddy banks with <i>Chenopodium rubrip.p.</i> and <i>Bidention p.p. vegetation</i> [3270]	Physical: The proposed project site is located 5km southeast of the SAC. There is no physical connectivity between the SAC and the proposed project site. The SAC is outside of the 50m Zol for dust impacts there is no potential for indirect or direct impacts i.e. water pollution and habitat degradation on the QI species within the SAC. Hydrological: There is no hydrological connection between the proposed project and this SAC. Therefore, there is no potential for indirect or direct impacts on the SACs QIs. Hydrogeological: The proposed project site is located within a separate GWB, therefore there is no potential for indirect or direct impacts on the QI of the SAC. Ecological: The SAC is designated habitats, therefore there is no ecological connectivity between the SAC and the proposed project site. No Source-pathway-receptor links exist between the proposed project site and this SAC.	No - No pathway for effects were identified between the proposed project site and this SAC. There is no potential for likely significant effects on this SAC.
Old Domestic Building (Keevagh) SAC (Site code: 002010) (NPWS,2018e)	Lesser Horseshoe Bat (<i>Rhinolophus hipposideros</i>) [1303]	Physical: The proposed project site is located 11.3km south of the SAC. There is no physical connectivity between the SAC and the proposed project site. The SAC is outside of the 50m Zol for dust impacts there is no potential for indirect or direct impacts i.e. water pollution and habitat degradation on the QI species within the SAC. Hydrological: There is no hydrological connection between the proposed project and this SAC. Therefore, there is no potential for indirect or direct impacts on the SACs QIs.	No - No pathway for effects were identified between the proposed project site and this SAC. There is no potential for likely significant effects on this SAC.

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European Site	Qualifying Interests /Special Conservation Interests	Source-Pathway-Receptor Link	Possibility for Likely Significant Effects
		Hydrogeological: The proposed project shares the same GWB, the Tulla-Newmarket on Fergus with the SAC. However, the SAC is not designated for any GWDTE therefore there is no potential for indirect or direct impacts on the QI of the SAC. Ecological: The SAC is designated for lesser horseshoe bat however the proposed project site is outside of their foraging/commuting range of the lesser horseshoe bat (2.5km). While a network of hedgerows, treelines and woodlands provide some connectivity, given the distance, there is no potential for indirect or direct impacts on the QI species within the SAC. No Source-pathway-receptor links exist between the proposed project site and this SAC.	
Newhall and Edenvale Complex SAC (Site code: 002091) (NPWS,2018f)	- Caves not open to the public [8310] - Lesser Horseshoe Bat (<i>Rhinolophus hipposideros</i>) [1303]	Physical: The proposed project site is located 13.5km southeast of the SAC. There is no physical connectivity between the SAC and the proposed project site. The SAC is outside of the 50m Zol for dust impacts there is no potential for indirect or direct impacts i.e. water pollution and habitat degradation on the QI species within the SAC. Hydrological: There is no hydrological connection between the proposed project and this SAC. Therefore, there is no potential for indirect or direct impacts on the SACs QIs. Hydrogeological: The proposed project site is located within two separate GWB, therefore there is no potential for indirect or direct impacts on the QI of the SAC. Ecological: The SAC is designated for lesser horseshoe bat however the proposed project site is outside of their foraging/commuting range of the lesser horseshoe bat (2.5km). While a network of hedgerows, treelines and woodlands provide some connectivity, given the distance, there is no potential for indirect or direct impacts on the QI species within the SAC. No Source-pathway-receptor links exist between the proposed project site and this SAC.	No - No pathway for effects were identified between the proposed project site and this SAC. There is no potential for likely significant effects on this SAC.
Newgrove House SAC (Site code: 002157)	Lesser Horseshoe Bat (<i>Rhinolophus hipposideros</i>) [1303]	Physical: The proposed project site is located 14.6km south of the SAC. There is no physical connectivity between the SAC and the proposed project site. The SAC is outside of the 50m Zol for dust impacts there is	No - No pathway for effects were identified between



European Site	Qualifying Interests /Special Conservation Interests	Source-Pathway-Receptor Link	Possibility for Likely Significant Effects
(NPWS,2018g)		no potential for indirect or direct impacts i.e. water pollution and habitat degradation on the QI species within the SAC. Hydrological: There is no hydrological connection between the proposed project and this SAC. Therefore, there is no potential for indirect or direct impacts on the SACs QIs. Hydrogeological: The proposed project shares the same GWB, the Tulla-Newmarket on Fergus with the SAC. However, the SAC is not designated for any GWDTE therefore there is no potential for indirect or direct impacts on the QI of the SAC. Ecological: The SAC is designated for lesser horseshoe bat however the proposed project site is outside of their foraging/commuting range of the lesser horseshoe bat (2.5km). While a network of hedgerows, treelines and woodlands provide some connectivity, given the distance, there is no potential for indirect or direct impacts on the QI species within the SAC. No Source-pathway-receptor links exist between the proposed project site and this SAC.	the proposed project site and this SAC. There is no potential for likely significant effects on this SAC.

7.3 POTENTIAL IN-COMBINATION EFFECTS

A comprehensive evaluation of the likely in-combination effects of the proposed project and all associated activities was conducted, taking into account existing and proposed plans and projects in the surrounding area. This evaluation focused on how plans and projects, when considered together, could lead to combined environmental impacts that might not be evident when examining each project individually.

7.3.1 Assessment of Plans

The review of relevant plans focused on evaluating policies and objectives that have the potential for impacting European sites in-combination with the proposed project. the Clare County Council (CCC) County Development Plan (CDP) 2023–2029¹⁰. The proposed project site is located within a zoned area under the Clare CDP. The CDP includes the following objectives:

- **Objective 2.18** - *To facilitate and support the development of solar farms in appropriate locations throughout the County including on agricultural lands and brownfield sites subject to normal planning considerations; and to encourage the use of solar thermal or solar PV installations as part of the design and planning process for new developments and refurbishments.*

Also, and relevant to the protection of European sites against significant effects from any plan or project, is Objective 15.4, which assures compliance with the Habitats Directive:

- **Objective 15.4** - *To implement Article 6(3) and where necessary 6(4) of the Habitats Directive and to ensure that Appropriate Assessment is carried out in relation to works, plans and projects likely to impact on European sites (SACs and SPAs), whether directly or indirectly or in combination with any other plan(s) or project(s);*

It is clear that the CCC planned for plans and projects such as the proposed project, and it includes the requirement that any future plans or projects will be subject to AA to examine and assess their effects on European sites, alone and in-combination with other plans and projects.

Volume 9 of the CDP is the Strategic Integrated Framework Plan (SIFP) for the Shannon Estuary¹¹. This inter-jurisdictional plan, developed collaboratively with Limerick and Kerry County Councils, aims to guide sustainable development within the estuary's land and marine environments. Ecological and Biodiversity Objectives of the SIFP emphasises the protection and enhancement of biodiversity within the Shannon Estuary. Key objectives include:

- Conservation of Natura 2000 Sites: Safeguarding Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) from adverse impacts.
- Protection of Species and Habitats: Ensuring that developments do not negatively affect designated species and habitats.

¹⁰ <https://www.clarecoco.ie/services/planning/plans/clarecountydevelopmentplan23-2029/>

¹¹ <https://clarecdp2023-2029.clarecoco.ie/stage3-amendments/adoption/volume-9-strategic-integrated-framework-plan-for-shannon-estuary-clare-county-development-plan-2023-2029-51393.pdf>



- Sustainable Management of Natural Resources: Promoting the responsible use of the estuary's natural resources to maintain ecological balance.
- Integration of Ecological Considerations into Planning: Incorporating environmental assessments into planning processes to align with the EU Birds and Habitats Directives.

These objectives are detailed in Volume 10a¹² of the development plan, which includes the Appropriate Assessment Natura Impact Report, Strategic Environmental Assessment, and Strategic Flood Risk Assessment.

The ecological and biodiversity objectives of Clare CDP are positive in nature, aiming to protect and enhance habitats, species, and ecological connectivity within the Shannon Estuary. Given their protective and enhancement focus, these objectives do not pose any potential for adverse or in-combination effects on European sites, and therefore the likelihood of such impacts can be excluded.

The assessment of in-combination effects also considered relevant policies in Ireland's 4th National Biodiversity Action Plan 2023-2030 (DoCHG, 2024). This assessment aimed to determine how existing regulatory frameworks support ecological preservation and mitigate potential environmental impacts. In addition to biodiversity-focused policies, the review examined objectives related to European sites conservation. The five key strategic objectives guide biodiversity conservation efforts:

- Adopt a Whole of Government, Whole of Society Approach to Biodiversity: This objective emphasises the need for collective action across all sectors of government and society to effectively address biodiversity challenges.
- Meet Urgent Conservation and Restoration Needs: Focusing on immediate actions required to conserve and restore Ireland's biodiversity, this objective aims to halt further loss and promote recovery of vital ecosystems.
- Secure Nature's Contribution to People: Recognising the essential services that nature provides, this objective seeks to ensure the sustainable use of natural resources, benefiting both people and the environment.
- Enhance the Evidence Base for Action on Biodiversity: This objective highlights the importance of strengthening scientific research and data collection to inform effective biodiversity policies and actions.
- Strengthen Ireland's Contribution to International Biodiversity Initiatives: Aiming to bolster Ireland's role in global biodiversity efforts, this objective focuses on active participation and contribution to international conservation initiatives.

These objectives collectively aim to deliver transformative changes in how Ireland values and protects its natural heritage. The NBAP also introduces a public sector duty on biodiversity, as mandated by the Wildlife (Amendment) Act 2023. This legislation requires all public service bodies, including government departments, agencies, and local authorities, to integrate biodiversity considerations into their plans, policies, and programs, and to report on their progress. Given their focus on the protection, restoration, and sustainable management of

¹² <https://clarecdp2023-2029.clarecoco.ie/stage2-draft/display/volume-10a-appropriate-assessment-natura-impact-report-45176.pdf>



biodiversity, these NBAP objectives are positive in nature, and the potential for any in-combination adverse effects on European sites can be excluded.

7.3.2 Assessment of Projects

A review of the Clare online Planning Registers was carried out to identify past, present, and future plans and projects that could contribute to in-combination environmental effects. An assessment of in-combination effects of those projects in combination with the proposed project is presented below.

GP Joule (Planning Ref: 24435)

In December 2024, GP Joule Ireland Limited lodged a planning application (Planning Ref. 24435) with Clare County Council. The application sought permission for a renewable energy development, consistent with the company's wider portfolio of solar and energy projects across the county. On 24 February 2025, as part of the review process for planning application Clare County Council issued a request for further information be provided by GP Joule to allow a determination to be made by Council. The application was formally withdrawn by GP Joule in June 2025. The project has since been resubmitted under Planning Ref: 25260 (see below), incorporating some alterations to the original design and revised impact assessments to address issues raised during the earlier review process.

GP Joule (Planning Ref: 25260)

In August 2025, GP Joule submitted a planning application (Planning Ref: 25260) to Clare County Council for a 95-hectare solar PV farm spanning the townlands of Mogullaun, Crossagh, Rathlaheen South, Culleen, Drumline, and Ballycasey Beg. The proposed GP Joule project is designed to operate for a 35-year period following its commissioning. As part of the planning application, a Screening for AA and a NIS were submitted to evaluate the potential effects of the GP Joule project on local biodiversity and nearby European sites, including SACs and SPAs. These assessments considered both direct impacts, such as habitat loss and disturbance to species within the site, and indirect impacts, including potential changes to water quality, hydrological connectivity, and the availability of foraging or roosting habitats. The screening also incorporated an assessment of cumulative or in-combination effects with other existing or planned developments in the surrounding area, and identified mitigation measures designed to avoid or minimise potential adverse effects on protected habitats and species.

Terra Solar – Firgrove, Sixmilebridge (Planning Ref: 1731)

Terra Solar secured planning permission for a renewable energy development at Firgrove, Sixmilebridge (Planning Ref: 1731), located immediately adjacent to the north and west of the proposed project site. The Terra Solar project provides for a 34,300 m² solar farm with ground-mounted panels supported on steel frames, together with a substation, underground cabling, and the demolition of a derelict cottage to facilitate development. The project will be connected to the national grid via the Drumline 110kV Substation.

Terra Solar – Clonloghan, Caherteige (Planning Ref: 18585)

Terra Solar obtained planning permission for a development at Clonloghan, Caherteige, (Planning Ref: 18585). The development covers approximately 63,000 m² and features ground-mounted solar panels, a substation, four inverter/transformer stations, a battery storage



module, security fencing, and CCTV for site monitoring. It also includes internal access tracks, an agricultural bridge, drainage works, and the creation of a new site entrance from the R472. A 10-year permission period was granted to facilitate project delivery and commissioning.

Assessment of Potential In-Combination Effects

The potential impact mechanisms associated with the above-listed solar projects are broadly similar to those of the current BNRG project, including runoff, sedimentation, changes to drainage, habitat modification, and disturbance from construction and operational activities. These mechanisms have the potential to affect a range of ecological receptors, including hydrologically connected SACs and SPAs.

There is uncertainty regarding potential in-combination effects, particularly via indirect pathways such as hydrological connectivity, habitat fragmentation, or overlapping species ranges. In the absence of clarity regarding these potential interactions, the above projects are brought forward to the Stage 2 AA / NIS alongside the proposed solar development for a detailed assessment of in-combination effects on European sites. This ensures that any additive or in-combination effects on SACs, SPAs, and their qualifying interests are fully evaluated, and that appropriate mitigation can be applied if necessary.

Kieran Kelly Haulage Ltd. (Planning Ref:2360568)

Project Context: The Kieran Kelly Haulage Ltd. development involves the importation of inert fill to agricultural lands, the establishment of internal access roads, and associated ancillary site works within the same area as the proposed solar project. These activities will result in temporary habitat disturbance, particularly to GA1 grassland, including temporary vegetation removal and habitat modification. Following completion, GA1 grassland is anticipated to naturally re-establish on the infilled areas. Short-term noise and dust generation may also occur during construction; however, these effects are localised and expected to be temporary.

- **Hydrology and Water Quality:** Potential impacts on hydrology and water quality are expected to be negligible. Standard drainage and sediment control measures will be implemented to prevent any deterioration in water quality or knock-on effects on downstream habitats. There is no expected adverse impact on hydrologically connected habitats, including those supporting designated species within nearby European sites.
- **Ecology and Species Considerations:** Species potentially using the area for foraging, commuting, or shelter, such as bird and mammals (volant and non-volant) may experience temporary disturbance. However, the scale, duration, and the spatial extent of the works are limited, and mitigation measures will minimise impacts. No permanent habitat loss or fragmentation is anticipated.
- **Temporal Separation of Works:** The infill project and the proposed solar development will not be undertaken concurrently. This temporal separation ensures there is no additive or cumulative disturbance from construction activities, further reducing any potential for impacts on local habitats or species.

Conclusion:

Based on the assessment, the Kieran Kelly Haulage project alone, and in combination with the proposed solar development, is not expected to result in significant adverse effects on the integrity of nearby European sites. Habitats and species present on-site, and those potentially

using the area for foraging or commuting, are unlikely to be affected in a manner that would compromise the conservation objectives of any SACs or SPAs in the vicinity.

John Callinan Munster Footgolf (Planning Ref: 2460459)

Project Context: Developer has been granted conditional permission on January 2025 to extend the existing carpark and to develop a mini golf course including ancillary site works. I intend to apply for a 10-year duration for the grant of Retention/Permission. The development is located 500m upstream of the proposed project site.

- **Hydrology and Water Quality:** The Footgolf development, being primarily a recreational and car park extension project, may increase impervious surface area. Given the 500 m separation, there is no significant in-combination effects on downstream watercourses. Water quality impacts in combination with the solar park are considered negligible.
- **Ecology and Biodiversity:** The Footgolf development is located outside any designated Natura 2000 sites and involves landscaped recreational areas. The development have limited habitat disturbance and include mitigation measures. No sensitive ecological features are affected by either project. Therefore, in-combination effects on European sites or species of interest can be excluded.
- **Air Quality and Dust:** Construction dust from the Footgolf project may occur during car park extension and landscaping, while solar park construction will generate localised dust. Dust-generating activities are temporary, spatially separated. No in-combination air quality impacts on sensitive receptors are predicted.

Conclusion: Based on the assessment of potential pathways (hydrology, ecology, air quality), the John Callinan Munster Footgolf development and the proposed project are unlikely to result in any significant in-combination effects. Consequently, the likelihood of adverse in-combination effects on Natura 2000 sites or other ecological receptors can be excluded.

Other Smaller Developments:

There are a number of small-scale projects and planning applications in the vicinity of the proposed project, including the construction or extension of residential properties and farmyard sheds (e.g., application nos. 061035, 23274, 04144, 091047, 062818, and 09913). These developments are relatively minor in scale, involve limited earthworks, and do not include activities likely to result in significant habitat loss, water quality impacts, or other pressures on ecological receptors. Additionally, there is no ecological or hydrological connectivity between these sites and the proposed project.

Conclusion: As a result, the likelihood of cumulative or in-combination effects with the proposed project is considered negligible, and there is no potential for significant adverse effects on any designated European sites.

7.4 SCREENING ASSESSMENT CONCLUSION

Following an examination, analysis, and evaluation of the relevant information, including the nature of the proposed project and its potential connectivity to the Lower River Shannon SAC, River Shannon and River Fergus Estuaries SPA, and Ratty River Cave SAC, and applying the precautionary principle, it is the professional opinion of the authors that it is not possible to rule out the possibility of likely significant effects on these European sites.



This conclusion has been reached without assuming the implementation of any mitigation measures and is based solely on the potential impact sources and pathways associated with the proposed project (as outlined in Section 6). Accordingly, a Stage 2 AA / NIS is required to determine whether adverse effects on the integrity of these sites can be excluded.

An assessment of in-combination effects with other plans and projects has also been undertaken. In-combination effects of the proposed project with other plans and projects have been excluded, with the exception of the GP Joule project (Planning Ref: 25260), Terre Solar (Planning Ref: 1731) and Terr Solar (Planning Ref: 18585). These projects are considered in the Stage 2 Appropriate Assessment, as they may give rise to potential in-combination effects on water quality and species, which cannot be ruled out without further detailed evaluation.

8. NATURA IMPACT STATEMENT

This NIS includes an examination and analysis of the best available scientific knowledge and field data to identify and assess the implications of the proposed project on the Lower River Shannon SAC, River Shannon and River Fergus Estuaries SPA, and Ratty River Cave SAC in view of their conservation objectives. It also considers whether there are ex-situ implications for any European sites, for example from impacts occurring via downstream hydrological pathways, from effects on populations of ex-situ species located outside of the designated sites, or from impacts on ex-situ supporting habitats.

The assessment further considers potential in-combination effects with other plans and projects in the surrounding area. In-combination effects have been excluded, with the exception of the Kieran Kelly Haulage Ltd. development (Planning Ref: 2360568), which is located at the proposed project site and is considered within this NIS due to potential pathways affecting water quality and species.

The assessment evaluates whether the proposed project, either alone or in combination with other plans or projects, could adversely affect the integrity of these European sites. In reaching a conclusion, consideration has been given to any mitigation measures necessary to avoid or reduce potential adverse effects.

8.1 DESCRIPTION OF EUROPEAN SITES AND ASSESSMENT OF POTENTIAL ADVERSE EFFECTS

8.1.1 The Lower River Shannon SAC

The proposed project site is located 3m north of the of the Lower River Shannon SAC, while proposed infrastructure is positioned an additional 72m from the SAC boundary.

This SAC consists of the freshwater stretches of the Shannon, the marine area between Loop Head and Kerry Head. Various habitats such as reefs, mudflats, saltmarshes and the Shannon and Fergus Estuaries which form the largest estuarine complex in Ireland. (NPWS, 2013).

The SAC is designated for the following Annex I habitats and Annex II species which are listed and discussed in relation to the proposed project below (* indicates priority habitat):

- Common Bottlenose Dolphin (*Tursiops truncatus*) [1349]
- Freshwater Pearl Mussel (*Margaritifera margaritifera*) [1029]
- Sea Lamprey (*Petromyzon marinus*) [1095]
- Brook Lamprey (*Lampetra planeri*) [1096]
- River Lamprey (*Lampetra fluviatilis*) [1099]
- Otter (*Lutra lutra*) [1355]
- Atlantic Salmon (*Salmo salar*) [1106]
- Estuaries [1130]
- Mudflats and sandflats not covered by seawater at low tide [1140]
- Salicornia and other annuals colonizing mud and sand [1310]
- Atlantic salt meadows (*Glauco-Puccinellietalia maritima*) [1330]
- Sandbanks which are slightly covered by sea water all the time [1110]
- Mediterranean salt meadows (*Juncetalia maritimi*) [1410]



- Coastal lagoons [1150]
- Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitriche-Batrachion* vegetation [3260]
- Large shallow inlets and bays [1160]
- Reefs [1170]
- Perennial vegetation of stony banks [1220]
- Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]
- Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410]
- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)* [91E0]

The above QIs and their conservation objectives are further assessed in Table 8.1 below.



Table 8.1: Qualifying Interests, Extent of Habitat and Conservation Objectives for the Lower River Shannon SAC and Potential for Effect

Qualifying Interests (*indicates a priority habitat)	Extent of Habitat & Closest Proximity	Conservation Objective	Pathway & Potential for Effects
Common Bottlenose Dolphin (<i>Tursiops truncatus</i>) [1349]	The SSCO document indicates that this species is located within the estuary and bay at a hydrological distance of approximately 34km from the proposed project site (NPWS, 2012a).	To maintain the favourable conservation condition.	No - this species is located at a significant hydrological distance of approximately 34km. Additionally, due to the mixing zone effect of transitional waters, the separation distance and the nature of the proposed works, the hydrological pathway from the proposed project is considered an ineffective pathway for impacts from the proposed project. This species is therefore outside the Zol and there is no potential for likely impacts.
Freshwater Pearl Mussel (<i>Margaritifera Margaritifera</i>) [1029]	The SSCO document (NPWS, 2012a) indicates that this species is located within in the Cloon River, Co. Clare located which is 30km west of the proposed project site.	To maintain the favourable conservation condition.	No - this species is located at a significant hydrological distance of approximately 30km. Additionally, due to the mixing zone effect of transitional waters, the separation distance and the nature of the proposed works, the hydrological pathway from the proposed project is considered an ineffective pathway for impacts from the proposed project. This species is therefore outside the Zol and there is no potential for likely impacts.
Sea Lamprey (<i>Petromyzon marinus</i>) [1095]	The current distribution of this species is not recorded within the SSCO document. Available NPWS data illustrates this species is located within 10km grid square R46 which encompass the proposed project. This indicates these species may be present within the Urlan Beg_010 River and the Cloverhill Stream_010. IFI sea lamprey survey data from 2022 and 2023 reported spawning within the Mulkear River at Annacotty, Co.Limerick located 23km upstream	To restore the favourable conservation condition.	Yes - there is potential for these species to be present within the Urlan Beg_010 River, the Cloverhill Stream_010 and downstream within the SAC. There is low potential for the proposed project to give rise to water quality impacts which may negatively impact this species within the SAC. Maitland (2003) notes that the critical freshwater habitat requirements of lamprey relate to the availability of clean spawning gravels and nursery silts. As there is potential for this QI to be located within the Zol of the proposed project, there is potential for likely impacts.

Qualifying Interests (*indicates a priority habitat)	Extent of Habitat & Closest Proximity	Conservation Objective	Pathway & Potential for Effects
	of the proposed project site. (Gallagher <i>et al.</i> , 2023) (Gallagher <i>et al.</i> , 2022).		
Brook Lamprey (<i>Lampetra planeri</i>) [1096]	The current distribution of these species is not recorded within the SSCO document. Available NPWS data illustrates that brook lamprey species are located within the 10km grid square R46. This indicates these species may be present within the Urlan Beg_010 River and the Cloverhill Stream_010.		
River Lamprey (<i>Lampetra fluviatilis</i>) [1099]			
Otter (<i>Lutra lutra</i>) [1355]	According to the SSCO document the current commuting range of this species is mapped within the 100m of the proposed project site (NPWS, 2012a). According to the available NPWS data the proposed site is not located within the current distribution however, the current range grid square encompasses the proposed project site. The watercourses within the site are considered to be suitable for otters.	To restore the favourable conservation condition.	Yes – there is potential for this species to be present within Urlan Beg_010 River, the Cloverhill Stream_010 and downstream within the SAC. There is low potential for the proposed project to disturb the species during the construction phase. Increased noise can negatively impact the local population of otter within the SAC. There is therefore potential for indirect impacts to this species, and thus likely significant effects.
Atlantic Salmon (<i>Salmo salar</i>) [1106]	The current distribution of this species is not recorded within the SSCO document. Available NPWS data illustrates that Atlantic salmon current range and distribution for Atlantic salmon is within the Zol of the proposed project.	To restore the favourable conservation condition.	Yes – there is potential for this species to be present within the Urlan Beg_010 River, the Cloverhill Stream_010 and downstream within the SAC. There is low potential for the degradation of water quality and the increase in sedimentation can negatively impact salmon by degrading suitable spawning habitats, consequently reducing the carrying capacity of salmon within the watercourse. In addition, the prolonged sedimentation of a watercourse has the potential to inhibit fish passage restricting salmon from reaching important spawning sites. A degradation of water quality, a decrease in suitable spawning habitats and impediments to migration would all negatively impact the designated population of

Qualifying Interests (*indicates a priority habitat)	Extent of Habitat & Closest Proximity	Conservation Objective	Pathway & Potential for Effects
			Atlantic salmon within the SAC. There is therefore potential for likely significant effects on this species.
Estuaries [1130]	The Site-Specific Conservation Objectives (SSCO) document indicates that this transitional habitat is located 84m south of the proposed project site (NPWS, 2012a) at a hydrological distance of approximately 243m downstream from the proposed project.	To maintain the favourable conservation condition.	No - this habitat is located downstream from the proposed project within the Shannon estuary, at a hydrological distance of approximately 243m. Due to the mixing zone effect of transitional waters, the separation distance and the nature of the proposed works there is no potential for the proposed project to impact the habitat area or community distribution of the habitat. Therefore, the hydrological pathway from the proposed project is considered an ineffective pathway for impacts from the proposed project.
Tidal mudflats and sandflats not covered by seawater at low tide [1140]			This habitat is therefore outside the Zol and there is no potential for likely impacts.
<i>Salicornia</i> and other annuals colonising mud and sand [1310]	The SSCO document indicates that this marine habitat is located within the lower reaches of the SAC (NPWS, 2012a) at a hydrological distance of approximately 40km downstream from the proposed project.	To maintain the favourable conservation condition	No - this habitat is located downstream from the proposed project within the Shannon estuary, at a significant hydrological distance of approximately 40km. Additionally, due to the mixing zone effect of transitional waters, the separation distance and the nature of the proposed works, the hydrological pathway from the proposed project is considered an ineffective pathway for impacts from the proposed project once the first WFD transitional water body is reached.
			This habitat is therefore outside the Zol and there is no potential for likely impacts.
Atlantic salt meadows [1330]	The Site-Specific Conservation Objectives (SSCO) document indicates that this habitat is located 191m south of the proposed project site (NPWS, 2012a) at a hydrological distance of	To restore the favourable conservation condition	No - this habitat is located downstream from the proposed project within the Shannon estuary, at a hydrological distance of approximately 519m. Due to the mixing zone effect of transitional waters, the separation distance and the nature of the proposed works there is no potential for

Qualifying Interests (*indicates a priority habitat)	Extent of Habitat & Closest Proximity	Conservation Objective	Pathway & Potential for Effects
	approximately 519m downstream from the proposed project.		the proposed project to impact the habitat area or community distribution of the habitat. Therefore, the hydrological pathway from the proposed project is considered an ineffective pathway for impacts from the proposed project. This habitat is therefore outside the Zol and there is no potential for likely impacts.
Sandbanks which are slightly covered by sea water all the time [1110]	The SSCO document indicates that this marine habitat is located within the lower reaches of the SAC (NPWS, 2012) at a hydrological distance of 64km downstream from the proposed project.	To restore the favourable conservation condition	No - this habitat is located downstream from the proposed project within the Shannon estuary, at a hydrological distance of approximately 64km. Due to the mixing zone effect of transitional waters, the separation distance and the nature of the proposed works there is no potential for the proposed project to impact the habitat area or community distribution of the habitat. Therefore, the hydrological pathway from the proposed project is considered an ineffective pathway for impacts from the proposed project. This habitat is therefore outside the Zol and there is no potential for likely impacts.
Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410]	The Site-Specific Conservation Objectives (SSCO) document indicates that this habitat is located 14.4km southwest of the proposed project site (NPWS, 2012) at a hydrological distance of approximately 17km downstream from the proposed project.	To restore the favourable conservation condition	No - this habitat is located downstream from the proposed project within the Shannon estuary, at a hydrological distance of approximately 17km. Due to the mixing zone effect of transitional waters, the separation distance and the nature of the proposed works there is no potential for the proposed project to impact the habitat area or community distribution of the habitat. Therefore, the hydrological pathway from the proposed project is considered an ineffective pathway for impacts. This habitat is therefore outside the Zol and there is no potential for likely impacts.

Qualifying Interests (*indicates a priority habitat)	Extent of Habitat & Closest Proximity	Conservation Objective	Pathway & Potential for Effects
Coastal lagoons [1150]	The Site-Specific Conservation Objectives (SSCO) document indicates that this habitat is located 6.6km southwest of the proposed project site (NPWS, 2012) at a hydrological distance of approximately 7.8km downstream from the proposed project.	To restore the favourable conservation condition	No - this habitat is located downstream from the proposed project within the Shannon estuary, at a hydrological distance of approximately 7.8km. Due to the mixing zone effect of transitional waters, the separation distance and the nature of the proposed works there is no potential for the proposed project to impact the habitat area or community distribution of the habitat. Therefore, the hydrological pathway from the proposed project is considered an ineffective pathway for impacts from the proposed project. This habitat is therefore outside the Zol and there is no potential for likely impacts.
Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260]	The Site-Specific Conservation Objectives (SSCO) document indicates that this habitat is located 14.3km southeast of the proposed project site (NPWS, 2012) at a hydrological distance of approximately 18.5km downstream from the proposed project.	To maintain the favourable conservation condition.	No - this habitat is located downstream from the proposed project within the Shannon estuary, at a hydrological distance of approximately 18.5km. Due to the mixing zone effect of transitional waters, the separation distance and the nature of the proposed works there is no potential for the proposed project to impact the habitat area or community distribution of the habitat. Therefore, the hydrological pathway from the proposed project is considered an ineffective pathway for impacts from the proposed project. This habitat is therefore outside the Zol and there is no potential for likely impacts.
Large shallow inlets and bays [1160]	The SSCO document indicates that this habitat is located within the lower reaches of the SAC (NPWS, 2012) at a hydrological distance of approximately 46.3km downstream from the proposed project.	To maintain the favourable conservation condition.	No - this habitat is located downstream from the proposed project within the Shannon estuary, at a hydrological distance of approximately 46.3km. Due to the mixing zone effect of transitional waters, the separation distance and the nature of the proposed works there is no potential for the proposed project to impact the habitat area or community distribution of the habitat. Therefore, the

Qualifying Interests (*indicates a priority habitat)	Extent of Habitat & Closest Proximity	Conservation Objective	Pathway & Potential for Effects
			hydrological pathway from the proposed project is considered an ineffective pathway for impacts from the proposed project. This habitat is therefore outside the Zol and there is no potential for likely impacts.
Reefs [1170]	The SSCO document indicates that this habitat is located within the lower reaches of the SAC (NPWS, 2012) at a hydrological distance of approximately 19.5km downstream from the proposed project.	To maintain the favourable conservation condition.	No - this habitat is located downstream from the proposed project at a significant hydrological distance of approximately 19.5km. Additionally, due to the mixing zone effect of transitional waters, the separation distance and the nature of the proposed works, the hydrological pathway from the proposed project is considered an ineffective pathway for impacts from the proposed project once the first WFD transitional water body is reached. This habitat is therefore outside the Zol and there is no potential for likely impacts.
Perennial vegetation of stony banks [1220]	The SSCO document indicates that this habitat is located within the lower reaches of the SAC (NPWS, 2012) at a hydrological distance of approximately 46.1km downstream from the proposed project.	To restore the favourable conservation condition	No - this habitat is located downstream from the proposed project at a significant hydrological distance of approximately 46.1km. Additionally, due to the mixing zone effect of transitional waters, the separation distance and the nature of the proposed works, the hydrological pathway from the proposed project is considered an ineffective pathway for impacts from the proposed project once the first WFD transitional water body is reached. This habitat is therefore outside the Zol and there is no potential for likely impacts.
Vegetated Sea cliffs of the Atlantic and Baltic coasts [1230]	The SSCO document indicates that this habitat is located within the lower reaches of the SAC (NPWS, 2012) at a hydrological distance of approximately 62km downstream from the proposed project.	To restore the favourable conservation condition	No - this habitat is located downstream from the proposed project at a significant hydrological distance of approximately 62km. Additionally, due to the mixing zone effect of transitional waters, the separation distance and the nature of the proposed works, the hydrological

Qualifying Interests (*indicates a priority habitat)	Extent of Habitat & Closest Proximity	Conservation Objective	Pathway & Potential for Effects
			pathway from the proposed project is considered an ineffective pathway for impacts from the proposed project once the first WFD transitional water body is reached. This habitat is therefore outside the Zol and there is no potential for likely impacts.
Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410]	The extent of this habitat is not mapped within the SSCO document. Available NPWS data illustrates that the nearest mapped area is 7.1km east of the proposed project.	To restore the favourable conservation condition	No – there is no physical or hydrological connection between the proposed project site and the habitat. The habitat location is outside of the Zol for dust impacts, therefore there is no potential for likely significant effects on this QI as a result of the proposed project.
*Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0]	The SSCO document illustrates that the closest area of this habitat is located 21.6km east of the proposed project site. This habitat is a GWDTE, however the locations of this habitat are within different groundwater bodies.	To restore the favourable conservation condition	No – There is no hydrological or hydrogeological connectivity between the proposed project site and the habitat. The habitat is located upstream in a separate subcatchment and within a separate GWB to the proposed project site. There is no potential for likely significant effects on this QI as a result of the proposed project.

8.1.2 River Shannon and River Fergus Estuaries SPA

The proposed project redline boundary is located 4m north of the River Shannon and River Fergus Estuaries SPA, while proposed infrastructure is positioned an additional 72m from the SAC boundary.

The proposed project is hydrologically connected via the Urlan beg_010 which flows downstream into the SPA. The estuaries of the River Shannon and River Fergus form the largest estuarine complex in Ireland and contains the most important coastal wetland site in the country with an assemblage of over 20,000 wintering waterbirds and over 50,000 wintering waterfowl. The site is of national importance for 17 species and international importance for four species, light-bellied brent goose, dunlin, black-tailed godwit, and redshank. The site also supports a nationally important breeding population of Cormorant (NPWS, 2015).

The SPA is designated for the following Annex I species which are listed and discussed (Table 10.2) in relation to the proposed project below:

- Cormorant (*Phalacrocorax carbo*) [A017]
- Whooper Swan (*Cygnus cygnus*) [A038]
- Light-bellied Brent Goose (*Branta bernicla hrota*) [A046]
- Shelduck (*Tadorna tadorna*) [A048]
- Teal (*Anas crecca*) [A052]
- Pintail (*Anas acuta*) [A054]
- Scaup (*Aythya marila*) [A062]
- Ringed Plover (*Charadrius hiaticula*) [A137]
- Golden Plover (*Pluvialis apricaria*) [A140]
- Grey Plover (*Pluvialis squatarola*) [A141]
- Lapwing (*Vanellus vanellus*) [A142]
- Knot (*Calidris canutus*) [A143]
- Dunlin (*Calidris alpina*) [A149]
- Black-tailed Godwit (*Limosa limosa*) [A156]
- Bar-tailed Godwit (*Limosa lapponica*) [A157]
- Curlew (*Numenius arquata*) [A160]
- Redshank (*Tringa totanus*) [A162]
- Greenshank (*Tringa nebularia*) [A164]
- Black-headed Gull (*Chroicocephalus ridibundus*) [A179]
- Wigeon (*Mareca penelope*) [A855]
- Shoveler (*Spatula clypeata*) [A857]
- Wetland and Waterbirds [A999]



Table 8.2 Potential for Effects on the SCIs of the River Shannon and River Fergus Estuaries SPA

Special Conservation Interest	Habitat & Closest Proximity	Conservation Objective	Pathway & Potential for Effects
Cormorant (<i>Phalacrocorax carbo</i>) [A017] (Breeding and Wintering)	Cormorant breed on cliff edges and in trees along waterbodies. This species winter and forage along rivers, lakes and the sea. The closest suitable foraging habitat for cormorant is 40m south from the proposed project site.	To maintain the favourable conservation condition.	Yes While no suitable breeding or foraging habitat occurs within the proposed project site, the project could indirectly affect the species through potential impacts on water quality in connected waterbodies, with any deterioration potentially reducing fish prey availability and negatively affecting foraging success.
Whooper Swan (<i>Cygnus cygnus</i>) [A0308] (Wintering)	Mostly lowland open farmland, wetlands, wet grassland, dry improved grassland, stubble fields. Traditionally feeds on aquatic vegetation, but also graze on improved and unimproved grassland, as well as some arable crops.	To maintain the favourable conservation condition.	No There is suitable habitat (farmland/ improved grasslands) within the proposed project site which is within the species core foraging range (5-8km). (SNH, 2016). The species is often found at inland freshwater habitats, including lakes, rivers, flooded fields, and wet grasslands. They feed mainly by grazing on grasses, agricultural crops, and aquatic vegetation, rather than foraging in marine or estuarine environments. However, the species was not observed during surveys at the project site. Should the species be present, there are extensive alternative foraging areas available within the local landscape, meaning that the potential impact of the project on foraging habitat is likely to be minimal and not significant.
Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046] (Wintering)	Mostly found on coastal estuaries during the autumn and early winter, and on grasslands from mid-winter, until departure for the breeding grounds begins in late April. During the winter, it feeds mostly on eel-grass, which grows on muddy estuaries, and on grasslands, usually when coastal supplies have been depleted at estuarine sites.	To maintain the favourable conservation condition.	No Light-bellied Brent goose is a coastal wintering species that primarily feeds on intertidal habitats, including eelgrass beds, algae, and other marine vegetation. They also use farmland/ improved grasslands both of which are present within the proposed project site which is within the species core foraging range (5km). (SNH, 2016). However, the species was not observed during surveys at the project site. Should the species be present, there are extensive alternative foraging areas

Special Conservation Interest	Habitat & Closest Proximity	Conservation Objective	Pathway & Potential for Effects
			available within the local landscape, meaning that the potential impact of the project on foraging habitat is likely to be minimal and not significant.
Shelduck (<i>Tadorna tadorna</i>) [A048] (Wintering)	This species winters and forages in sheltered estuaries or tidal mudflats. The closest suitable foraging habitat for shelduck is 20m south from the proposed project site.	To maintain the favourable conservation condition.	Yes Shelduck is a coastal and estuarine duck that typically winters on mudflats, estuaries, tidal lagoons, and sheltered coastal waters. They feed primarily on invertebrates such as molluscs, crustaceans, and worms by dabbling or probing in shallow water and mudflats. There is no suitable foraging habitat within the proposed project site. The project could indirectly affect the species through potential impacts on water quality in connected waterbodies.
Teal (<i>Anas crecca</i>) [A052] (Wintering)	Found on wetlands with good cover, such as reedbeds, estuaries, inland marshes, lakes, ponds, and turloughs. The closest suitable foraging habitat for Teal is 20m south from the proposed project site.	To maintain the favourable conservation condition.	Yes Teal (is a small dabbling duck that typically winters on shallow freshwater habitats, marshes, estuaries, and wet grasslands. They feed by dabbling and grazing, primarily consuming aquatic plants, seeds, and small invertebrates. There is no suitable foraging habitat within the proposed project site. The project could indirectly affect the species through potential impacts on water quality in connected waterbodies.
Pintail (<i>Anas acuta</i>) [A054] (Wintering)	This species flocks on brackish coastal lagoons, in estuaries and on large inland lakes. The closest suitable foraging habitat for pintail is 20m south from the proposed project site.	To maintain the favourable conservation condition.	Yes Pintail is a dabbling duck that typically winters on shallow freshwater habitats, estuaries, and coastal lagoons. They feed mainly by dabbling in shallow water, foraging on aquatic plants, seeds, and invertebrates. There is no suitable foraging habitat within the proposed project site. The project could indirectly affect the species through potential impacts on water quality in connected waterbodies.

Special Conservation Interest	Habitat & Closest Proximity	Conservation Objective	Pathway & Potential for Effects
Scaup (<i>Aythya marila</i>) [A062] (Wintering)	Found on coastal estuaries and bays. The closest suitable foraging habitat for scaup is 20m south from the proposed project site.	To maintain the favourable conservation condition.	Yes Scaup is a diving duck that primarily winters on coastal and inland freshwater habitats, such as lakes, rivers, estuaries, and sheltered bays. They forage by diving underwater, feeding mainly on bivalves, molluscs, and aquatic invertebrates. And there is no suitable foraging habitat within the proposed project site. However, the project could indirectly affect the species by impacting water quality in connected waterbodies, which could in turn reduce the availability of prey for the species.
Ringed Plover (<i>Charadrius hiaticula</i>) [A137] (Wintering)	Found along the coastline and estuaries. The closest suitable foraging habitat for ringed plover is 20m south from the proposed project site.	To maintain the favourable conservation condition.	Yes There is no suitable foraging habitat within the proposed project site. Ringed plovers rely on marine and estuarine habitats rather than inland fields or grasslands. The project could indirectly affect the species through potential impacts on water quality in connected waterbodies.
Golden Plover (<i>Pluvialis apricaria</i>) [A140] (Wintering)	This species feeds on winter cereals, stubbles, grazed pasture and more open areas above the foreshore at coastal locations. There is suitable foraging habitat within the proposed project site for this species.	To maintain the favourable conservation condition.	No There is suitable habitat (farmland/grasslands) within the proposed project site which is within the species core foraging range (3-11km). (SNH, 2016). The species was not observed during surveys at the project site. Should the species be present, there are extensive alternative foraging areas available within the local landscape, meaning that the potential impact of the project on foraging habitat is likely to be minimal and not significant.
Grey Plover (<i>Pluvialis squatarola</i>) [A141] (Wintering)	Found on large muddy estuaries feeding on a wide variety of burrowing intertidal invertebrates, particularly polychaete worms, molluscs and crustaceans. The closest suitable foraging habitat for grey plover is 20m south from the proposed project site.	To maintain the favourable conservation condition.	Yes There is no suitable foraging habitat within the proposed project site. The species was not observed during surveys at the project site. Grey Plover is a coastal and estuarine forager during the winter. They typically feed on

Special Conservation Interest	Habitat & Closest Proximity	Conservation Objective	Pathway & Potential for Effects
			mudflats, sandflats, and other intertidal habitats along coasts and estuaries, probing for invertebrates. The project could indirectly affect the species through potential impacts on water quality in connected waterbodies used by the species for foraging.
Lapwing (<i>Vanellus vanellus</i>) [A142] (Wintering)	Found on wetlands, pasture and rough land adjacent to bogs. There is suitable foraging habitat within the proposed project site for this species.	To maintain the favourable conservation condition.	Yes The project could indirectly affect the species through potential impacts on water quality in connected waterbodies. Any deterioration in water quality could reduce the availability of aquatic and invertebrate prey resources in wetland habitats, thereby negatively affecting the species' foraging success.
Knot (<i>Calidris canutus</i>) [A143] (Wintering)	Found on estuarine sites with extensive areas of muddy sand. The closest suitable foraging habitat for knot is 20m south from the proposed project site.	To maintain the favourable conservation condition.	Yes While there is no suitable breeding or foraging habitat within the proposed project site itself, the project could indirectly affect the species through potential impacts on water quality in connected estuarine and coastal habitats. Any deterioration in water quality could reduce benthic invertebrate prey availability, thereby negatively affecting the species' foraging success.
Dunlin (<i>Calidris alpina</i>) [A149] (Wintering)	This species favours coastal areas, particularly estuaries and tidal mudflats. The closest suitable foraging habitat for dunlin is 20m south from the proposed project site.	To maintain the favourable conservation condition.	Yes The Dunlin is a small wader that it forages primarily on benthic invertebrates. While there is no suitable habitat within the proposed project site, the project could indirectly affect the species through potential impacts on water quality in connected estuarine habitats. Any deterioration in water quality could reduce benthic prey availability, thereby negatively affecting the species' foraging success.
Black-tailed Godwit (<i>Limosa limosa</i>) [A156] (Wintering)	Black-tailed Godwit are largely confined to estuaries, and adjacent wet grassland, with largest numbers recorded on sandy estuaries.	To maintain the favourable conservation condition.	Yes Black-tailed Godwit is a large wader that winters mainly on estuaries, wetlands, and wet grasslands, where it forages on invertebrates within soft sediments and agricultural land. While no suitable habitat occurs

Special Conservation Interest	Habitat & Closest Proximity	Conservation Objective	Pathway & Potential for Effects
			within the proposed project site, the project could indirectly affect the species through potential impacts on water quality in connected waterbodies. Any deterioration in water quality could reduce the abundance of benthic invertebrate prey, thereby negatively impacting the species' foraging opportunities.
Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157] (Wintering)	This species is found on estuaries, intertidal sands and mudflats. The closest suitable foraging habitat for bar-tailed godwit is 20m south from the proposed project site.	To maintain the favourable conservation condition.	Yes Bar-tailed Godwit is a medium-to-large wader that winters mainly on estuaries and intertidal mudflats, where it feeds on benthic invertebrates. There is no suitable habitat within the proposed project site; however, the project could indirectly affect the species through potential impacts on water quality in connected waterbodies. A deterioration in water quality could reduce benthic prey availability, thereby negatively affecting the species' foraging success.
Curlew (<i>Numenius arquata</i>) [A160] (Wintering)	Curlew are found in wetland habitats (coastal and inland). Good feeding areas including damp fields.	To maintain the favourable conservation condition.	Yes There is suitable habitat (wet grassland) within the proposed project site which is within the species core foraging range (1-2km). (SNH, 2016) therefore, there is a potential impact on the species for loss of foraging habitat. A flock of 51 curlew were recorded within the southern section of the proposed project site during the February survey. Should the species be present, there are extensive alternative foraging areas available within the local landscape, meaning that the potential impact of the project on foraging habitat is likely to be minimal and not significant. A deterioration in water quality could reduce benthic prey availability, thereby negatively affecting the species' foraging success.

Special Conservation Interest	Habitat & Closest Proximity	Conservation Objective	Pathway & Potential for Effects
Redshank (<i>Tringa totanus</i>) [A162] (Wintering)	Favours mudflats, large estuaries and inlets. Smaller numbers at inland lakes and large rivers. The closest suitable foraging habitat for redshank is 20m south from the proposed project site.	To maintain the favourable conservation condition.	Yes Redshank is a medium-sized wader associated with estuaries, saltmarshes, mudflats, and wet grasslands, where it forages mainly on invertebrates. While no suitable habitat occurs within the proposed project site, the project could indirectly affect the species through potential impacts on water quality in connected waterbodies. A reduction in water quality may decrease invertebrate prey availability, thereby negatively impacting the species' foraging success.
Greenshank (<i>Tringa nebularia</i>) [A164] (Wintering)	Favour estuaries. The closest suitable foraging habitat for greenshank is 20m south from the proposed project site.	To maintain the favourable conservation condition.	Yes Greenshank is a large wader typically associated with estuaries, tidal flats, saltmarshes, and shallow coastal waters, where it forages primarily on small fish and aquatic invertebrates. While no suitable habitat occurs within the proposed project site, the project could indirectly affect the species through potential impacts on water quality in connected waterbodies. Any deterioration in water quality may reduce prey availability and thus negatively affect the species' foraging success.
Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] (Wintering)	Coastal and inland areas such as grasslands, bogs and marshes.	To maintain the favourable conservation condition.	No The Black-headed Gull is a medium-sized gull that breeds colonially on inland wetlands and forages opportunistically across a wide range of habitats, including estuaries, rivers, lakes, farmland, and coastal areas. No suitable breeding or regular foraging habitat occurs within the proposed project site, and due to its opportunistic feeding behaviour, the project is not expected to have any significant impact on this species, even considering potential indirect effects via water quality in connected waterbodies.

Special Conservation Interest	Habitat & Closest Proximity	Conservation Objective	Pathway & Potential for Effects
Wigeon (<i>Mareca penelope</i>) [A855] (Wintering)	Found in wetlands, marshes, lagoons, estuaries, coastal bays, inland lakes, rivers and turloughs. The closest suitable foraging habitat for wigeon is 20m south from the proposed project site.	To maintain the favourable conservation condition.	No Wigeon is a dabbling duck that winters primarily on shallow freshwater habitats, wet grasslands, and coastal lagoons, feeding on aquatic plants, seeds, and occasionally small invertebrates. No suitable habitat occurs within the proposed project site, and given its mobility and wide availability of alternative foraging areas in the surrounding landscape, the project is not expected to have any significant impact on this species, including via potential indirect effects on water quality.
Shoveler (<i>Spatula clypeata</i>) [A857] (Wintering)	Found in coastal estuaries, lagoons and inland lakes and callows. The closest suitable foraging habitat for shoveler is 20m south from the proposed project site.	To maintain the favourable conservation condition.	Yes Shoveler is a dabbling duck that winters primarily on shallow freshwater habitats, lagoons, and wetlands, feeding on aquatic invertebrates and plant material using its specialized broad bill. No suitable habitat occurs within the proposed project site. There is potential for indirect effects via impacts on water quality.
Wetland and Waterbirds [A999]	Wetlands are located at a hydrological distance of approximately 723.4m and 20m (as the crow flies) south of the proposed project site.	To maintain the favourable conservation condition.	Yes The proposed project site does not contain any wetland habitat. There is potential for indirect effects to waterbird species via impacts on water quality.

8.1.3 Ratty River Cave SAC

The proposed project site is located 4.1km southwest of the of the Ratty River SAC. This SAC consists of a cave which is an important winter roost and breeding site of the lesser horseshoe bat. In 2001, 187 bats were recorded making the site of international importance. The surrounding area contains a stretch of river providing foraging and commuting habitat and a derelict cottage which contains a maternity roost(NPWS, 2014).

The SAC is designated for the following Annex I habitats and Annex II species which are listed and discussed (Table 10.3) in relation to the proposed project below (* indicates priority habitat):

- Caves [8310]
- Lesser Horseshoe Bat (*Rhinolophus hipposideros*) [1303]

Table 8.3 Potential for Effects on the QIs of Ratty River SAC

Qualifying Interest	Habitat & Closest Proximity	Conservation Objective	Pathway & Potential for Effects
Caves [8310]	The SSCO document indicates that this habitat is located 4.5km northeast of the proposed project site.	A conservation objective has not been set for the habitat as it is integrally linked to lesser horseshoe bat, as part of the habitat for the species.	No There is no viable connection between the proposed project site and the habitat. The habitat location is outside of the Zol for impacts, therefore there is no potential for likely significant effects on this QI as a result of the proposed project.
Lesser Horseshoe Bat (<i>Rhinolophus hipposideros</i>) [1303]	The SSCO document indicates that this species is within habitats including a derelict cottage (4.1km) and caves (4.5km) northeast of the proposed project site.	To restore the favourable conservation condition.	Yes The proposed project site contains suitable habitat and provides good commuting habitat (scattered patches of woodland and treelines). Although the proposed project is located outside of the species core foraging range (2.5km) however, as outlined in Eire Ecology Bat Report (APPENDIX B) existing linear landscape features should be retained within 5km of lesser horseshoe bat roosts with 20 bats or more. Therefore, there is a potential impact for likely significant effects on this QI through loss of hedgerows, treelines and patchy woodland.

8.2 ASSESSMENT OF ADVERSE EFFECTS ON SITE INTEGRITY

8.2.1 Potential Impacts on QIs and SCIs

It has been determined, in the absence of appropriate mitigation, the proposed project has the potential for impacts on four of the QIs of the Lower River Shannon SAC due to the potential degradation of water quality, seven SCIs of the River Shannon and River Fergus Estuaries SPA due to habitat loss and, one QI of the Ratty River Cave SAC for habitat loss and disturbance during the proposed project works:

QIs of the Lower River Shannon SAC:

- Brook lamprey (*Lampetra planeri*) [1096]
- River lamprey (*Lampetra fluviatilis*) [1099]
- Atlantic salmon (*Salmo salar*) [1106]
- Otter (*Lutra lutra*) [1355]

SCIs of the River Shannon and River Fergus Estuaries SPA:

- Cormorant (*Phalacrocorax carbo*) [A017]
- Shelduck (*Tadorna tadorna*) [A048]
- Teal (*Anas crecca*)
- Pintail (*Anas acuta*) [A054]
- Scaup (*Aythya marila*) [A062]
- Ringed Plover (*Charadrius hiaticula*) [A137]
- Grey Plover (*Pluvialis squatarola*) [A141]
- Lapwing (*Vanellus vanellus*) [A142]
- Knot (*Calidris canutus*) [A143]
- Dunlin (*Calidris alpina*) [A149]
- Wetland and Waterbirds [A999]

QI of the Ratty River Cave SAC:

- Lesser Horseshoe Bat (*Rhinolophus hipposideros*) [1303]

8.2.2 Conservation Objectives of the European Sites

European and national legislation places a collective obligation on Ireland and its citizens to maintain or restore habitats and species in the Natura 2000 Network to favourable conservation condition. Ireland has determined conservation objectives for European sites, which define favourable conservation condition for habitats and species protected under the Habitats Directive and Birds Directive.

Site-specific conservation objectives have been set by the NPWS for each of the listed QIs of the Lower River Shannon SAC, the River Shannon and River Fergus Estuaries SPA, and the Ratty River Cave SAC. The NPWS (2012a) Conservation Objectives state that:

'A site-specific conservation objective aims to define favourable conservation condition for a particular habitat or species at that site. The maintenance of habitats and species within the Natura 2000 network at favourable conservation condition will contribute to



the overall maintenance of favourable conservation status of those habitats and species at a national level'.

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.

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.

An assessment of whether the potential impacts, identified in Section 8.2.1 could adversely affect the integrity of the Lower River Shannon SAC, the River Shannon and River Fergus Estuaries SPA, and the Ratty River Cave SAC was undertaken in relation to the attributes, measures and targets that would be expected to define the favourable conservation condition of the QIs the SACs and the SCIs of the SPA. This assessment is presented in Table 8.4, Table 8.5 and Table 8.6 below.

Table 8.4: Evaluation of Potential Adverse Effects on the Conservation Objectives of the Lower River Shannon SAC as a Result of the Proposed Project

Attributes	Measures	Target	Potential for Adverse Effects
[1096] Brook Lamprey (<i>Lampetra planeri</i>)			
Distribution	% of river accessible	Access to all water courses down to first order streams.	There will be no instream works undertaken within this SAC as part of the proposed project, as such there is no potential for the proposed project to inhibit accessibility through river channels within the SAC. Therefore, there is no potential for adverse effect on the integrity of the site.
Population structure of juveniles	Number of age/size groups	At least three age/size groups of brook/river lamprey present.	The proposed project has the potential to result in the degradation of water quality to the Urlan Beg_010 and the Cloverhill Stream_010 which flows into the SAC. Unfavourable water quality conditions could impact upon the population structure of juveniles, juvenile density in fine sediment, extent of spawning habitat and availability of juvenile habitat within the watercourses by impeding upon the availability of suitable fine sediment habitat and necessary/favourable water chemistry conditions for brook lamprey. Such impacts to the water column and suitable habitat would constitute an adverse effect on the integrity of the site .
Juvenile density in fine sediment	Juveniles/m ²	Mean catchment juvenile density of brook/river lamprey at least 2/m ² .	
Extent and distribution of spawning habitat	m ² and occurrence	No decline in extent and distribution of spawning beds.	
Availability of juvenile habitat	Number of positive sites in 2 nd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive.	
[1099] River Lamprey (<i>Lampetra fluviatilis</i>)			
Distribution: extent of anadromy	% of river accessible	Access to all water courses down to first order streams.	There will be no instream works undertaken within this SAC as part of the proposed project, as such there is no potential for the proposed project to inhibit accessibility through river channels within the SAC. Therefore, there is no potential for adverse effect on the integrity of the site.
Population structure of juveniles	Number of age/size groups	At least three age/size groups of river/brook lamprey present.	The proposed project has the potential to result in the degradation of water quality to the Urlan Beg_010 and the Cloverhill Stream_010 which flows into the SAC.
Juvenile density in fine sediment	Juveniles/m ²	Mean catchment juvenile density of brook/river lamprey at least 2/m ² .	Unfavourable water quality conditions could impact upon the population structure of juveniles, juvenile density in fine sediment, extent of spawning habitat and availability of juvenile habitat within the watercourses impeding upon the

Attributes	Measures	Target	Potential for Adverse Effects
Extent and distribution of spawning habitat	m ² and occurrence	No decline in extent and distribution of spawning beds.	availability of suitable fine sediment habitat and necessary/favourable water chemistry conditions for river lamprey.
Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive.	Such impacts to the water column and suitable habitat would constitute an adverse effect on the integrity of the site.
[1106] Atlantic Salmon (<i>Salmo salar</i>)			
Distribution: extent of anadromy	% of river accessible	100% of river channels down to second order accessible from estuary.	There will be no instream works undertaken within this SAC as part of the proposed project, as such there is no potential for the proposed project to inhibit accessibility through river channels within the SAC. Therefore, there is no potential for adverse effect on the integrity of the site
Adult spawning fish	Number	Conservation Limit (CL) for each system consistently exceeded.	The proposed project has the potential to result in the degradation of water quality and habitat, which could result in impacts on the CL of the Lower River Shannon SAC. A decrease in adult spawning fish would constitute an adverse effect on the integrity of the site.
Salmon fry abundance	Number of fry/5 minutes electrofishing	Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5 min sampling.	The proposed project has the potential to result in the degradation of water quality to the Urlan Beg_010 and the Cloverhill Stream_010 which flows into the SAC. Unfavourable water quality conditions could impact upon the number of adult spawning fish, salmon fry and out-migrating smolt abundance, number and distribution of redds within the Urlan Beg_010 and the Cloverhill Stream_010 and associated waterbodies by impeding upon the availability of suitable fine sediment habitat and necessary/favourable water chemistry conditions for Atlantic salmon.
Number and distribution of redds	Number and occurrence	No decline in number and distribution of spawning redds due to anthropogenic causes.	
Out-migrating smolt abundance	Number	No significant decline.	
			Such impacts to the water column and suitable habitat would constitute an adverse effect on the integrity of the site.

Attributes	Measures	Target	Potential for Adverse Effects
Water quality	EPA Q value	At least Q4 at all sites sampled by EPA.	The proposed project has the potential to result in the degradation of water quality to the Urlan Beg_010 and the Cloverhill Stream_010 which flows into the SAC. The degradation of water quality due to the proposed project could prevent the watercourse from achieving Q4 water quality status. A degradation in water quality would constitute an adverse effect on the integrity of the site.
[1355] Otter (<i>Lutra lutra</i>)			
Distribution	Percentage positive survey sites	No significant decline.	The proposed project may result in the disturbance of otter due to the presence of onsite vehicles and construction machinery associated with the proposed project. There are no instream works proposed, however HDD could result in noise and vibration disturbance. Works will take place during daylight hours (and as such no temporary lighting will be required during the works). Otter is known to be relatively tolerant of disturbance (Bailey and Rochford, 2006) and are generally more active at night, this temporary disturbance would not be considered to have an adverse effect on the distribution of otter within the SAC.
Extent of terrestrial habitat	Hectares	No significant decline. Area mapped and calculated as 596.8ha above high water mark (HWM); 958.9ha along riverbanks / around ponds.	The proposed project will take place within predominantly improved agricultural grassland, which is deemed unfavourable habitat for this species. The proposed project habitat loss will be outside of the Lower River Shannon SAC. Due to the low value and unsuitability of the habitat (improved grassland) for otter within the TWA, there is no potential for impact on the extent of terrestrial and/or marine habitat for otter.
Extent of marine habitat	Hectares	No significant decline. Area mapped and calculated as 4,461.6 ha.	The proposed project will not result in any decline in marine habitat, as no works will occur outside the proposed project site. There is, therefore, no potential for adverse effects.
Extent of freshwater (river) habitat	Kilometres	No significant decline. Length mapped and calculated as 500.1km.	No activities are proposed for the proposed project that could cause erosion or destabilisation of watercourses or riverbanks within the Lower River Shannon SAC.
Extent of freshwater (lake) habitat	Hectares	No significant decline. Area mapped and calculated as 125.6 ha.	The proposed project will not result in any decline in the freshwater lake habitat, as no works will occur outside the proposed project site. There is, therefore, no potential for adverse effects.

Attributes	Measures	Target	Potential for Adverse Effects
Couching sites and holts	Number	No significant decline.	No holts or couching sites were recorded within or in the vicinity of the proposed project site. The proposed project will not result in the loss or decline in couching sites or holts, as none were recorded within the proposed project site, and there are no instream works proposed. There is, therefore, no potential for adverse effects.
Fish biomass available	Kilograms	No significant decline.	The potential degradation of water quality within the Urlan Beg_010 and the Cloverhill Stream_010 which flows into the SAC could affect the availability of fish biomass to otter. The runoff or discharge of bentonite to this waterbody could result in a decline in available feeding resources for otter. A significant decline in fish biomass available for otter would constitute an adverse effect on the integrity of the site.
Barriers to connectivity	Number	No significant increase	The proposed project will not result in any barriers along the Urlan Beg_010 or the Cloverhill Stream_010. The works will occur outside the proposed project site. There is, therefore, no potential for adverse effects.

Table 8.5 Evaluation of Potential Adverse Effects on the Conservation Objectives of the River Shannon and River Fergus Estuaries SPA as a Result of the Proposed Project

Attributes	Measures	Target	Potential for Adverse Effects
Cormorant (<i>Phalacrocorax carbo</i>) [A017] Shelduck (<i>Tadorna tadorna</i>) [A048] Teal (<i>Anas crecca</i>) Pintail (<i>Anas acuta</i>) [A054] Scaup (<i>Aythya marila</i>) [A062] Ringed Plover (<i>Charadrius hiaticula</i>) [A137] Grey Plover (<i>Pluvialis squatarola</i>) [A141] Lapwing (<i>Vanellus vanellus</i>) [A142] Knot (<i>Calidris canutus</i>) [A143] Dunlin (<i>Calidris alpina</i>) [A149]			
Population trend Percentage change Long term population trend	Percentage change	Long term population trend stable or increasing	There is suitable foraging habitat within the proposed project site, however, the loss of this habitat would not be substantial due to the availability of this habitat within the surrounding area and therefore will not result in an adverse effect on the species population.
Distribution Range, timing and	Range, timing and intensity of use of Areas	There should be no significant decrease in the range, timing or intensity of use of areas by species other than that occurring from natural patterns of variation	The suitable habitat within the proposed project is minimal, the loss of this habitat would not be substantial and will not result in an adverse effect on the species population.
Wetland and Waterbirds [A999]			
Wetland habitat area	hectares	The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 32,261ha, other than that occurring from natural patterns of variation	No loss of this habitat is anticipated and therefore there will not result in an adverse

Table 8.6 Evaluation of Potential Adverse Effects on the Conservation Objectives of the Ratty River Cave SAC as a Result of the Proposed Project

Attributes	Measures	Target	Potential for Adverse Effects
[1303] Lesser Horseshoe Bat (<i>Rhinolophus hipposideros</i>)			
Population per roost	Number	Minimum number of 165 bats for the winter roost (roost id. 51 in NPWS database); minimum number of 100 bats for the summer roost (roost id. 05).	The proposed project is located 4.1km from the maternity roost. Due to the distance there is no potential for adverse effects on the population or condition of the summer or winter roost.
Winter roosts	Condition	No decline	
Summer roosts	Condition	No decline	
Auxiliary roosts	Number and condition	No decline	
Extent of potential foraging habitat	Hectares	No significant decline within 2.5km of qualifying roosts	The proposed project site is outside of the 2.5km buffer set out in the SSCO target therefore, there is no potential for adverse effects on the extent of the foraging habitat or linear features within the SAC.
Linear features	Kilometres	No significant loss within 2.5km of qualifying roosts	
Light pollution	Lux	No significant increase in artificial light intensity adjacent to named roosts or along commuting routes within 2.5km of those roosts	There is no proposal to install artificial lighting within the site. Therefore, there is no potential for adverse effects as a result of artificial lighting.

8.3 IN COMBINATION EFFECTS

8.3.1 Overview

As described in Section 7.3, the potential in-combination effects were screened out for the following:

- GP Joule (Planning Ref: 24435): the application for this project has been withdrawn, consequently, the project will not proceed.
- John Callinan Munster Footgolf (Planning Ref: 2460459): No significant in-combination effects are anticipated; in-combination effects on European sites can be excluded.
- Kieran Kelly Haulage Ltd. (Planning Ref: 2360568): No significant in-combination effects are anticipated; in-combination effects on European sites can be excluded.
- Other Small-Scale Developments: No potential for significant in-combination effects; in-combination effects on European sites can be excluded.
- Relevant Plans: No plans were identified that would result in likely significant in-combination effects negative effects with the proposed project.

In contrast, the following two projects have been brought forward here to the Stage Two AA NIS (see Section 8.3.2 below):

- Terra Solar (Planning Ref: 1731)
- Terra Solar (Planning Ref: 18585)
- GP Joule (Planning Ref: 25260)

8.3.2 Assessment of In-Combination Effects: BNRG Project and Nearby Solar Developments (Planning Refs: 25260, 1731, 18585)

The proposed BNRG solar project is located within a broader area of solar development in County Clare. Three nearby projects have been considered for potential in-combination effects:

- **GP Joule – Mogullaun, Crossagh, Rathlaheen South, Culleen, Drumline, and Ballycasey Beg (Planning Ref: 25260)**
GP Joule submitted a planning application in August 2025 for a 95-hectare solar PV farm designed to operate for 35 years. A Screening for Appropriate Assessment (AA) and Natura Impact Statement (NIS) were submitted to evaluate potential effects on local biodiversity and nearby European sites, including SACs and SPAs. These assessments addressed direct impacts (habitat loss, disturbance to species) and indirect impacts (changes to water quality, hydrological connectivity, and availability of foraging or roosting habitats), along with potential in-combination effects with nearby developments.
- **Terra Solar – Firgrove, Sixmilebridge (Planning Ref: 1731)**
Planning permission was granted for a 34,300 m² solar farm, comprising ground-mounted panels on steel frames, a substation, underground cabling, and the demolition of a derelict cottage. The project will connect to the national grid via the Drumline 110kV Substation. The site is located immediately north and west of the proposed BNRG project site.
- **Terra Solar – Clonloghan, Caherteige (Planning Ref: 18585)**

Planning permission was granted for a 63,000 m² development, including ground-mounted solar panels, a substation, four inverter/transformer stations, a battery storage module, security fencing, CCTV, internal access tracks, an agricultural bridge, drainage works, and a new site entrance from the R472. A 10-year permission period was granted to facilitate project delivery and commissioning.

Assessment of Potential In-Combination effects Impacts

While there is some limited hydrological and ecological connectivity between the BNRG project site and the nearby GP Joule and Terra Solar developments, this connectivity is minimal and does not result in overlapping impacts on SACs or SPAs. Key considerations include:

- **Hydrology and Water Quality:** Some connections via local drainage and watercourse patterns exist, but each development has independent surface water management, drainage design, and sediment control measures in place. These measures prevent any additive effects on hydrologically connected habitats or water-dependent species.
- **Habitat Loss or Disturbance:** The projects occupy separate land parcels. Habitat modification and vegetation clearance are confined to individual sites. Even with limited ecological connectivity, mitigation measures such as habitat retention, enhancement, and strategic placement of buffers ensure there is no cumulative loss of critical habitats.
- **Ornithology and Ecology:** Bird foraging, roosting, and commuting ranges, as well as qualifying interests of nearby SACs (e.g., bats, flora), are largely site-specific. Where minor overlap in usage may occur, careful timing of works, habitat protection, and species-specific mitigation prevent compounding effects.
- **Mitigation Measures:** Each project includes robust mitigation measures, including controlled construction timing, erosion and sediment management, habitat enhancement, and ecological monitoring. The implementation of these measures across all sites ensures that indirect or cumulative pressures are avoided.

Conclusion

Despite the presence of some limited hydrological and ecological connectivity between the BNRG project and nearby GP Joule and Terra Solar developments, the combination of site-specific mitigation and spatial separation ensures that no in-combination effects are anticipated. All projects operate effectively independently regarding their potential impacts on SACs, SPAs, and other ecological receptors, and no significant in-combination effects on European sites are expected

8.4 MITIGATION MEASURES

The assessment concluded that the proposed project, in the absence of appropriate mitigation measures, could result in an adverse effect on the Lower River Shannon SAC, the River Shannon and River Fergus SPA and River Ratty SAC.

For the purpose of Article 6(3) of the Habitats Directive, the mitigation measures prescribed hereunder will avoid and/or reduce the significance of the potential impacts from the proposed project and prevent the occurrence of significant adverse effects on European sites (Section 8.1.1 through Section 8.1.3).

The mitigation measures are prescribed with regards to the EC Guidance (EC 2021a) which requires mitigation by avoidance as a first approach, the guidelines states that:

'The hierarchy of mitigation measures suggests first avoidance (i.e. preventing significant impacts from happening in the first place) and then reduction of impact (i.e. reducing the magnitude and/or likelihood of an impact).'

In addition, the guidelines further states that:

- *'Each mitigation measure must be described in detail, specifying how it will eliminate or reduce the adverse impacts identified, and how, when and by whom it will be implemented. The following aspects must be indicated:*
- *The impacts concerned that the mitigation measures aim to address, including information on relevant parameters (e.g. the area of the habitats of Community interest subject to deterioration and their conservation degree in the site, the species population subject to disturbance).*
- *The expected results from implementing the proposed mitigation measures, with reference to each parameter (e.g. habitat area, species population numbers or structure and functions).*
- *Technical-scientific feasibility and degree of effectiveness expected of the proposed measures.*
- *The person or body in charge of implementation.*
- *The management of the area where the mitigation measures will be implemented (methods, duration).*
- *The location and timing of the measures with relation to the plan or project.*
- *The methods for checking implementation of the measures.*
- *The financing of the measures.*
- *The monitoring programme to verify the effectiveness of the measures and adapt them if necessary.'*

The above guideline recommendations have been considered within the proposed mitigation measures, which are outlined hereunder.

8.4.1 Habitats and Protected Fauna

8.4.1.1 Habitats and Fauna

The Biodiversity Enhancement Management Plan (BEMP) included as 10 in this report, is designed to protect and strengthen local habitats while supporting a wide range of species, in line with national and regional biodiversity strategies. The approach prioritises the safeguarding of existing high-value habitats such as woodlands, scrub and hedgerows, while introducing targeted measures to enhance biodiversity across the site.

Hedgerows and treelines, which are vital corridors for birds, bats and other wildlife, will be protected by a 5-metre buffer. Any sections that must be removed will be reinstated with native Irish provenance species, and existing hedgerows will be bolstered with additional planting of shrubs and trees that provide food and shelter. These will be managed on a rotational cycle to maximise their value for nesting birds, pollinators and insects.

Areas of woodland and scrub that remain untouched (parcel 2 and parcel 3) will allow natural succession to occur, while new woodland pockets will be planted to improve habitat connectivity.

Grassland areas will be diversified, with some managed as species-rich hay meadows, others as wet grassland to benefit breeding waders, and grassy verges maintained to support butterflies, invertebrates and small mammals.

Fauna will be supported through specific interventions. Nest boxes will provide safe breeding opportunities for a range of bird species, while bat boxes will be installed to create additional roosting sites alongside enhanced foraging and commuting routes. Known badger areas will be protected, and hedgerow planting will include food-bearing shrubs such as elder to sustain them. Invertebrates will benefit from a chemical-free management regime, along with the creation of log piles, bee scrapes, insect hotels and specially designed bee posts to encourage pollinators and other beneficial species.

Biosecurity is a key component of the plan, with strict measures in place to prevent the introduction or spread of invasive species during construction and site management. Finally, a comprehensive monitoring programme will track the success of these measures at intervals over the life of the development.

8.4.1.2 Bats

Bat mitigation (as outlined by Eire Ecology in the Bat Report included in APPENDIX B) is proposed as follows:

- Buffer zones around the SAC
- Buffer zones around the hedgerows
- Hedgerow creation and enhancement

With the implementation of the above mitigation as detailed in APPENDIX B, any negative impacts on bats in the surrounding environment will be temporary, with positive end results, once existing hedgerows are bolstered and new hedgerows are planted

8.4.2 Protection of Aquatic Habitats – Sediment Control

The following mitigation measures are prescribed to ensure the prevention of water quality degradation due to the runoff of construction pollution during the construction works:

- Works within and adjacent to watercourses will be suspended during periods of heavy rainfall (i.e. greater than 10mm/hour or greater than 25mm in a 24-hour period);
- Excavations will be covered with tarp or similar material, during high rainfall to avoid the creation of surface water with high concentrations of suspended solids that would require dewatering;
- During lighter rain periods, the time period over which excavations are left open will be reduced;
- Excavated materials temporarily stockpiled will be stored away from watercourses and drainage paths during the installation works to minimise generating sediment laden runoff during the works;
- Silt fences will be constructed within the immediate vicinity of the proposed works to prevent the runoff of sediment entering the river;
- Silt fences will be constructed using a permeable filter fabric (Hy-Tex Terrastop Premium silt fence or similar) and not a mesh. The silt fences will be positioned to allow an appropriate working area, but should not occur within areas prone to flood, or below the high-water mark. Silt fencing will be installed as per the manufacturer's guidelines and shall be maintained until vegetation on the disturbed

ground has been re-established. Once installed, the silt fence will be inspected regularly during construction and more frequently during heavy rainfall; and

- Dewatering of excavations will be avoided where possible. If required, this will be achieved by pumping excess water to settlement tanks or filtration systems located at the construction site, where the water will be retained for a sufficient length of time to allow particles to settle. Silt de-watering bags will be used when water is being discharged to ground. This discharged water will be within prescribed water quality limits (i.e. $\leq 25\text{mg/L}$ Total Suspended Solids [TSS] in accordance with the Freshwater Fish Directive [2006/44/EC] and Salmonid Waters Regulations [1988]).

8.4.3 Protection of Habitats – Pollution Control

- All works must align with the guidance set out in the Guidance document entitled: Control of Water Pollution from Construction Sites. Guidance for consultants and contractors (C532) (CIRIA, 2001);
- A 24-hour, seven day week Emergency Response protocol will be drawn up, included in the CEMP and implemented. This Protocol must be implementable in the unlikely event of an accidental spillage of chemicals, hydrocarbons or release of sediment to the surface or groundwater system. A spill method statement will be drawn up which all personnel must adhere to and receive training in;
- Storage locations for excavated materials, equipment, hydrocarbons (including fuels for machinery) will be designated prior to commencement of works. Excavated materials will not be stored within 50 m of any ditches, dry or wet, watercourses or wetland areas. Site compounds must also be located at least 20 m from an aquatic feature;
- Transformers and all fuel will be stored in bunded areas, exclusively at a marked area within the construction compound. The bund capacity will be sufficient to accommodate 110% of the largest tank's maximum capacity or 25% of the total maximum capacities of all tanks, whichever is the greater. The exception to this being double walled tanks equipped with leak detection, which do not require additional retention;
- Spill-kits and hydrocarbon absorbent packs will be stored in the cabin of each vehicle and operators will be fully trained in the use of this equipment. An oil spill response plan will be developed for the construction works and included as a part of contractor Tool box talks;
- Refuelling of construction equipment and the addition of hydraulic oil or lubricants to vehicles/equipment will take place in designated hard surface bunded areas within the construction compound, and not on-site. If it is not possible to bring machinery to the refuelling point, fuel will be delivered in a double-skinned mobile fuel bowser. A drip tray will be used beneath the fill point during refuelling operations in order to contain any spillages that may occur;
- All machinery will be regularly maintained and checked for leaks. Servicing must be undertaken at the construction compound which is located offsite. In emergency situations where services need to occur onsite, they will not be undertaken within 50 m of aquatic features, including dry drainage ditches;
- All concrete will be mixed off site and imported into the site. All concrete browsers will be washed down at a dedicated concrete washout offsite at least 50 m from a drainage ditch or watercourse. Concrete washings must not be disposed of onsite to any surface or ground water feature. All washings will be removed offsite and treated at a licensed facility;



- No chemicals that are deleterious to aquatic organisms are to be used in cleaning works. All raw, uncured waste concrete must be cured at a designated location, offsite and at least 50 m from any aquatic feature or dry drainage ditch; and
- On completion of the works, all apparatus, plant, tools, offices, sheds, surplus materials, rubbish and temporary erections or works of any kind will be removed from the site.

8.4.4 Dust and Air Pollution Control

Potential impacts during the construction stage arising from dust emissions and air pollution will be minimised through the provision of mitigation measures which include:

- Minimisation of extent of working areas.
- Use of a self-contained wheel wash.
- Stockpiling of excavated materials will be limited to the volumes required to practically meet the construction schedule.
- Daily inspections by site personnel to identify potential sources of dust generation along with implementation measures to remove causes where found.
- Use of dust suppression measures (e.g., sweeps / covers/ water bowzers) on stockpiles and the road surface during periods of extended dry weather.
- All machines shall be suitably maintained to ensure that emissions of engine-generated pollutants shall be kept to a minimum in accordance with 'Measures Against the Emission of Gaseous and Particulate Pollutants from Internal Combustion Engines to be Installed in Non-Road Mobile Machinery' (2002/88/EC) and 'Emissions of Pollutants from Diesel Engines' (2005/21/EC).
- Vehicles will not be left running unnecessarily and low emission fuels will be used where possible.

8.4.5 Noise Management

To minimise disturbance to wildlife and reduce the risk of behavioural changes in sensitive species, a series of targeted mitigation measures will be implemented throughout the construction and operational phases.

- Construction Phase
 - Construction Scheduling:
 - Limit high-noise activities (e.g. excavation, machinery operation) to daytime hours to avoid disturbance to nocturnal wildlife.
 - Avoid early morning, late evening, and night-time operations where feasible.
 - Equipment Management:
 - Use machinery and vehicles with low-noise specifications and maintain equipment to prevent unnecessary noise.
 - Position stationary machinery as far as possible from sensitive habitats.
- Operational Phase
 - MV Station Placement:
 - Locate MV stations, and other operational plant away from sensitive habitats to minimise noise impact.
 - Noise-Optimised Equipment:

- Use low-noise MV stations where possible, and maintain equipment regularly to prevent noise escalation over time.
- Buffer Zones:
 - Maintain buffer zones between operational equipment and wildlife habitats. Vegetation can be enhanced to provide additional acoustic screening.

8.4.6 Monitoring

Monitoring is a key component of biodiversity management, aimed at of enhancement measures and ensuring habitats and species are maintained or improved over time. A qualified ecologist will carry out monitoring, establish baseline conditions, and report findings to the planning authority.

Key Elements and Activities:

- Hedgerows and Treelines: Check for damage, gaps, and species diversity to maintain structurally dense, species-rich corridors (Years 1, 5, 10, 20; summer).
- New Woodland: Assess tree health, growth, and habitat development to ensure connectivity with existing woodland (Years 1, 5, 10, 20; summer).
- Grasslands: Inspect vegetation condition and advise on stocking rates to maintain flower-rich, semi-natural grassland (Years 1, 5, 10, 20; summer).
- Bird Boxes: Annually inspect for occupation, integrity, and cleanliness (winter).
- Bat Boxes: Annually check for occupation and structural condition (summer).
- Invertebrates: Inspect bee posts, log piles, and scrapes for use by target species and other invertebrates (annually; summer).

The monitoring programme ensures that biodiversity measures, identifies any issues early, and supports adaptive management throughout the life of the development

8.4.7 Biosecurity Measures

Although no non-native invasive plant species included in the Third Schedule Part 1 of the European Communities Regulations (S.I. 477/2011) were recorded during baseline surveys, the spread and introduction of alien invasive species and noxious weeds will be avoided by adopting appropriate mitigation measures as per guidance issued by the NRA (2010) and IFI with respect to the protocols developed for the control of the spread of alien species to the aquatic environment. The presence of alien invasive species and requirement for actions will be confirmed by the ECoW. The following measures to reduce the risk of the spread of alien species will be incorporated into the CEMP:

- Prior to arrival on site the contractor's vehicles and equipment must be thoroughly cleaned at the entrance to the site. High-pressure steam cleaning, with water > 60 °C, is recommended for vehicles and equipment where reasonably feasible. If it is not possible to steam clean the equipment, a normal power hose must be used. After cleaning, the operator should visually inspect the equipment to ensure that all adherent material and debris have been removed;
- Each individual entering/leaving the site should visually inspect all equipment (including footwear) that has come into contact with water or soils for evidence of attached plant or animal material, or adherent mud or debris. This should be done before entering and

leaving the site. Remove any attached or adherent material before entering or leaving the site of operation;

- All Contractors will be required to sign a prepared form detailing the nature of the cleaning process carried out and the date on which this was conducted; and
- The ECoW will be responsible for keeping a logbook with records of all the inspections and all relevant information.

8.4.8 Mitigation Specific to Horizontal Directional Drilling

- A competent Contractor will be appointed to undertake the trenchless construction works;
- The Contractor will prepare a trenchless construction Method Statement which will outline the standard approach for the construction. The Method Statement will include a contingency plan for break-out and for excessive ground settlement;
- The Contractor will undertake the trenchless construction in accordance with industry best practice including British Standard EN 16191:2014 Tunnelling machinery, safety requirements and CIRIA C648 "Control of water pollution from linear construction projects Technical Guidance";
- To prevent loss of bentonite or 'frac-out' from occurring, a series of actions will be implemented. The drill fluids operator will monitor drill fluid density, viscosity and solids content on an ongoing basis, to ensure that the fluid does not increase in viscosity, requiring additional pressure to maintain mobility;
- In critical cases, viscometers will be used to measure drill fluid gel strength and shear strength. Filtrate can also be measured to calculate the amount of filter cake building up on the internal wall of the bore. Any increases in pump pressure experienced by the drill operator will be investigated immediately to prevent the risk of pressure build up within the annulus. In some circumstances, dependant on the drilling equipment used, the pilot drill borehole assembly will be fitted with a down hole pressure monitor to measure pressure in the annulus between the drill and the bore wall. This will give an early indication of pressure build up in the hole and allow the drill operator to prevent a 'break-out'. If there is a risk of a 'frac-out' a number of measures will be implemented including (1) pumping a pill of drilling fluid with a higher density to the risk zone (2) circulate and pump loss circulation material (typically cork or manufactured inert polymers) to the risk zone to seal the risk zone, grouting of the risk zone, and, or launch a packer before the risk zone;
- The Contractor will implement procedures to maximise the recirculation or reuse of drilling mud to minimise waste disposal;
- Disposal of drilling fluids will be the responsibility of the Contractor to an approved and licenced waste facility;
- Monitoring of the drilling operations will be undertaken at all times by the Contractor. The monitoring will include visual inspection of the pits and monitoring of the volume of returns flowing back to the entry pit. The monitoring personnel will be in constant communication with the drilling rig operator and thus will be able to immediately cease drilling if necessary;
- Buffer strips of natural uncleared vegetation shall be preserved between construction activity. The launch and reception pits will be situated outside of the riparian zone. A buffer zone width for smaller channels (<10m) of 20m or greater will be maintained; and

- In addition, the ECOW will undertake sediment monitoring both upstream and downstream of the trenchless construction works.

8.4.9 Management of Material Disposal

Some minor material waste will be generated as a result of the proposed project. This waste will be removed to a licenced facility or will be reinstated into the landscaping where possible. All waste will be removed from the site and disposed of by an approved waste contractor in accordance with prevailing waste management regulations.

8.5 MITIGATION EFFECTIVENESS

The appointed Contractor will be responsible for ensuring all mitigation measures listed above, including any additional planning conditions, are fully implemented prior to the proposed project commencing and undertaken throughout the duration of the works.

The above outlined mitigation measures are best practice and are proven technologies/methods. The mitigation measures, once correctly applied, will avoid or reduce the magnitude of potential impacts on the receiving environment.

9. CONCLUSION

This NIS has been prepared following the Department of the Environment, Heritage and Local Government guidance '*Appropriate Assessment of Plans and Projects in Ireland; Guidance for Planning Authorities*'. The function of this report is to assist and provide sufficient objective scientific information to the competent authority with undertaking an Appropriate Assessment in accordance with the Habitats Directive, Part XAB of the Planning and Development Act 2000 and case law.

The assessment considers whether the proposed development, alone or in-combination with other projects or plans, will result in likely adverse effects on the integrity of any European site within the ZOI of the proposed development and includes any mitigation measures necessary to avoid or reduce the risk of such adverse effects.

In absence of mitigation, the potential risk to the Lower River Shannon SAC, the River Shannon and River Fergus Estuaries SPA, and Ratty River SAC is the potential for habitat loss, degradation of water quality and disturbance. However, following the application of the detailed mitigation measures, any adverse effects will be avoided. Consequently, it is concluded that no adverse effects will occur on the QIs or SCIs of European site, nor on the overall integrity of European sites, and the conservation objectives will not be compromise.

In line with the provisions of Article 6 of the Habitats Directive 92/43/EEC, an analysis and evaluation of the relevant information including, in particular, the nature of the proposed development, including mitigation measures, characteristics of the QIs, the potential link between the proposed development and the European Sites, no adverse effects on the integrity of any European sites during the proposed development at Ballycunneen, County Clare is anticipated, either alone or in-combination with any other plans or projects, and there is no scientific doubt in relation to this conclusion.

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APPENDIX B. EIRE ECOLOGY BAT REPORT

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