Limerick City & County Council

Supporting Information for Screening for Appropriate Assessment

Limerick Flood Relief Scheme

MCW1078-RPS-O5-ZZ-RP-Z-0101

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Tetra Tech Ireland Limited. Registered in Ireland: No. 161581
Registered Office: West Pier Business Campus, Old Dunleary Road, Dún Laoghaire, Co. Dublin, A96 N6T7, Ireland

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Prepared by	Prepared for
Tetra Tech	**Limerick City & County Council**

Executive Summary

The Limerick City and Environs Flood Relief Scheme (hereafter referred to as the Limerick FRS) is located within the Shannon Upper and Lower River Basin and is subject to both coastal and fluvial flooding. The objective of the overall project is the identification, design and submission (for planning consent) of a flood relief scheme, that is technically, socially, environmentally and economically acceptable, to alleviate the risk of flooding to the community of Limerick to a determined standard of protection, and to procure, manage and oversee the construction of that scheme.

This report has been prepared by Tetra Tech, on behalf of Limerick City & County Council (LCCC), in support of a Maritime Usage Licence Application (MULA) to the Maritime Area Regulatory Authority (MARA). Site investigation (SI) works are required to inform the detailed construction and engineering design of the Limerick FRS and to provide baseline data for any subsequent environmental assessments. Information collected by the SI works will support the overall Limerick FRS project in its aim to alleviate coastal and fluvial flooding in Limerick City and surrounding areas. Therefore, this Maritime Usage Licence (MUL) represents a critical step towards supporting future climate resilience within the community of Limerick.

The SI works comprise geophysical, geotechnical and environmental surveys below the High-Water Mark (HWM) within the Shannon Estuary, as summarised below:

- Land-based geophysical (topographical) surveys (below the HWM)
- Geotechnical surveys (51No. boreholes and SPT's);
- Marine (boat-based) geophysical surveys; and
- Marine environmental surveys (benthic grab samples).

This Supporting Information for Screening for Appropriate Assessment (SISAA) report has been prepared to provide all necessary information to allow MARA to complete a Screening for Appropriate Assessment of the potential for Likely Significant Effects on European sites, in view of their conservation objectives, arising from the SI works either individually or in combination with other plans or projects.

The overall findings of this SISAA are as follows.

1. The SI works are not connected with or necessary to the management of the nature conservation interest of any European site.
2. Intrusive geotechnical investigations and environmental grab sampling will take place within the Shannon Estuary. Sampling locations will be discrete and confined to the area of investigation, however, without further information on locations, there is potential for loss of, or damage to, qualifying interest (QI) habitats in Lower River Shannon Special Area of Conservation (SAC) (002165). Intrusive sampling techniques

also have the potential to cause increased suspended sediment concentration (SSC)/smothering/water quality impacts.

3. The SI works, in the absence of mitigation, have the potential to contribute to the introduction/spread of invasive species which may impact the QI habitats in the Lower River Shannon SAC.
4. The instructive sampling and land-based SI works will not interact with otter couches or holts below the HWM, therefore likely significant effects due to habitat loss, alteration or fragmentation can be excluded. Due to the current baseline of activity in the areas adjacent to the MUL Area and the limited live sightings of otter within and in close proximity to the MUL Area (three sightings most recently in 2023), likely significant effects due to above-water noise, vibration impacts can be excluded for otters of the Lower River Shannon SAC. Underwater noise impacts can also be excluded as risk ranges for auditory injury and temporary threshold shift (TTS) are less than 10 m from the sound source without any mitigation applied. Disturbance ranges are within 1.4 km for the geophysical survey, however the presence of the vessel along with current baseline activity in the area i.e. commercial and residential will cause otters to likely avoid the area.
5. No likely significant effects to harbour seal (*Phoca vitulina*) and grey seal (*Halichoerus grypus*) from above-water noise due to the proposed SI works will occur due to the lack of haul out sites within the MUL Area and the lack of seal sightings within the MUL Area. The nearest SAC for seals is over 86 km (Galway Bay Complex SAC for harbour seal) by sea. Therefore, likely significant effects from above-water noise disturbance due to the proposed SI works can be excluded. Likely significant effects due to habitat loss, alteration and fragmentation can also be ruled out given the limited nature and scale of the proposed works equating the total area of impact to 417.9 m^2 which is 0.00897% of the MUL Area (466 ha). The marine geophysical and geotechnical surveys will introduce subsea noise that has the potential to impact on bottlenose dolphin (*Tursiops truncates*) QI of the Lower River Shannon SAC. Auditory risk ranges for the geophysical survey occur within 580 m of the sound source while TTS occurs within 1.4 km (for the Very High Frequency (VHF) group). Therefore, based on the precautionary principal utilising the maximum risk ranges (i.e. risk ranges for bottlenose dolphin will be lower due to them being within the Higher Frequency Group (HF)). There is potential for likely significant effects to bottlenose dolphin species due to subsea noise produced by the SI works within the Lower River Shannon SAC.
6. Significant effects due to habitat loss/water quality impacts on migratory fish species cannot be excluded due to the proposed SI which overlap potential migratory routes within the Shannon Estuary for the following species: sea lamprey (*Petromyzon marinus*), river lamprey (*Lampetra fluviatilis*) and salmon (*Salmo salar)*. Likely significant effects due to subsea noise produced by the proposed SI works can be excluded for all migratory fish species as no impact will occur beyond 10 m of the

sound source and TTS could occur within 20 m. Given the turbid nature of the estuary which in inundated with frequent tides there is already a baseline level of ambient noise coupled with regular vessel traffic within the Shannon estuary, therefore likely significant effects due to subsea noise on migratory fish species can be excluded.

7. In the absence of mitigation measures, the SI works will introduce above water noise, vibration and lighting that have the potential to impact on seabirds and wintering birds at the following European sites:
   - River Shannon and River Fergus Estuaries SPA (wintering waterbirds/geese)
   - Lough Derg (Shannon) SPA (breeding and wintering species)
8. Habitat loss, alteration and fragmentation impacts can be excluded at the River Shannon and River Fergus Estuaries SPA due to the nature and scale of the works which will equate to a total area of impact of 417.9 m^2 or 0.00013% of the total wetland habitat area of the SPA. Underwater noise impacts can also be excluded as it is considered that there is a very low likelihood of interaction between underwater noise sources and diving birds during the proposed SI works.
9. It is our opinion that without the implementation of mitigation measures, it cannot be excluded on the basis of objective scientific information that the project, individually or in combination with other plans or projects, will have a significant effect on the European sites listed below. It is respectfully submitted that MARA should carry out an Appropriate Assessment, and a Natura Impact Statement (NIS) will be submitted to MARA accordingly.
   - Lower River Shannon SAC
   - River Shannon and River Fergus Estuaries SPA
   - Lough Derg (Shannon) SPA

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1 Introduction

1.1 Overview

The Scheme area for the Limerick FRS is located within the Shannon Upper and Lower River Basin and is subject to both coastal and fluvial flooding. The Office of Public Works (OPW) working in partnership with LCCC and Clare County Council, completed the Shannon Catchment Flood Risk Assessment and Management (CFRAM) Study in 2018. The Shannon CFRAM Study identified Limerick City as an Area of Further Assessment and concluded that a flood relief scheme is to be undertaken.

Tetra Tech RPS have been commissioned by LCCC as Engineering and Environmental Consultants to design and progress the delivery of a Limerick FRS. The objective of the overall project is the identification, design and submission (for planning consent) of a flood scheme, that is technically, socially, environmentally and economically acceptable, to alleviate the risk of flooding to the community of Limerick to a determined standard of protection, and to procure, manage and oversee the construction of that scheme.

This MULA is required to undertake site investigations (hereafter referred to as the SI works) within the upper Shannon Estuary. These SI works, which are discussed in more detail in **Section 2** below, are required to inform detailed construction and engineering design of the Limerick FRS and to provide baseline data for any subsequent environmental assessments. Information collected by the SI works will support the overall Limerick FRS project in its aim to alleviate coastal and fluvial flooding in Limerick City and surrounding areas. Therefore, this MUL represents a critical step towards supporting future climate resilience within the community of Limerick.

For the avoidance of doubt, no construction works associated with the flood relief scheme are included under this MUL application.

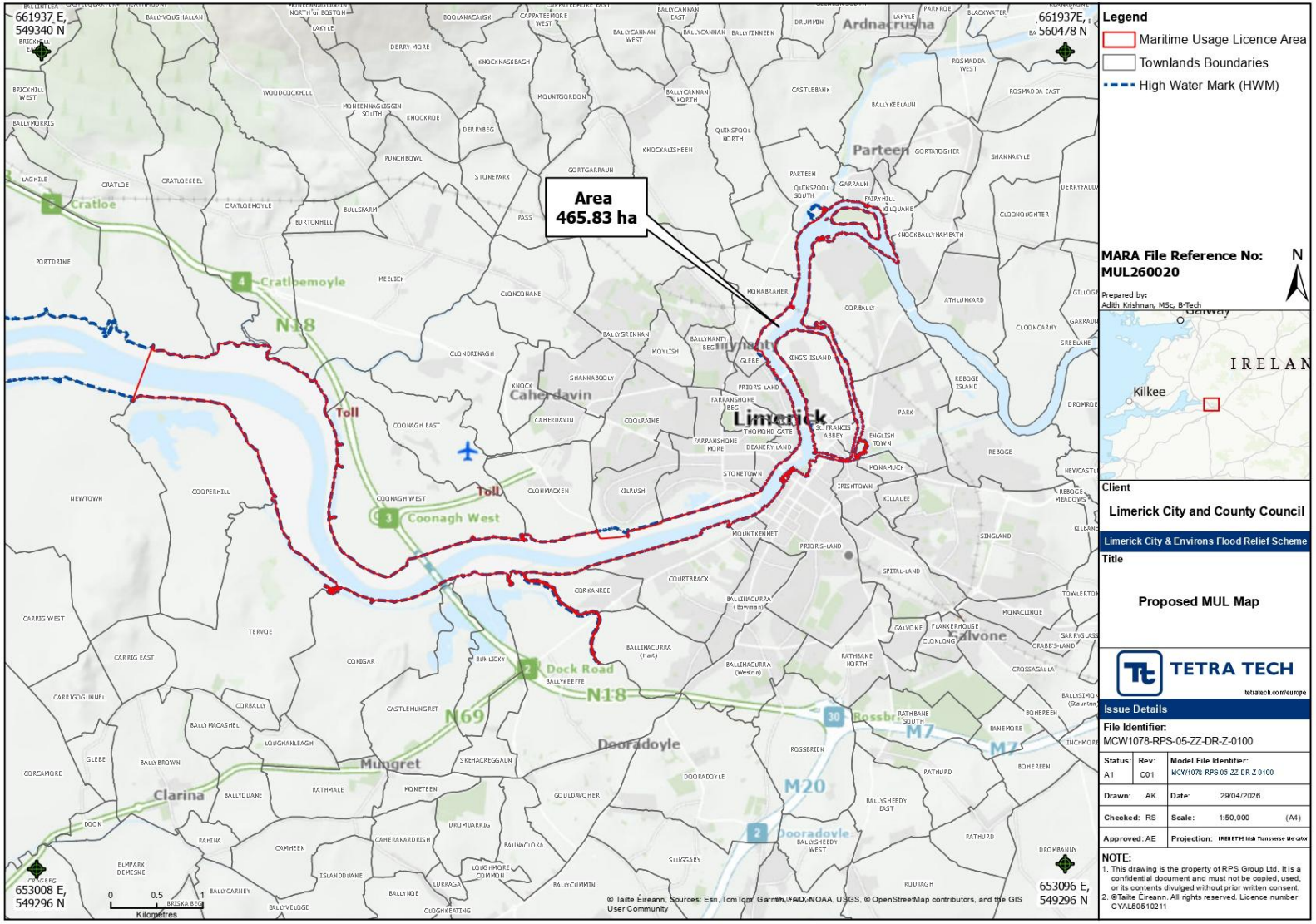

Figure 1-1: MUL Area for proposed SI works

1.2 Accompanying Reports

The MULA consists of the following documents and reports:

- Maritime Usage Licence Application (MULA) Form and relevant attachments;
- Project Description;
- Supporting Information for Screening for Appropriate Assessment (SISAA) report;
- Annex IV Species Risk Assessment;
- Subsea Noise Technical Report; and
- Natura Impact Statement (NIS).

1.3 Purpose of Report

This report has been prepared by Tetra Tech, on behalf of LCCC, to provide information on the SI Works proposed to be undertaken for the Limerick FRS project in support of the MULA to MARA. This report provides all necessary information to MARA to allow for completion of a Screening for Appropriate Assessment of the potential for likely significant effects on European sites, in view of their conservation objectives, arising from the SI works either alone or in-combination with other plans or projects.

This report provides a brief description of the SI works, consisting of geophysical, geotechnical and environmental SI works that are proposed to be undertaken. A more detailed description is provided in the separate 'Project Description' document (Report ref: MCW1078-RPS-05-ZZ-RO-Z-1015). The Project Description includes details of the methods, equipment and quantities for proposed activities. The results of the SI works will be used to inform the detailed engineering design for the Limerick FRS and will also provide baseline data for subsequent environmental assessments.

1.4 Statement of Authority

The technical competence of the authors is outlined below:

Aoife Edgely is an Associate Marine Scientist in the Environmental Services Business Unit in Tetra Tech. She has over 14 years' experience in the marine science field and is a Chartered Environmentalist and a Full Member of the Institute of Environmental Sciences. Aoife holds an honours degree in Environmental Science from Trinity College Dublin and a Master's in Marine Environmental Protection from Bangor University, Wales. Aoife has delivered the environmental assessments for a wide range of marine and coastal projects, including environmental impact assessment, appropriate assessment and Annex IV species reports.

Rachael Shaw is a Project Scientist in the Environmental Services Business Unit in Tetra Tech. She holds a Bachelor's Degree in Marine Science from the University of Galway and Master's Degree in Climate Change and Managing the Marine Environment from Heriot-Watt University Edinburgh. She has four years' experience working in consultancy, assisting on a wide range of projects from offshore renewable energy projects to flood relief schemes, including marine and terrestrial surveys. She is a full member with Institute of Environmental Sciences (IES).

Róisín Murphy is a Scientist in the Environmental Services Business Unit in Tetra Tech. She holds an honours degree in Zoology (B.Sc.) and Master's degree in Marine Biology, both from University College Cork. She has two years experience as a Project Manager at Cork Nature Network, responsible for marine and river surveys, and is currently involved in marine licensing and flood relief projects within Tetra Tech. She is a qualifying member with IES.

1.5 Legislation

1.5.1 European Legislation

Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (as amended) (the Habitats Directive) provides protection for habitats and species of European importance; Council Directive 2009/147/EC on the conservation of wild birds (Codified version) (the Birds Directive) aims to protect all of the 500 wild bird species naturally occurring in the European Union (EU). Areas designated for protection under the Habitats Directive are described as Special Areas of Conservation (SAC) and those designated under the Birds Directive as Special Protection Areas (SPA) and the sites are known collectively as the Natura 2000 network which includes European sites (see **Section 1.5.2.4**). As each member of the EU is required to designate areas in their jurisdictions, the establishment of this network of European sites under Articles 3 to 9 of the Habitats Directive is the key measure to protect nature and biodiversity in the EU.

Articles 6(3) and 6(4) of the Habitats Directive set out the decision-making tests for plans and projects likely to have a significant effect on or to adversely affect the integrity of Natura 2000 sites. Article 7 of the Habitats Directive extends the scope of its articles 6(3) and 6(4) to the Birds Directive.

Article 6(3) establishes the requirement for Appropriate Assessment (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. Considering 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 public."

Further detail on the stages of AA is provided in **Section 0**.

In the context of the marine works to which this MULA relates, the Habitats and Birds Directives have been transposed into Irish Legislation under, amongst other things, the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011), as amended.

Each European site has assigned Conservation Objectives (COs) and a list of Qualifying Interests (QI). The CO concept appears in the eighth recital of the Habitats Directive which reads: **"whereas it is appropriate, in each area designated, to implement the necessary measures having regard to the conservation objectives pursued". Article 1 then explains that "conservation means a series of measures required to maintain or restore the natural habitats and the populations of species of wild fauna and flora at a favourable status".**

The National Parks and Wildlife Service (NPWS) has established COs for each European site in Ireland. These are published on their website. NPWS advise in the general introductory notes of their site-specific conservation objectives (SSCO) series publications, that an appropriate assessment based on their **"published conservation objectives will remain valid even if the CO targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out**". NPWS advise that to assist in that regard, it is essential that the date and version are included when objectives are cited.

1.5.2 National Legislation

1.5.2.1 Maritime Area Planning Act

The Maritime Area Planning Act, 2021 (as amended) established MARA. One of the functions of MARA is to determine applications for the granting of licences to undertake any of the activities included in Schedule 7 of the Maritime Area Planning Act, 2021 (as amended).

The following definitions in relation to Appropriate Assessment (AA) are included in Section 2(1) of the Maritime Area Planning Act, 2021 (as amended):

> **"screening for appropriate assessment" shall be construed in accordance with, as appropriate—**
>
> **(a) section 177U of the Act of 2000, or**
>
> **(b) Part 5 of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011)**
>
> **"appropriate assessment" shall be construed in accordance with, as appropriate—**

(a) section 177V of the Act of 2000, or

(b) Part 5 of the European Communities (Birds and Natural Habitats) Regulations (S.I. No. 477 of 2011);

where the Act of 2000 refers to the Planning and Development Act 2000 (as amended).

Under Section 112 of the Maritime Area Planning Act, 2021 (as amended), MARA has been designated as a competent authority for the purposes of Part 5 of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011); and appropriate assessments to which that Part applies.

MARA is required to carry out a screening for Appropriate Assessment (AA) in accordance with Section 117(4)(a) of the Maritime Area Planning Act, 2021 (as amended).

Where MARA determines that an AA is required it shall carry out the AA in accordance with Section 117(7)(a) of the Maritime Area Planning Act, 2021 (as amended).

1.5.2.2 Screening Out for AA

Under Regulation 42(7) of the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) the competent authority in this case MARA shall determine that an AA of a project *is not required* where the plan or project is not directly connected with or necessary to the management of the site as a European Site *and* if it can be excluded on the basis of objective scientific information following screening that the project, individually or in combination with other plans or projects, will have a significant effect on a European site.

1.5.2.3 Screening In for AA

Under Regulation 42(6) of the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) the competent authority shall determine that an AA of a plan or project *is required* where the plan or project is not directly connected with or necessary to the management of the site as a European Site and if it cannot be excluded, on the basis of objective scientific information following screening under this Regulation, that the plan or project, individually or in combination with other plans or projects, will have a significant effect on a European site. Under Section 117(4) of the Maritime Area Planning Act, 2021 (as amended) the MARA shall, as soon as is practicable after it receives a MUL application and if it considers it necessary to do so in its capacity as the competent authority, carry out screening for Appropriate Assessment in respect of the proposed maritime usage the subject of the application.

Where the competent authority determines that an AA is required, they shall make a determination under Article 6(3) of the Habitats Directive as to whether or not the proposed development would adversely affect the integrity of a European site and an Appropriate Assessment shall be carried out by the competent authority before consent is given for the

proposed development - see Regulation 42(11) European Communities (Birds and Natural Habitats) Regulations 2011 (as amended).

1.5.2.4 European Sites and Natura 2000 Sites

The term European site is defined in the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) as:

> **"European Site" means—**
> **(a) a candidate site of Community importance,**
> **(b) a site of Community importance,**
> **(c) a candidate special area of conservation,**
> **(d) a special area of conservation,**
> **(e) a candidate special protection area, or**
> **(f) a special protection area.**

The term Natura 2000 is defined in the same Regulations as:

> **"Natura 2000" means the European network of special areas of conservation under the Habitats Directive and special protection areas under the Birds Directive, provided for by Article 3(1) of the Habitats Directive and, for the purposes of these Regulations, includes European Sites.**

As such, and as adopted in this report, the term European site refers to one of the sites comprising the Natura 2000 network.

2 Project Description

A detailed Project Description report (Report ref: MCW1078-RPS-05-ZZ-RO-Z-1015), including drawings, has been included as a separate report to limit repetition and reduce the length of reports. Please refer to the Project Description for the detailed information on each of the SI activities summarised in the text below.

The MUL Area covers the geographical area where SI works are required below the HWM within and immediately downstream of Limerick City in the upper Shannon Estuary. The MUL Area encompasses an area of 466 ha and is illustrated in **Figure 1-1**.

The SI works will comprise geophysical, geotechnical and environmental surveys. It should be noted that all locations shown are provisional only and subject to change due to evolving project options or on-site due to the presence of obstructions/refusals at individual locations.

For the avoidance of doubt, no construction works associated with the flood relief scheme are included under this MUL application.

The activities proposed to be carried out within the MUL Area are summarised in **Table 2-1** below.

Table 2-1: Proposed SI Activities

Survey Type	Survey Elements (indicative equipment)	Indicative Equipment (where applicable)	Maximum Quantity (where relevant)
Land-based Topographical Surveys (below HWM, on intertidal zone)	Survey station (e.g., tripod and total station) and mobile surveying equipment.	Hand-held pole mounted Global Navigation Satellite Systems (GNSS) devices.	N/A
Marine Geophysical Surveys (undertaken from survey vessel)	Multi Beam Echosounder (MBES)	Kongsberg EM series, Kongsberg Geoswath series, R2 Sonic series & Reson Teledyne Seabat series	N/A
	Side Scan Sonar (SSS)	Edgetech FS-4200 series, C-Max CM2 series and Klein System 3900-5000 or similar.	
	Sub-bottom profiler (SBP-C)	GeoAcoustics Geopulse series	
	Sub-bottom profiler (SBP-P)	Innomar smart, quattro (QBM) sixpack (HBM), Innomar SES 2000 compact light, Innomar standard quattro (DBM) sixpack (DBM), Innomar medium 100	

Survey Type	Survey Elements (indicative equipment)	Indicative Equipment (where applicable)	Maximum Quantity (where relevant)
Marine Geomagnetic Surveys (undertaken from survey vessel, no acoustic signal)	Magnetometer	Geometrics G-882, Marine Magnetics SeaSPY, G-Tec Magwing System or similar.	N/A
Marine Geotechnical Surveys (undertaken from survey vessel(s)/ jack-up barge; JUB/spud barge)	Rotary and cable percussive boreholes	Drill rig and JUB / drilling vessel (See Section 2.5 of the Project Description Report)	51
	Standard Penetration Tests (SPTs)	Split spoon sampler/JUB	
Marine Environmental Surveys (undertaken from survey vessel)	Drop-down video (DDV) and/or Remotely Operated Vehicles (ROV) survey.	Camera system	N/A
	Grab sampling (incl. contaminant sediment samples)	Hamon / Day / Van Veen Grab (0.1m^2)	63
	Water quality samples, including conductivity, temperature and depth (CTD) Measurements.	CTD profiler and Niskin bottler sampler	20
Archaeological Surveys	Intertidal walkover surveys	See Section 2.7.1 of the Project Description Report	N/A
	Marine geophysical survey (this is the same campaign as the Marine Geophysical Surveys described above).	Same equipment as marine geophysical equipment listed	
	Sampling	See Section 2.7.3 of the Project Description Report	N/A
	Dive survey	See Section 2.7.4 of the Project Description Report	N/A
	Wade survey	See Section 2.7.5 of the Project Description Report	N/A

The drawings prepared in support of the MULA are included in the Project Description document. As described in more detail in the Project Description document, the proposed locations shown in the figures and drawings are subject to refinement based on the results

of the geophysical and environmental surveys. Similarly, a location may be moved due to the presence of obstructions/ refusals at individual locations, i.e. where a physical object, e.g. a subsurface boulder, prevents the borehole from going to its target depth. In such circumstances, the borehole location is moved to another nearby location away from the obstruction and drilled again to the target depth.

LCCC are seeking a MUL for a period of five years from the date of the granting of the licence. The programme of works for the SI works will be dependent upon award of the MUL and the appointment and availability of survey contractors. Based on the proposed scope of works to be conducted, it is expected that each geotechnical sampling location will take two days to complete; however, this is dependent on weather conditions and contractor/vessel availability. The geophysical survey is likely to take approximately one week to complete, while the environmental survey is likely to take approximately two weeks dependant on weather conditions and contractor/vessel availability.

3 Methodology

3.1 Appropriate Assessment Guidance

This SISAA report has been completed in accordance with the EU and national guidance documents that pertain to Member States' fulfilling their requirements under the EU Habitats Directive, with particular reference to Article 6(3) and 6(4) of that Directive. The methodology followed in relation to this SISAA has complied with the following guidance:

- EC (2000). Communication from the Commission on the Precautionary Principle. Office for Official Publications of the European Communities, Luxembourg;
- EC (2002). 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. European Commission;
- EC (2007). Guidance document on the strict protection of animal species of Community interest under the Habitats Directive 92/43/EEC. European Commission;
- DoEHLG (2009, rev. 2010). Appropriate Assessment of Plans and Projects in Ireland Guidance for Planning Authorities. Department of the Environment, Heritage and Local Government;
- EC (2013). Interpretation Manual of European Union Habitats. Version EUR 28. European Commission, Luxembourg;
- EC (2018). European Commission Notice C (2018) 7621 'Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC', Office for Official Publications of the European Communities, Luxembourg;
- OPR (2021). Practice Note PN01: Appropriate Assessment Screening for Development Management. Office of the Planning Regulator, Dublin Ireland.
- EC (2021). European Commission Notice C (2021) 6913 'Assessment of plans and projects in relation to Natura 2000 sites – Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC', Office for Official Publications of the European Communities, Luxembourg.

Appropriate Assessment (AA) is a four-stage process with tests at each stage. The four stages are summarised diagrammatically in **Figure 3-1** below. An important aspect of the process is that the outcome at each successive stage determines whether a further stage in the process is required.

Stages 1-2 deal with the main requirements for assessment under Article 6(3) of the Habitats Directive. Stage 3 is a precursor to Stage 4 which is the main derogation step of Article 6(4).

3.2 Stages of Appropriate Assessment

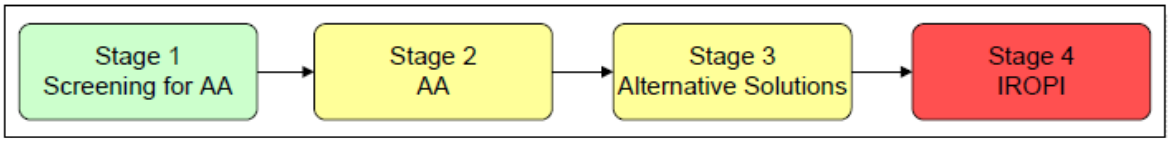

Figure 3-1: Four Stages of Appropriate Assessment

The screening for AA carried out by the competent authority (Stage 1), will determine whether an AA (Stage 2) for this MULA for the Limerick FRS project is required. The purpose of the screening stage is to determine, on the basis of a preliminary assessment and objective criteria, whether a plan or project, alone and in-combination with other plans or projects, could have significant effects on a European site in view of the site's conservation objectives.

There is no necessity to establish such an effect; it is merely necessary for the competent authority to determine that there may be such an effect. The need to apply the precautionary principle in making any key decisions in relation to the tests of Appropriate Assessment (AA) has been confirmed by the case law of the Court of Justice of the European Union (CJEU). Plans or projects that have no appreciable effect on a European site may be excluded. The threshold at this first stage is a very low one and operates as a trigger in order to determine whether a Stage Two AA must be undertaken by the competent authority on the implications of the proposed development for the conservation objectives of a European site. Therefore, where significant effects are likely, uncertain or unknown at screening stage, a second stage AA will be required

Stage 2 is required if it cannot be excluded, on the basis of the objective information provided at Stage 1, that the SI Works, individually or in combination with other projects or plans, will have a significant effect on a European site, in view of the site's conservation objectives. In this case, a Natura Impact Statement (NIS) must be prepared to assist the competent authority to conduct the Stage 2 AA. Stage 2 AA is a focused and detailed examination, analysis and evaluation carried out by the competent authority of the implications of the plan or project, alone and in-combination with other plans and projects, on the integrity of a European site in view of that site's conservation objectives. Case law has established that such an Appropriate Assessment, to be lawfully conducted, in summary:

(i) must identify, in the light of the best scientific knowledge in the field, all aspects of the proposed development which can, by itself or in-combination with other plans or projects, affect the conservation objectives of the European site;

(ii) must contain complete, precise and definitive findings and conclusions and may not have lacunae or gaps; and

(iii) may only include a determination that the proposed development will not adversely affect the integrity of any relevant European site where the competent authority decides

> (on the basis of complete, precise and definitive findings and conclusions) that no reasonable scientific doubt remains as to the absence of the identified potential effects. If adverse impacts can be satisfactorily avoided or successfully mitigated at this stage, so that no reasonable doubt remains as to the absence of the identified potential effects, then the process is complete. If the assessment is negative, i.e. adverse effects on the integrity of a site cannot be excluded, then the process must proceed to stage three and, if necessary, stage four.

If it is not possible during Stage 2 to avoid adverse effects on the integrity of one or more European sites through avoidance and/or mitigation, Stage 3 of the process must be undertaken which is to objectively assess whether alternative solutions exist by which the objectives of the plan or project can be achieved. If it can be demonstrated that there are no reasonable alternative solutions, the AA progresses to Stage 4. This final stage is undertaken when it has been determined that negative impacts on the integrity of a European site will result from a plan or project and there are no alternative solutions. At Stage 4 of the AA process, the competent authority must determine if, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, the project must nevertheless be carried out for imperative reasons of overriding public interest, or 'IROPI', including those of a social or economic nature. In such circumstances, the Member State is required to take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected.

While there is no prescribed form or content for reporting (DoEHLG, 2009) the methodology and format adopted in this report has been in accordance with the European Commission Methodological Guidance on the provision of Article 6(3) and 6(4) of the 'Habitats' Directive 92/43/EEC (EC, 2021) and the European Commission Guidance 'Managing Natura 2000 sites' (EC, 2018), guidance prepared by the NPWS (DoEHLG, 2009) and by the Office of the Planning Regulator (OPR, 2021).

As per DoEHLG (2009):

> **The first test is to establish whether, in relation to a particular plan or project, appropriate assessment is required.**

In summary, the test for the screening for AA is to determine on the basis of a preliminary assessment and objective scientific information could there be effects in view of the site's conservation objectives. There is no necessity to establish such an effect; it is merely necessary for the competent authority to determine that there may be such an effect. The need to apply the precautionary principle in making any key decisions in relation to the tests of Appropriate Assessment (AA) has been confirmed by the case law of the Court of Justice of the European Union (CJEU). Plans or projects that have no appreciable effect on a European site may be excluded. The threshold at this screening stage is a very low one and operates as a trigger in order to determine whether an AA must be undertaken by the competent authority on the implications of the proposed development for the conservation

objectives of a European site. Therefore, where significant effects are likely, uncertain or unknown at screening stage, an AA and NIS will be required.

3.3 Stage 1 Screening / Test of Significance

This process identifies whether the proposed development is directly connected to or necessary for the management of a European site(s) and identifies whether likely significant effects upon a European site(s) can be excluded, either alone or in combination with other projects or plans.

1. The screening for AA will incorporate the following steps:
2. Determining whether a project is directly connected with or necessary to the conservation management of any European sites;
3. Describing the project;
4. Identifying the European sites potentially affected by the project or plan;
5. Identifying and describing any potential effects of the project or plan on European sites, alone, or in combination with other plans/projects; and
6. Assessing the likelihood of significant effects on European sites.

The output from this stage is a determination for each European site(s) of not significant, significant, potentially significant, or uncertain effects. The latter three determinations will cause that site to be brought forward to Stage 2.

3.4 Desk Study

Information on the receiving environment was analysed to determine the potential for significant effects to QIs and SCIs of the European sites with established connectivity to the SI works (see **Section 5.3**). The following publications and data sources were reviewed in May 2026:

- Information on ranges of mobile QI populations in Volume 1 of NPWS' Status of EU Protected Habitats and Species in Ireland (NPWS, 2025), and associated digital shapefiles obtained from the NPWS Research Branch;
- BirdWatch Ireland (https://birdwatchireland.ie/);
- Mapping of European site boundaries and Conservation Objectives for relevant sites, available online from the NPWS including Site Synopses, European site Data Forms and Conservation Objective Supporting Documents, where available (https://www.npws.ie/protected-sites);
- Distribution records for QI of European sites held online by the National Biodiversity Data Centre (NBDC) (https://biodiversityireland.ie/);
- Ordnance Survey of Ireland maps and aerial photography (https://osi.ie)
- EMODnet (2026) Map Viewer. Available at: EMODnet Map Viewer accessed May 2026.

3.5 Identification of Relevant European Sites

3.5.1 Source-Pathway Receptor Model

The identification of relevant European sites to be included in this report was based on the identification of the 'zone of influence (ZoI)' of the SI works using a Source-Pathway-Receptor (S-P-R) model where:

- A 'source' is defined as the individual element of the proposed works that has the potential to impact on a European site, its qualifying features, and its COs;
- A 'pathway' is defined as the means or route by which a source can affect the ecological receptor; and
- A 'receptor' is defined as QI of SACs or SPAs for which COs have been set for the European site(s) being assessed.

An S-P-R model is a standard tool used in environmental assessment. In order for an effect to be likely, all three elements of this mechanism must be in place. The absence or removal of one of the elements of the mechanism results in no likelihood for the effect to occur. The S-P-R model was used to identify a list of European sites, and their QIs, to which the SI works are potentially linked. These are termed as 'relevant' sites/QIs throughout this report.

3.5.2 Zone of Influence

Determination of the SI works' ZoI was achieved by assessing the SI works against the ecological receptors within the MUL Area, in addition to the ecological receptors that could be connected to and subsequently impacted by the project through abiotic and biotic vectors.

The proximity of the SI works to European sites, and more importantly, QIs and SCIs of the European sites, is of importance when identifying potentially likely significant effects. In accordance with the OPR AA Screening Guidelines (2021), the S-P-R model has been used to identify the ZoI to ensure that relevant European sites are identified. The S-P-R model minimises the risk of overlooking distant or obscure effect pathways, while also avoiding an over reliance on buffer zones (e.g., 15 km), within which all European sites should be considered. This approach follows the DoEHLG 2009 guidance on AA which states that:

> **"For projects, the distance could be much less than 15 km, and in some cases less than 100m, but this must be evaluated on a case-by-case basis with reference to the nature, size and location of the project, and the sensitivities of the ecological receptors, and the potential for in combination effects" (DoEHLG, 2009; p.32, para 1).**

The ZoI of the SI works on mobile species (e.g., birds, mammals, and fish), and static species and habitats (e.g., saltmarshes, woodlands, and flora) is considered differently. Mobile species have 'range' outside of the European sites in which they are QI. The range

of mobile QI species varies considerably, from several metres (e.g., in the case of whorl snails *Vertigo* spp.), to hundreds of kilometres (in the case of migratory wetland birds). A project's ZoI may extend well beyond the project boundary and can impact or have an effect on static species and habitats remote from the SI works; for example, where an aquatic QI habitat or plant is located many kilometres downstream from a pollution source. In particular, hydrological linkages between the SI works and European sites (and their QIs) can occur over significant distances; however, any effect will be site-specific depending on the receiving water environment and nature of the potential impact.

To this end, the ZoI for this project extends outside of the immediate SI works MUL Area to include ecological receptors connected to the project through proximity and connectivity through features such as watercourses and waterbodies in addition to potential connectivity through land and air. See **Section 5.3** for the identification of relevant European sites.

4 Desk Study

This section details the results of the desk study undertaken to describe the receiving environment of the SI works. The relevant receiving environment relates to anything that may be directly or indirectly related to the QIs/SCIs of the relevant European Sites. The MUL Area is located wholly within the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA at Limerick City.

4.1 Habitats

The MUL Area spans an area of 466 ha and comprises estuarine habitat. In order to understand the marine habitat types likely to be encountered, the boundary of the MUL Area was reviewed against EUSeaMap, a broad-scale predictive seabed habitat map for Europe (EMODnet, 2026). There is no habitat information on EMODnet (2026) for the upper Shannon Estuary, however data from NPWS Site Specific Conservation Objectives (2025)[1], shows the middle and westward reaches of the MUL Area to be tidal mudflat and sandflat habitat.

The MUL Area is located wholly within the Lower River Shannon Estuary SAC and does not intersect any other SACs designated for Annex I habitats. The desk study identified a number of Annex I estuarine habitats in the wider landscape within and adjacent to the MUL Area. These include Mudflats and sandflats not covered by seawater at low tide (1140), Estuaries (1130), and Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation (3260).

Lower River Shannon SAC, within which the MUL Area occurs, is located within the Shannon Valley from Killaloe in Co. Clare to Loop Head in Co. Kerry (NPWS, 2013). The Shannon Estuary is subject to permanent marine inundation with a tidal flow in a generally west to east aligned main channel that measures almost 100 km from its mouth to Limerick City (Hickey & Healy, 2005). The estuary is macrotidal, having the largest tidal range (5.44 m at Limerick Docks) on the Irish coast. Water depths vary from c.37m at the estuary mouth to less than 5m near Limerick City (NPWS, 2012).

Lower River Shannon Estuary SAC is a site of importance for its Mudflats and sandflats not covered by seawater at low tide, with an estimated habitat area of 8,808 ha. The SAC is also known for its water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation. While there is no total area assigned to this Annex I habitat by NPWS, three sub-types of this habitat are located within or adjacent to the MUL Area these include *Groenlandia densa (*Opposite-leaved Pondweed), *Schoenoplectus triqueter* (Triangular Club-rush) and Bryophyte-rich streams and rivers.

[1] SSCO-data | National Parks & Wildlife Service accessed May 2026

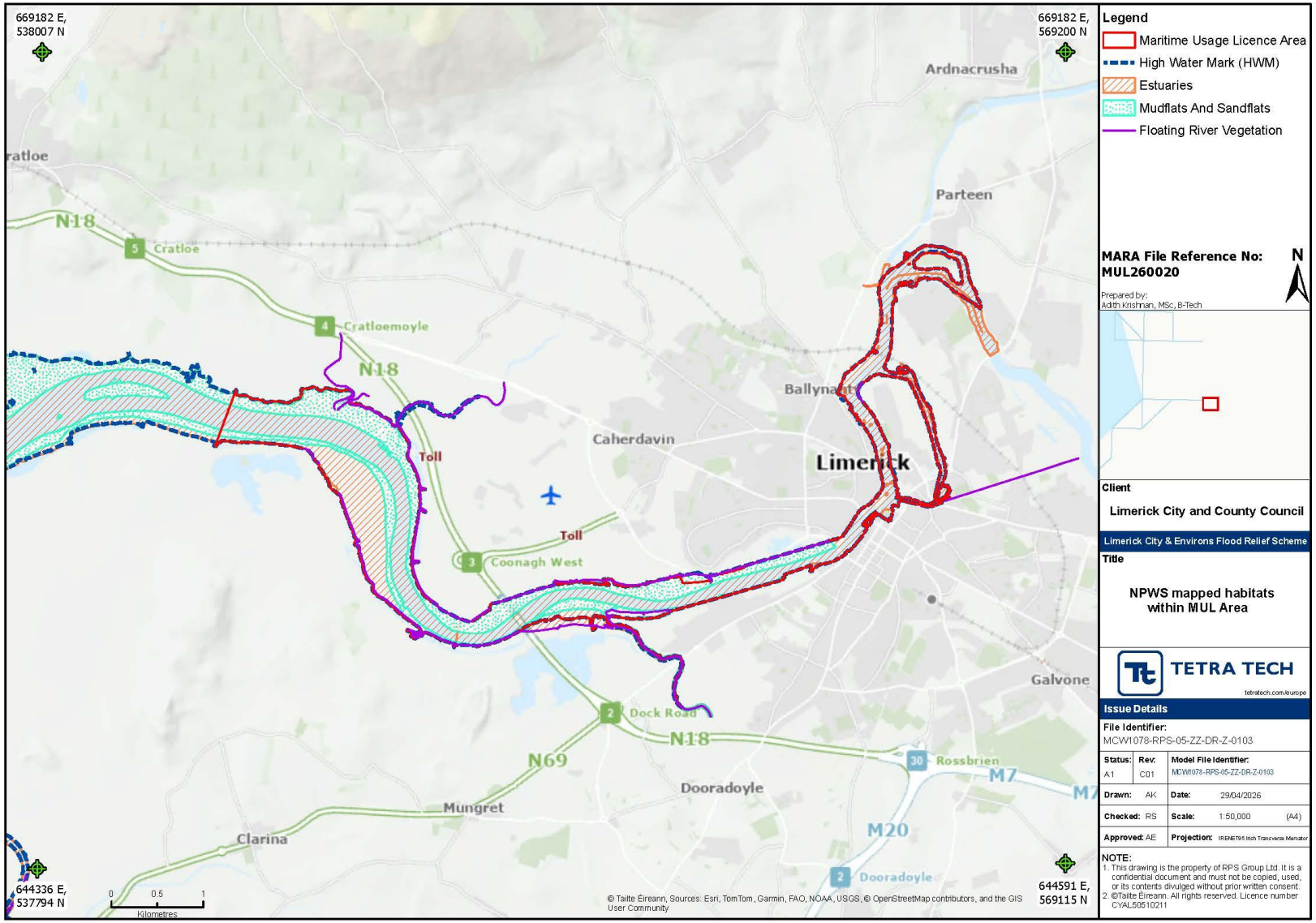

Figure 4-1 NPWS mapped habitats within the MUL Area

4.2 Species

4.2.1 Otter

Otter (*Lutra lutra*) occurs throughout Ireland, including along the Shannon Estuary with populations found along rivers, lakes, and coasts, where fish and other prey are abundant, and where the bank-side habitat offers plenty of cover (NPWS, 2025). They have diverse habitat preferences: lakes, canals, riverine (streams up to major river systems) marshland and estuaries. Otters are a mobile species and maintain territories. In lowland rivers and fish-rich lakes otters only need to maintain small territories (up to 6km), but along smaller river systems and in upland areas where prey may be less abundant, otter territories can stretch to 20 km (Mullen et al., 2021). Female territories range between 7.5 ± 1.5 km for riverine and 6.5 ± 1.0 km for coastal environments, whereas male territories are approximately 13.2 ± 5.3 km along rivers but with a high degree of variability (Reid et al., 2013). In general, otters exploit a narrow strip of habitat, about 10 m wide at the aquatic-terrestrial interface (Mullen et al., 2021). For the purpose of this study, the MUL Area has been deemed a “River” water body as defined in NPWS (2009) as coastal systems are described by single shorelines. In rivers wider than 80 m (such as within the MUL Area), otter may forage up to 80m from either shoreline.

Otters are opportunistic predators with a broad and varied diet. In freshwater areas a variety of fish from sticklebacks to salmon and eels will be taken, while crayfish and frogs can be important locally or seasonally. (Mullen et al., 2021).

A desk-based study utilising records from NBDC (2026a) indicated that otters have been sighted in the last 10 years adjacent to the MUL Area. Three live otter sightings were recorded with the most recent sighting in 2023, approximately 210 m from the MUL Area at Bunlicky Lagoon. In 2017 and 2018 a live sighting was recorded at Limerick Boat Club and Curragower. The MUL Area is located within the Lower River Shannon SAC, which is designated for otter, therefore, it is reasonable to conclude that otters may be present within the MUL Area. There are 44 SACs designated for otter in Ireland, however, none of these are within 20 km of the MUL Area (considered as a precautionary riverine range for otter).

The main threats to otter include water pollution, habitat disturbance and accidental deaths (road traffic). (NPWS, 2025). The most recent Article 17 conservation assessment for otters in Ireland deemed the species as being in favourable conservation status (NPWS, 2025).

4.2.2 Marine Mammals

Ireland supports a great diversity and abundance of marine mammals, including the following species listed on Annex II of the Habitats Directive: bottlenose dolphin (T*ursiops truncatus)*, harbour porpoise (*Phocoena phocoena*), harbour seal (*Phoca vitulina*) and grey seal (*Halichoerus grypus*). The desk study set out to establish presence and abundance of these species within the Shannon Estuary, and connectivity to the MUL Area.

4.2.2.1 Bottlenose dolphin

The Shannon Estuary is one of the most important areas for bottlenose dolphins in Ireland, and the species is a qualifying interest of the Lower River Shannon SAC. Bottlenose dolphins are found throughout the estuary, but regular concentrations occur off Kilcredaun Head in the outer estuary and Tarbert-Killimer, a location which is associated with foraging behaviour (Rogan et al., 2000). This area has been identified as a 'Critical Area' for bottlenose dolphin within the Shannon Estuary (Ingram and Rogan, 2002). Previous surveys in 2002 (Ingram and Rogan, 2001), 2007 (Englund et al., 2007), 2010 (Berrow et al., 2010) and in 2018 (Rogan et al., 2018) have confirmed high site fidelity of dolphins within the Shannon Estuary. A second critical area was identified further east into the estuary around Moneypoint and Tarbert/ Killimer. Both of these areas are located in deep parts of the estuary within fast tidal currents (Ingram and Rogan, 2002).

The population of bottlenose dolphins in the Shannon Estuary is estimated at around 145 individuals with only 80 adults (Baker *et al*., 2018). Rogan et al (2000) recorded bottlenose dolphins in the estuary all year round with a peak from May to September and noted the presence of neo-natal calves from July to September as evidence of a well-defined breeding season in the Shannon Estuary between June and September, with the peak calving period occurring in August (Rogan & Ingram, 2000).

A desk-based study utilising records from NBDC (2026b) indicated that bottlenose dolphin has been sighted in the last 10 years in the Shannon Estuary and within the MUL Area. In 2020, four individuals were recorded off Ted Russell Dock in Limerick City. Further west, approximately 10 km from the MUL Area off Ringmoylan Pier, 14 individuals were recorded in 2023. The IWDG (2026a) records indicate that between May 2025 and May 2026, there were no sighting of bottlenose dolphin recorded within the MUL Area, while 80 individuals were recorded within the wider Shannon Estuary Area, these were recorded westward of the MUL Area off Aughinish Co. Limerick (26 km downstream of the MUL Area) and towards the mouth of the Shannon estuary. As the MUL Area is within the Lower River Shannon SAC and given that there have been sightings of bottlenose dolphins within and adjacent to the MUL Area, it is reasonable to assume that bottlenose dolphins may be present within the MUL Area.

The most recent Article 17 conservation assessment for bottlenose dolphin in Ireland deemed the species as being in favourable conservation status (NPWS, 2025). However, bottlenose dolphins can be subjected to local and/or regional environmental pressures throughout their range in Irish waters (DEHLG, 2009). The main pressures involve commercial shipping-based or vessel-based activities that occur primarily on a local to regional scale and/or on a temporary to intermittent basis, which includes geophysical seismic exploration (DAHG, 2014).

4.2.2.2 Harbour porpoise

Harbour porpoise is the smallest, most widespread and abundant cetacean species in Irish waters (Berrow, 2001). It has been recorded off all coasts and over the continental shelf but is thought to be most abundant off the southwest coast (Wall et al., 2013). The shallow continental shelf is a key habitat for harbour porpoise, which is strongly associated with shallow water (<200 m) where they predominantly feed on demersal fish species. Sightings of this species offshore are relatively uncommon, but this may be due in part to low sighting and acoustic survey effort in favourable sea conditions (Ó Cadhla et al., 2004).

As this species is highly mobile, species-specific Management Units (MU) are used to assess the effect of an activity on them. The MUL Area is located within the Celtic and Irish Seas MU, where the most recent estimate of abundance for harbour porpoises is 62,517 (IAMMWG, 2023), based on data collected during SCANS III and the ObSERVE surveys (Rogan et al., 2018, Hammond et al., 2021).

Violent interactions have been recorded between bottlenose dolphins and harbour porpoise (Ross and Wilson, 1996; Gross et al., 2020) and suggested reasons for this aggression include interspecies territoriality, defence of group members, food competition, feeding interference and object-orientated play (Gross et al., 2020).

A desk-based study utilising records from NBDC (2026c) indicated that harbour porpoise has been sighted in the last 10 years within the Shannon Estuary, however, none have been recorded within or adjacent to the MUL Area. The most recent recording was in 2017 of an individual off Foynes Island, approximately 27 km west of the MUL Area. No harbour porpoise was recorded within the MUL Area or the Shannon Estuary between May 2025 and May 2026 (IWDG, 2026b). The closest SAC designated for harbour porpoise is the Blasket Islands SAC in Kerry, located approximately 170 km by sea from the SI works area. From the lack of recorded sightings of harbour porpoise within the Shannon Estuary, it is likely that they largely avoid the area. As a result, spatial overlap with harbour porpoise individuals from other SACs within foraging range is considered highly unlikely.

Harbour porpoise foraging areas are often associated with areas of strong tidal currents and eddies (NPWS, 2024). These areas have been identified off Kilcredaun Head in the outer estuary, Tarbert-Killimer and Moneypoint. These areas are located in deep parts of the estuary with fast tidal currents and are used regularly for bottlenose dolphin foraging (Ingram and Rogan, 2002). It is therefore reasonable to conclude that while harbour porpoise may utilise the lower reaches of the Shannon Estuary for foraging, it is unlikely that they utilise the upper reaches of the estuary within the MUL Area.

The most recent Article 17 conservation assessment for harbour porpoise in Ireland deemed the species as inadequate with a stable trend (NPWS, 2025).

4.2.2.3 Grey seal

Grey seal is the larger of the two pinniped species which occur around the Irish coast. They are primarily pelagic or demersal in their feeding habits and can be wide-ranging. In Ireland they are generally considered part of a larger population or meta-population that also inhabits adjacent jurisdictions (i.e. the UK and France) (NPWS, 2025). The habitat used by grey seals in Ireland is diverse and dynamic, from coastal and estuarine waters close to human activity and undisturbed offshore islands, to deeper Atlantic shelf waters and shallow seas shared with adjacent member states (Cronin et al., 2013). The key prey species for grey seal include a number of clupeids (e.g., herring), gadoids (e.g., cod, whiting), salmon, flatfish, and sand eels.

Grey seals have been recorded undertaking foraging trips over hundreds of kilometres, although the mean distance travelled in a telemetry study carried out in 2011 for NPWS was 51 km (Cronin et al., 2011). NPWS-funded aerial thermal-imaging of seal in Ireland (Morris and Duck, 2019) shows very low usage of the Shannon Estuary by both harbour seal and grey seal, indicating that the estuary is not likely to be an important area for hauling out. The most recent Morris and Duck (2025) report stated that due to time constraints the River Shannon was not surveyed for either species as these are areas where very few animals have been found during previous aerial surveys. Therefore, previous survey data is utilised here (Morris and Duck, 2025). Based on tracking data from Carter et al (2020), grey seals can also typically forage within 100 km of an SAC. The closest SAC designated for grey seal is the Blasket Islands SAC, located approximately 170 km by sea from the SI works area. While it is possible that individuals from the Blasket Islands population may be present in the Shannon Estuary, it is considered highly unlikely that the SI works area represents an important foraging ground.

A desk-based study utilising records from NBDC (2026d) indicated that grey seals have been sighted in the last 10 years in within the Shannon Estuary, however, none have been recorded within or adjacent to the MUL Area. The most recent sighting was recorded at Carrig Island in Co. Kerry 2025, 53 km west of the MUL Area as the crow flies. As the nearest SAC is over 100 km from the MUL Area and due to a lack of sightings within the upper reaches of the Shannon Estuary, it is therefore reasonable to conclude that grey seals do not utilise the MUL Area.

Grey seal has a ‘Favourable’ conservation status with an improving trend in Irish waters (NPWS, 2025). Grey seals face a range of local and regional environmental pressures and threats in Irish coastal/offshore waters. The main pressures involve commercial vessel-based or shipping-based activities, which include prey removal and/or bycatch from fisheries, and impacts arising from geophysical seismic exploration (NPWS, 2025). While the effect of these pressures may act on a temporary and/or regional scale, none is considered to be of sufficient magnitude to adversely impact on grey seal populations in Irish waters. Furthermore, disturbances such as these may also cause potential injury to grey seal, such as impacts on both reproduction and survival rates (Bellman et al., 2019).

4.2.2.4 Harbour seal

Harbour seal is the smaller of the two species of pinniped found in Ireland. They occur in estuarine, coastal, and fully marine areas, and breed in small groups scattered along the coastline. Harbour seals tend to forage within a maximum of 40 or 50 km of their haul-out sites, but most foraging trips tend to be within shorter ranges (Carter et al., 2020). Telemetry data indicates that harbour seal foraging trips in the south-west of Ireland generally extend no further than 20 km from haul-out sites (Cronin et al., 2008). The key prey species for harbour seals are similar to that of grey seal, including clupeids (e.g., herring), gadoids (e.g., cod, whiting), salmon, flatfish, and sand eels.

A desk-based study utilising records from (NBDC, 2026e) indicated that harbour seals have been sighted in the last 10 years within the Shannon Estuary, however none have been within or adjacent to the MUL Area. Two live sightings have been recorded in 2018, one off Tarbert in Co. Kerry, 44 km westwards of the MUL Area as the crow flies and one off Scattery Island off the coast of Kilrush in Co. Clare 54 km westwards from the MUL Area as the crow flies Harbour seals have been assessed as having a 'Favourable' conservation status in Irish waters and there are 13 SACs in Ireland for which this species is a QI (NPWS, 2025). The closest SAC for which harbour seal is designated is the Galway Bay Complex SAC located approximately 86 km by sea to the MUL Area. Given the typical foraging distances of harbour seal, it is highly unlikely that harbour seals from this SAC will be present within the Shannon Estuary.

Harbour seals are at risk of similar disturbance and threats to grey seals. These include prey removal, by-catch in fisheries, geophysical seismic exploration, as well as coastal tourism and localised human disturbance at haul-out sites. Strong disturbance could result in displacement of harbour seals from an area, changes in behaviour, reduced reproduction rates, and mortality (Bellman et al., 2019).

4.2.3 Migratory Fish Species

The MUL Area is located within the Lower River Shannon SAC which is designated for the following Annex II diadromous fish species (which migrate between the sea and fresh water): river lamprey (*Lampetra fluviatilis*), sea lamprey (*Petromyzon marinus*) and Atlantic salmon (*Salmo salar*). These fish species have the potential to pass through the MUL Area during certain times in their life cycle. This may occur only during upstream or downstream migrations to and from spawning grounds. Atlantic salmon, sea and river lamprey are protected under EU legislation via Annex II of the Habitats Directive, with salmon offered protection under Annex II when in freshwater only. Brook lamprey (*Lampetra planeri*), which is also a designated Annex II species in Lower River Shannon SAC, is not considered in this SISAA report as brook lamprey is not a diadromous fish species (i.e. it is confined to the freshwater section of the river and does not migrate to the marine environment). Thus, there is no potential for connectivity with the MUL Area. No other SACs for migratory fish species overlap the MUL Area. Freshwater pearl mussel is also a

QI of the Lower River Shannon SAC and occurs abundantly in part of the Cloon River in Co. Clare 37 km west of the MUL Area as the crow flies therefore there is no potential for connectivity between the proposed SI works and freshwater pearl mussel of the Cloon River.

4.2.4 Birds

The MUL Area overlaps the boundary of the following SPA, designated for wintering waterbirds and seabird QIs:

- River Shannon and River Fergus Estuaries SPA.

River Shannon and River Fergus Estuaries SPA (004077) forms the largest estuarine complex in Ireland and encompasses the entire estuarine habitat from Limerick City westward as as far as Doonaha in Co. Clare and Dooneen Point in Co. Kerry. The SPA has vast intertidal flats and salt marsh vegetation which provide rich food resources and high tide roost areas. The site is also utilised as an important site for several other species during the spring/autumn migration. It supports internationally important populations of four species, i.e. light-bellied brent goose (*Branta bernicla hrota*), dunlin (*Calidris alpina*), black-tailed godwit (*Limosa limosa*) and redshank (*Tringa totanus*). The site also supports a nationally important breeding population of cormorant (*Phalacrocorax carbo*) (NPWS, 2015a).

The MUL Area is within 20 km of other SPAs designated for wintering waterbirds and seabirds (See **Section 3.5** for screening distances): Slievefelim to Silvermines Mountains SPA (004165) and Lough Derg (Shannon) SPA (004058).

Slievefelim to Silvermines Mountains SPA is 15 km east from MUL Area and is an extensive upland site which is designated for hen harrier (*Circus cyaneus*). It is one of the strongholds for hen harrier in the country with a 2005 survey recording five breeding pairs which represented 3.7% of the all-Ireland population (NPWS, 2015b). Hen harrier typically forage within 5 km of their nest sites utilising open bog and moorland, including hill farmland and conifer plantations (NPWS, 201b5). SNH (2016) states that during the breeding season hen harriers core range is 2 km with a maximum range of 10 km, while distances between nest sites range within 1 km. As the MUL Area is located 15 km west of the SPA and utilising the maximum hen harrier distances (i.e. 10 km). There is no pathway from the SI works to this European site as it is unlikely hen harrier would utilise the MUL Area for foraging given more suitable habitat is available within range of the Slievefelim to Silvermines Mountains SPA, therefore, this SPA (and associated species) is not considered further in this SISAA.

Lough Derg (Shannon) SPA is 19 km as the crow flies upstream from MUL Area and is of importance for both breeding and wintering birds and is of special conservation interest for the following species: cormorant, tufted duck (*Aythya fuligula*), goldeneye (*Bucephala clangula*) and common tern (*Sterna hirundo*) (NPWS, 2014). The site supports a nationally important breeding colony of cormorant and common tern, during winter it has nationally important populations of tufted duck and goldeneye, as well as a range of other species

including whooper swan (*Cygnus cygnus)*. The presence of whooper swan, Greenland white-fronted goose (*Anser albifrons flavirostris)* and hen harrier is of particular note (NPWS, 2014).

5 Identification of Relevant European Sites

5.1 Assessment of Connectivity

Connectivity is identified via the S-P-R model which identifies the potential impact pathways such as land, air, hydrological pathways etc. which may support direct or indirect connectivity between the SI works (source) and European sites and their QIs or SCIs (receptors).

Where it is evident that there is no connectivity between the SI work and receptors (i.e., European sites and/or habitats and species for which the sites are selected), the receptors are excluded from the AA process. Where connectivity exists between the SI works and receptors, these receptors are taken forward to the assessment of likely significant effects (**Section 6.2**).

When assessing impact, the QI and SCI habitats and species are only considered receptors where a credible or tangible S-P-R link exists between the SI works and the receptor. In order for an impact to occur there must be a risk initiated by having a ‘source’ - the origin of potential impacts (e.g., near stream construction works), an impact pathway - the means by which the effect reaches the receptor (air, water, or ground) between the source and the receptor (e.g., a watercourse which connects the development site to the site designated for the protection of a receptor) and a 'receptor' (e.g. a protected species associated aquatic or riparian habitats). If the source, pathway, or receptor is absent, no linkage exists and thus, there will be no potential for an impact to be transmitted.

5.2 Source-Pathway-Receptor Assessment

5.2.1 Source of Impact

Identification of a risk of impact does not constitute a prediction that it will occur or, in the event that it does occur, that there is an intrinsic likelihood that it will result in ecological or environmental damage or that it will cause or create a significant effect on the European sites in question. The level and significance of the effect depend upon the magnitude, duration or intensity of the impacts ensuing from the proposal and the existence of a credible or tangible S-P-R link between the SI works and the aforementioned European sites. It is also determined by the extent of the exposure to the risk and the characteristics of the receptor.

5.2.2 Impacts Scoped out of Assessment

Accidental pollution event: All vessels operating in the marine environment must adhere to the International Convention for the Prevention of Pollution from Ships (MARPOL) which is the main international convention covering prevention of pollution of the marine environment by ships from operational or accidental causes. The Sea Pollution Act, 1991 ratified MARPOL in Ireland. In addition, all substances handled and/or used whilst

undertaking the works are required to be handled, used, stored, and documented in accordance with assessments and the Chemicals Act 2008 (No. 13 of 2008) and Chemicals (Amendment) Act 2010 (No. 32 of 2010) and associated Regulations.

Given the standard legal and regulatory pollution control requirements that apply to all vessels, the nature of the proposed SI works, their limited scale and duration, and the insignificant increase in vessel activity, it can be excluded on the basis of objective evidence that an accidental pollution will cause, either individually or in combination with any other plans or projects, a likely significant effect on any European Site. Therefore, this effect is not considered further in this assessment.

Collision Risk: Vessel strikes are a known cause of mortality in marine mammals (Laist et al., 2001). Non-lethal collisions have also been documented (Laist et al., 2001; Van Waerebeek et al., 2007). Injuries from such collisions can be divided into two broad categories: blunt trauma from impact and lacerations from propellers. Injuries may result in individuals becoming vulnerable to secondary infections or predation.

It has been calculated that a maximum of one vessel and one jack-up/spud barge could be operating at any one time within the MUL Area. For the geophysical surveys, the vessels will be travelling in a predefined trajectory. It is considered that this will allow animals to predict the movement of the vessels and therefore avoid collisions. It is likely that the other survey vessels (i.e. benthic survey and/or geotechnical survey vessel) will be stationary for extended periods throughout their operations which will reduce the potential for collision with these vessels.

The area supports low heavy vessel traffic, with mainly cargo, passenger, and other vessels traversing the western extents of the Shannon estuary i.e. Shannon Foynes- Anguish and Moneypoint with some entering the MUL Area to access commercial ports including some to Ted Russel Dock. Vessel trips have been recorded as per 0.08 km² per year for vessels equipped with an AIS system (generally required on vessel >20 ton)[2]. It is, therefore, reasonable to assume that marine mammals in the area are exposed to some vessel traffic on a regular basis and may exhibit some habituation. The increase in vessel traffic at any one time is considered to be very low, given the location of the MUL Area. Therefore, it can be excluded on the basis of objective evidence that there is potential for collision risk with cetacean species by the SI works and thereby cause, either individually or in combination with any other plans or projects, a likely significant effect on any European Site. Therefore, this effect is not considered further in this assessment.

5.2.3 Impacts Scoped in for Assessment

Table 5-1 identifies the potential impacts arising from the SI works, the element of SI works associated with each impact, a description of effect pathway and the receptors with the potential to be affected. This assessment will then be used to identify relevant European

[2] MarineTraffic: Global Ship Tracking Intelligence | AIS Marine Traffic

sites and QIs and SCIs to be taken forward to the Stage 1 Screening for Appropriate Assessment. Identification of relevant European sites and QIs is presented in **Section 5.3.1** to **Section 5.3.5**, with **Table 5-1** summarising all sites taken forward for screening.

Table 5-1: Source-Pathway-Receptor Assessment for the SI Works

Impact	Potential source of impact	Description of Effect Pathway	Relevant Receptors
Above water noise, vibration and lighting	Presence of vessel and general non-survey vessel activity. Human presence and use of equipment during land-based surveys.	Potential for disturbance to species, leading to displacement from the area.	Marine mammals, birds, otter
Habitat loss, alteration and/ or fragmentation (including smothering due to increased suspended sediment concentrations (SSC))/water quality	Intrusive sampling methods which remove or interact with seabed habitats, including geotechnical borehole drilling, SPT's, JUB/spud legs, environmental grab sampling	Potential for direct loss of and/or damage to habitats and potential to indirectly affect species that rely on those habitats for feeding and/or breeding. Potential for marine sediments disturbed by intrusive sampling methods to smother sensitive habitats and to indirectly affect species that rely on those habitats for feeding and/or breeding.	Habitats, marine mammals, birds, fish, otter
Underwater noise	Underwater noise emissions from geophysical surveys (MBES, SSS, SBP), geotechnical survey (borehole drilling, vessel activity).	Potential for direct effects (including injury, disturbance and/or displacement) on mobile species with hearing abilities.	Marine mammals, diving birds, fish, otter
Introduction of invasive alien species	Presence of vessel and general non-survey vessel activity. Human presence and use of equipment during land-based surveys.	Potential for direct effects on estuarine habitats and species in translocation of estuarine invasive species if present.	Habitats

5.3 Identification of Relevant European Sites

The following sections detail the identification of relevant European sites for consideration in the Stage 1 Screening for Appropriate Assessment. Each section describes the rationale for site selection, which is based on a S-P-R model of assessment. As outlined in **Section 1.5.2.4**, the term 'European sites' includes SACs, candidate SACs, SPAs and candidate SPAs, and as such, all designated and candidate European sites are considered in the following assessment.

European sites identified within the overall zone of influence of the SI works, their respective relevant QI/ SCI, and a measure of the distance of the European site from the MUL Area are detailed in **Table 5-2** below.

Figure 5-1 shows the location of the SI works relative to these European sites.

5.3.1 Annex I Habitats

The European sites with relevant Annex I habitat QIs to be considered in this SISAA are:

- All European sites that physically overlap with the MUL Area. It is noted that intrusive sampling methods will only directly affect a relatively small portion of the overall MUL Area, however, as a conservative measure, and to allow for flexibility in sampling locations, the entire area of the MUL Area is assessed for potential impacts.
- All European sites within the zone of influence of impacts and where a S-P-R link exists, as assessed in **Table 5-1**. All direct impacts to Annex I habitats (estuarine) will be limited to the proposed survey area. Intrusive sampling techniques with the potential to increase SSC in the water column will be limited to discrete sampling locations and the proposed sampling techniques are unlikely to give rise to large sediment plumes.

The site selected for consideration of Annex I habitat QIs in this SISAA are listed below and outlined in **Figure 5-1**:

- Lower River Shannon SAC

5.3.2 Annex II Otter

The European sites with relevant Annex II otter QIs to be considered in this SISAA are:

- All European sites that physically overlap with the MUL Area; and,
- All European sites that have otter as a QI that have a realistic potential for connectivity with the MUL Area. While otter is a mobile species, individuals have defined territories. Female territories range between 7.5 ± 1.5 km for riverine and 6.5 ± 1.0 km for coastal environments where male territories are approximately 13.2 ± 5.3 km along rivers but with a high degree of variability (Reid et al., 2013). In lowland rivers and fish-rich lakes otters only need to maintain small territories (up to 6km), but along smaller river systems and in upland areas where prey may be less abundant, otter territories can

stretch to 20 km (Mullen et al., 2021). Otter activity has been recorded in the adjacent areas of Limerick city (see **Section 4.2.1**), therefore a precautionary approach to the identification of relevant sites has been adopted, which has considered European sites designated for otter within 20 km of the MUL Area.

The site selected for consideration of Annex I habitat QIs in this SISAA are listed below and outlined in **Figure 5-1**:

- Lower River Shannon SAC

5.3.3 Annex II Marine Mammals

The European sites with relevant Annex II marine mammal QIs to be considered in this SISAA are:

- All European sites that physically overlap with the MUL Area; and,
- All European sites that have marine mammal QIs with a realistic potential for connectivity with the MUL Area. A conservative approach has been adopted which considered a 100 km buffer from the MUL Area. The 100km was calculated from the western boundary of the MUL Area along the Shannon Estuary to a distance of 100km, rather than an 'as the crow flies' buffer as this is not realistic when assessing marine mammal foraging distances. This buffer is considered precautionary with respect to capturing the zone of influence of underwater noise impacts associated with the proposed surveys, however, it allows for the possibility that marine mammals from distant SACs may be foraging or passing through the survey area.

It is noted that MARAs previous Applicant Technical Guidance Note[3] proposes that foraging ranges of 274 km and 448 km for harbour and grey seal, respectively, are applied in order to identify relevant European sites for Stage 1 screening, using maximum foraging distances quoted in the methodology of Carter *et al*. (2020). However, Carter *et al*. (2020) concludes that the drivers of distribution for both grey and harbour seals differ regionally, likely related to regional variation in diet and population trends and provide SAC-specific estimates of at-sea density in the UK and Ireland. These show that hotspots of seal density at sea are not necessarily attributable to nearby designated sites. While it is documented that grey seals can forage hundreds of kilometres from their breeding sides (Cronin et al., 2011; Russell & McConnell, 2014), and harbour seals may travel up to 100 km, this is dependent on seasonality, habitat preference and animal maturity. For the present assessment, given the maximum range for auditory injury expected for marine mammals (during the geophysical survey, auditory injury could occur to harbour porpoise within 580 m of the sound source see **Section 6.2.2.3** for assessment of underwater noise for marine mammals), it is considered sufficiently precautionary to apply a 100 km by sea buffer for the identification of marine mammal SACs to allow for consideration of foraging or transiting

[3] https://www.maritimeregulator.ie/wp-content/uploads/2025/04/Licence_Technical_Guidance_V08.pdf accessed May 2026

seals from distant SACs. Beyond this distance, there is no realistic S-P-R link which may have implications for the conservation objectives of more distant European sites (e.g. ability of these species to access habitats within these sites, effects on the natural range of the population etc.).

JNCC management units (MU) refer to geographical areas in which the animals of a particular cetacean species are found, to which management of human activities is applied (IAMMWG, 2023). It is noted that MUs are not estimates of populations, and that almost all species of cetacean are part of larger biological populations. The MU boundary is based on the best understanding of the population structure of species, taking into account jurisdictional boundaries and divisions already used for the management of human activities. According to IAMMWG (2023), MUs may be subdivided to provide advice on a smaller spatial scale for a given purpose.

It is recognised that MARA proposes that all harbour porpoise and bottlenose dolphin SACs within the JNCC MU boundaries should be used in order to identify relevant European sites for Stage 1 screening, however, given that the maximum range for auditory injury to all marine mammals is 580 m (see **Section 6.2.2.3**), and considering the vast scale of the relevant MUs for these species, it is considered that this this would result in an overly precautionary and lengthy assessment.

In summary, a suitably precautionary approach to the identification of relevant sites has been adopted, which has considered European sites designated for Annex II marine mammals within 100 km by sea of the MUL Area.

The sites selected for consideration of marine mammal QIs in this SISAA are listed below and outlined in **Figure 5-1**:

- Lower River Shannon SAC

5.3.4 Annex II Migratory Fish

The European sites with relevant Annex II migratory fish QIs to be considered in this SISAA are:

- All European sites that physically overlap with the MUL Area; and,
- All European sites that have migratory fish as a QI that have a realistic potential for connectivity with the MUL Area. A precautionary approach to the identification of relevant sites has been adopted which considers all European sites within a 50 km buffer of the MUL Area by sea. It should be noted that this buffer is considered to be over precautionary with respect to capturing the zone of influence of impacts (e.g. underwater noise) associated with the proposed surveys on the basis of the typically small ranges of effects on fish resulting from geophysical and geotechnical surveys within the MUL Area. There is, therefore, considered to be no realistic S-P-R link which may have implications for the conservation objectives of the European sites beyond this

range (e.g. ability of these species to access habitats within these sites, effects on the natural range of the population etc).

The sites selected for consideration of migratory fish QIs in this SISAA are listed below and outlined in **Table 5-2**:

- Lower River Shannon SAC

5.3.5 Birds

The European sites with relevant bird SCIs to be considered in this SISAA are:

- All European sites that physically overlap with the MUL Area; and,
- All European sites that have bird species as a SCI that have a realistic potential for connectivity with the MUL Area. Seabirds can forage considerable distances from their colonies with species such as Manx shearwater, storm petrel, gannet and fulmar capable of foraging hundreds of kilometres away (Woodward et al., 2019). Given the limited size, scale and duration of the SI works within the context of these extensive foraging ranges, seabirds from distant SPAs will not be foraging within the MUL Area in numbers that would lead to implications to the conservation objectives of those sites (e.g. the ability of these species to access habitats within these sites, effects on the natural range of the population etc). Wintering swan and goose species can have foraging ranges of up to 20 km from their night roosts (SNH, 2016). Given this ex-situ potential, it is possible that wintering birds occurring in the vicinity of the intertidal SI works are associated with SPAs located up to 20 km away. As a precautionary measure, all SPAs within 20 km of the MUL Area boundary have been considered for screening.

The sites selected for consideration of bird species SCI in this SISAA are listed below and outlined in **Figure 5-1**:

- River Shannon and River Fergus Estuaries SPA.
- Lough Derg (Shannon) SPA.

Table 5-2: Relevant European Sites and Qualifying Interests to be Considered in Stage 1 Screening for Likely Significant Effects

European Site (Code)	Distance from the MUL Area (km)	List of Relevant Qualifying Interests[4]	Connections (Source-Pathway Receptors)
Lower River Shannon SAC (002165)	Within SAC boundary	Sandbanks which are slightly covered by sea water all the time [1110]	No S-P-R connection to sandbanks as this habitat is located at the mouth of the Shannon Estuary approximately 69 km west of the MUL area.
		Estuaries [1130]	Yes. MUL Area overlaps with QI estuarine habitats as mapped by NPWS.
		Mudflats and sandflats not covered by seawater at low tide [1140]	Yes. MUL Area overlaps with QI mudflat habitat as mapped by NPWS.
		Coastal lagoons [1150]	No S-P-R connection to QI coastal lagoons as this habitat is located opposite Shannon Airport, approximately 13 km west of the MUL area.
		Large shallow inlets and bays [1160]	No S-P-R connection to QI large shallow inlets and bays as this habitat is located at the mouth of the Shannon Estuary, approximately 51 km west of the MUL area.
		Reefs [1170]	No S-P-R connection to QI reefs as the closest occurrence of this habitat is located at the mouth of the River Maigue, approximately 4 km west to the western boundary of the MUL area.
		Perennial vegetation of stony banks [1220]	No S-P-R connection to QI perennial vegetation of stony banks as the closest occurrence of this habitat is located at Ballymacrinan in Co. Clare, approximately 48 km west of the MUL area.

[4] Qualifying Interests that have not been identified as relevant to this assessment are greyed out.

European Site (Code)	Distance from the MUL Area (km)	List of Relevant Qualifying Interests[4]	Connections (Source-Pathway Receptors)
		Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]	No S-P-R connection to QI Vegetated sea cliffs of the Atlantic and Baltic coasts as this habitat is located at Burrane Lower east of the Killimer Ferry Terminal in Co. Clare, approximately 44 km west of the MUL area.
		Salicornia and other annuals colonising mud and sand [1310]	No S-P-R connection to QI *Salicornia*. This habitat has been mapped by NPWS at Carrigafoyle Co. Kerry, Barrigone, Aughinish and Beagh in Co. Limerick approximately 53 km, 23 km, 23 km and 15 km west of the MUL Area.
		Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330]	No S-P-R connection to QI Atlantic salt meadows as the closest occurrence of this habitat is located approximately 4 km west of the MUL area.
		Mediterranean salt meadows (J*uncetalia maritimi*) [1410]	No S-P-R connection to QI Mediterranean salt meadows as the closest occurrence of this habitat is located approximately 4 km west of the MUL area.
		Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260]	Yes. MUL Area overlaps with QI floating river vegetation as mapped by NPWS. This habitat is located in the north and south of the MUL area until the Clayton Hotel, northwest of Kings Island within the River Abbey.
		Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410]	No S-P-R connection to QI Molinia meadows on calcareous, peaty or clayey-silt-laden soils as this habitat has been mapped by NPWS within the Castleconnell area of Limerick 7 km further upstream as the crow flies from the MUL Area.

European Site (Code)	Distance from the MUL Area (km)	List of Relevant Qualifying Interests[4]	Connections (Source-Pathway Receptors)
		Alluvial forests with A*lnus glutinosa* and Fraxinus excelsior (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0]	No S-P-R connection to QI Alluvial forests as this habitat is mapped in five locations[5] upstream of the MUL Area. These are located at Clara Glens Co. Limerick (15 km east), Doonass Demesne Co. Clare (6 km east), Newgarden north (7 km east), Knockanavar in Co. Tipperary 29 km east and Gortnaskehy (41 km southeast).
		Margaritifera margaritifera (Freshwater Pearl Mussel) [1029]	No S-P-R connection to Freshwater Pearl Mussel as this species is located within the Cloon River in Co. Clare approximately 37 km west of the MUL area.
		Petromyzon marinus (Sea Lamprey) [1095]	Yes. Potential for QI sea lamprey to pass through the MUL Area during certain times in their life cycle. This may occur only during upstream or downstream migrations to and from spawning grounds.
		Lampetra planeri (Brook Lamprey) [1096]	No S-P-R connection to brook lamprey as it is not a diadromous fish species (i.e. it is confined to the freshwater section of the river and does not migrate to the marine environment). Thus, there is no potential for connectivity with the MUL Area within the estuary.
		Lampetra fluviatilis (River Lamprey) [1099]	Yes. Potential for QI river lamprey to pass through the MUL Area during certain times in their life cycle. This may occur only during upstream or downstream migrations to and from spawning grounds.

[5] Lower River Shannon SAC (site code 2165) Conservation objectives supporting document- Woodland Habitats Accessed May 2026

European Site (Code)	Distance from the MUL Area (km)	List of Relevant Qualifying Interests[4]	Connections (Source-Pathway Receptors)
		Salmo salar (Salmon) [1106]	Yes. Potential for QI salmon to pass through the MUL Area during certain times in their life cycle. This may occur only during upstream or downstream migrations to and from spawning grounds.
		Tursiops truncatus (Common Bottlenose Dolphin) [1349]	Yes. While the MUL Area does not overlap bottlenose dolphin habitat or critical habitat, as mapped by NPWS, there is potential for this mobile species to occur. with
		Lutra lutra (Otter) [1355]	Yes. The MUL Area overlaps with otter commuting habitat as mapped by NPWS.
River Shannon and River Fergus Estuaries SPA (004077)	Within SAC boundary	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]	Yes. MUL Area overlaps with SPA boundary, and therefore there is potential for SCI bird species to be present.

European Site (Code)	Distance from the MUL Area (km)	List of Relevant Qualifying Interests[4]	Connections (Source-Pathway Receptors)
		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]	
Lough Derg (Shannon) SPA. (004058)	19 km	Cormorant (*Phalacrocorax carbo*) [A017] Tufted Duck (*Aythya fuligula*) [A061] Goldeneye (*Bucephala clangula*) [A067] Common Tern (*Sterna hirundo*) [A193] Wetland and Waterbirds [A999]	Yes. Potential S-P-R connection as SPA is within 20km of MUL Area.

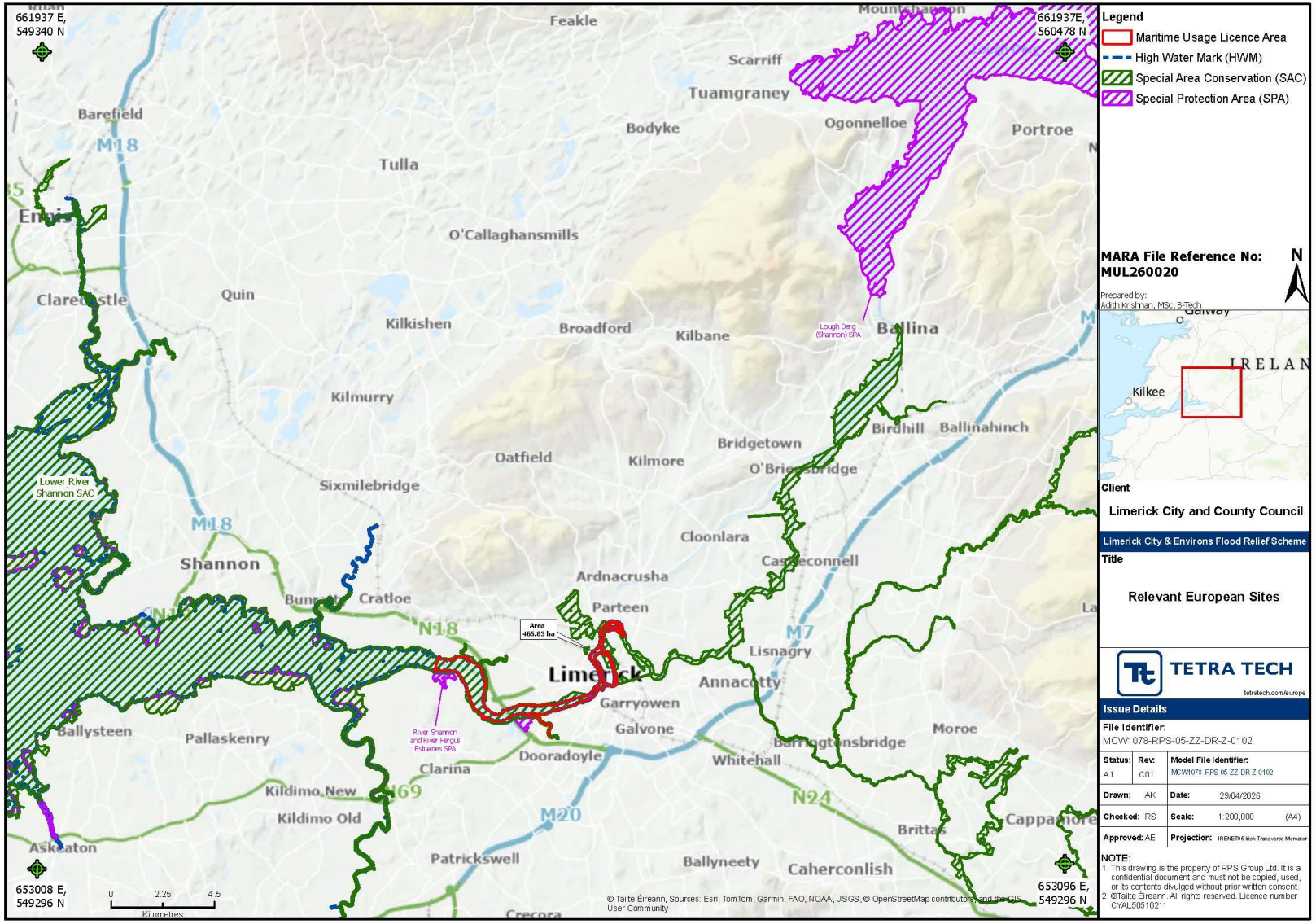

Figure 5-1: Relevant European sites

5.4 Conservation Objectives

The integrity of a European site (referred to in Article 6(3) of the EU Habitats Directive) is determined based on the conservation status of the QI of these sites.

European and national legislation places a collective obligation on Ireland to maintain at favourable conservation status areas designated as SAC and SPA. The government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

The specific conservation objectives for each European site in Ireland are available on www.npws.ie.

6 Supporting Information for Screening for Appropriate Assessment

6.1 Management of European Sites

The SI works are not directly connected with or necessary to the management of any European site(s).

6.2 Assessment of Likely Significant Impacts

This section determines whether the impacts identified in **Section 5.2.1** could have significant effects on the QI or SCIs of the European sites identified in **Section 5.3** in view of the conservation objectives of the sites. As described in **Table 5-1**, the potential impacts arising from the SI works have been identified as follows:

- Above- water noise, vibration, lighting, and human presence-related species disturbance (including the presence of increased marine traffic, where relevant);
- Habitat loss, alteration and/ or fragmentation (including increased SSC/ smothering);
- Underwater noise, including injury and or displacement of Annex II marine mammals, fish and diving birds from underwater noise;
- Introduction of invasive alien species.

The following sections will assess whether these impacts are likely to give rise to significant effects on the QIs or SCIs of European sites. The assessment has been split into sections based on receptor type, i.e. habitats, otter, marine mammals, fish, and birds.

6.2.1 Annex I Habitats

This section assesses the potential for likely significant effects on those SACs designated for Annex I habitats, where there is potential for connectivity with the MUL Area and the proposed SI works. The assessment is based on the precautionary principle and has been undertaken in the absence of mitigation.

The S-P-R assessment (**Table 5-1**) concluded that the following impacts have the potential to affect Annex I habitats as a result of the SI works:

- Habitat loss, alteration and/or fragmentation (including increased SSC/smothering – relevant to subtidal habitats only);
- Introduction of invasive alien species.

The following relevant QI habitats of the Lower River Shannon SAC were taken forward for assessment:

- Mudflats and sandflats not covered by seawater at low tide [1140],
- Estuaries [1130]; and

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

The following sections assess the likelihood for significant effects to Annex I habitats and summarise the screening for relevant European sites.

6.2.1.1 Habitat Loss, Alteration and/or Fragmentation (Including Increased SSC/Smothering)

SI works activities (below the HWM) with the potential to interact with QI habitats at Lower River Shannon SAC are as follows:

- Land-based geophysical survey including archaeological investigations.
- Geotechnical surveys (51 no. boreholes and SPT's and associated JUB/spud legs).
- Environmental surveys (environmental grab sampling).

The land-based geophysical surveys will involve a small team of surveyors walking along the estuary (below the HWM) using non-intrusive hand-held equipment such as pole-mounted devices. During these non-intrusive surveys, no sediment or vegetation will be removed or disturbed beyond baseline levels, and therefore there will be no habitat loss, alteration or fragmentation.

Boat-based geophysical surveys will involve a small nearshore vessel within the estuary utilising non-intrusive, therefore there is no potential for impacts to habitats due to boat-based geophysical surveys within the MUL Area.

Proposed locations for intrusive geotechnical and environmental sampling are presented in the drawings included in the Project Description report accompanying the MULA. However, as final sampling locations will be subject to the analysis of the geophysical survey findings, the entire estuarine area within the MUL Area must be considered for sampling, in line with the precautionary principle.

As a result, there is potential for direct overlap of the above-listed surveys with Annex I habitats within Lower River Shannon SAC (mudflats and sandflats not covered by seawater at low tide, estuaries, and water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation).

There is also potential for water quality impacts due to localised increased suspension of sediments and potential suspension of contaminated sediments. Intrusive sampling equipment, including grab samples, borehole drilling, SPT's and jack-up barge (JUB)/spud legs and anchoring points have the potential to lead to estuarine habitat loss or damage.

Geotechnical boreholes, environmental grab sampling (and archaeological sampling, if required) are intrusive and have the potential to remove and/or disturb sedimentary habitats within the Lower River Shannon SAC, below the HWM. Where a Jack-up Barge (JUB) is used as a platform to undertake the geotechnical surveys, the legs will result in the disturbance to sediments during the placement operations (i.e. "spudding"). 51 No.

boreholes and SPT's will be drilled within the MUL Area and 63 No. environmental grab samples will be taken within the MUL Area. Summing the areas equates to a total area of impact of 417.9 m^2 which is 0.00897% of the MUL Area (466 ha).

Therefore, intrusive and extractive geotechnical surveys and environmental surveys within the Lower River Shannon SAC have the potential to directly remove, alter or fragment relevant QI habitats of Lower River Shannon SAC.

The likelihood of significant effects cannot be excluded and the following relevant QI habitats of Lower River Shannon SAC are screened in:

- Mudflats and sandflats not covered by seawater at low tide [1140]
- Estuaries (1130)
- Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260]

6.2.1.2 Introduction of invasive alien species

The International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004, entered into force globally on 8 September 2017. It is a treaty, adopted by the International Maritime Organization (IMO) in order to help prevent the spread of potentially harmful aquatic organisms and pathogens in ships' ballast water, including invasive species[6]. The Sea Pollution (Miscellaneous Provisions) Act 2006 gives effect to a number of internationally agreed instruments including the International Convention on Ballast Water Management 2004. The Convention stipulates that ships must manage their ballast water so that aquatic organisms and pathogens are removed or rendered harmless before the ballast water is released into a new location.

Two invasive animal species were recorded within the MUL Area: zebra mussel (*Dreissena polymorpha*) and Quagga mussel (*Dreissena rostriformis bugensis)* were recorded within the MUL Area on the western side of Limerick City Docks (NBDC, 2026f, 2026g). Zebra mussel was first recorded in the Shannon Estuary in the 1990s. This freshwater invasive species is associated with changes in nutrient cycles and a reduction in zooplankton, indirectly impacting food chains[7]. Quagga mussel was first recorded in Ireland in 2021, found in Lough Ree and Lough Derg as well as in the Shannon River between these two lakes. It is noted as potentially competing with native mussel species and impacting nutrient availability through filter feeding. Current consensus is that both of the above species are spread via fouling on boats[8]. Therefore, as precise locations of these invasive species are not yet known, there is potential for the translocation of these species within the Shannon estuary due to the proposed SI works.

[6] https://invasives.ie/about/legislation-policy/ - Accessed May 2026.
[7] Invasive Species Northern Ireland Accessed May 2026
[8] Quagga mussel - Invasives.ie Accessed May 2026

Multiple invasive plant species have been recorded along the banks of the upper Shannon estuary within the MUL Area[9]:

- Giant hogweed (*Heracleum mantegazzianum)*
- Himalayan balsam (*Impatiens glandulifera*
- Japanese knotweed (*Fallopia japonica)*
- Winter heliotrope (*Petasites fragrans)*

As the majority of SI works will take place within the estuary either by boat or JUB/spud barge with access/egress occurring via docklands and not transversing riverbanks where the above invasive plant species were recorded. Therefore, it is unlikely that boat-based SI works will interact with invasive plant species along the Shannon Estuary banks. However, there is potential for the land-based geophysical surveys to interact with these invasive species. **In summary, in the absence of mitigation and in light of the precautionary principle, likely significant effects due to introduction of invasive alien species cannot be excluded for Annex I habitats of the Lower River Shannon SAC.**

6.2.1.3 Annex II Otter

This section assesses the potential for likely significant effects on those SACs designated for Annex II otter, where there is potential for connectivity with the MUL Area and the proposed SI works. The assessment is based on the precautionary principle and has been undertaken in the absence of mitigation.

The SPR assessment (**Section 5.2**) concluded that the following impacts have the potential to affect Annex II otter as a result of the SI works:

- Above-water noise, vibration and lighting;
- Habitat loss, alteration and/or fragmentation (including increased SSC/smothering); and
- Underwater noise.

The following relevant QI of the Lower River Shannon SAC was taken forward for assessment:

- Otter (*Lutra lutra*)

The following sections assess the likelihood for significant effects to Annex II otter and summarise the screening for relevant European sites.

[9] Maps - Biodiversity Maps Accessed May 2026

6.2.1.4 Habitat Loss, Alteration and/or Fragmentation (Including Increased SSC/Smothering)

It is considered that intrusive sampling works will not interact with otter holts or couches as these are not likely to be within the subtidal estuarine areas below the HWM where intrusive sampling will take place. Land-based geophysical surveys will involve a small team of surveyors walking along the estuary (below the HWM) using non-intrusive hand-held equipment such as pole-mounted devices. During these non-intrusive surveys, no sediment or vegetation will be removed or disturbed beyond baseline levels, and therefore there will be no habitat loss, alteration or fragmentation. **Therefore, likely significant effects to otter due to habitat loss, alteration and/or fragmentation can be excluded.**

6.2.1.5 Above-water Noise, Vibration and Lighting

The land-based geophysical surveys will involve a small team of surveyors walking along the estuary (below the HWM) using non-intrusive hand-held equipment such as pole-mounted devices. During these non-intrusive surveys, no above-water noise, vibration or light will be emitted beyond baseline levels (works will be taking place within the confines of Limerick City and docklands where a high level of human activity regularly occurs). It is therefore highly unlikely that there will be any interaction with otters during these surveys capable of disturbance.

Above-water noise from geotechnical sampling (borehole drilling and SPT's from a JUB/spud barge) within the estuary have the potential to disturb otters using the area. As stated in **Section 4.2.1**, only three sightings of otter were recorded adjacent to the MUL Area, most recently in 2023. Given the existing level of baseline activity in the area due to industrial and commercial operations at Limerick Docks and within the city environs and the lack of regular otter sightings, any disturbance caused is likely to be temporary and limited in nature. While the precise geotechnical sampling locations are not known, they will be within or adjacent to industrial and commercial areas, and regardless of the location of sampling within these areas, the conclusion remains that any disturbance is likely to be temporary and limited in nature. Environmental grab sampling is a short-duration, highly localized activity using low-energy sampling gear, so it produces only brief, low-level noise that rapidly attenuates with distance and is small relative to ambient sounds in the Limerick County environment. **Therefore, likely significant effects to otter due to above-water disturbance can be ruled out.**

6.2.1.6 Underwater noise

As otters tend to forage within 80 m of the shoreline (NPWS, 2009), there is potential for interaction between foraging otters and underwater noise generated during the geophysical and geotechnical surveys, as well as from survey vessels. For otters foraging along the riverbanks of the estuary, this has the potential to result in injury and/or disturbance. While there are no published underwear noise injury criteria for Eurasian otter, Southall, et al.,

2019; NMFS, 2024 has provided injury criteria for the 'Other marine carnivores in water (OCW)' hearing group, which includes sea otters. The OCW criteria is extended to Eurasian otter in the current assessment in the absence of more suitable criteria. The underwater noise assessment undertaken to inform this SISAA has concluded the following with respect to injury and/or disturbance to OCW:

- In the absence of mitigation, geophysical sound sources have the potential to cause auditory injury and temporary threshold shift (TTS) to otter less than 10 m from the sound source. Behavioural disturbance for all hearing groups may range out to 1.4 km.
- In the absence of mitigation, geotechnical sound sources have the potential to cause auditory injury and temporary threshold shift (TTS) to otter less than 10 m from the sound source. Behavioural disturbance for all hearing groups may range out to 750m.

The above risk ranges for both the geophysical and geotechnical SI works with no mitigation applied are less than 10 m from the sound source for otters, and given that otters typically forage within 80 m of the shoreline It is predicted that, in addition to this reduced risk range, the physical presence of a survey vessel or JUB/spud barge will cause otters to avoid the immediate vicinity of the surveys, and therefore, they will not come within 10 m of the sound source.

In summary, likely significant effects can be excluded for the otters at Lower River Shannon SAC due to the potential for underwater noise disturbance.

6.2.2 Annex II Marine Mammals

This section assesses the potential for likely significant effects on those SACs designated for Annex II marine mammals, where there is potential for connectivity with the MUL Area and the proposed SI works. The assessment is based on the precautionary principle and has been undertaken in the absence of mitigation.

The S-P-R assessment (**Table 5-1**) concluded that the following impacts have the potential to affect Annex II marine mammal species as a result of the SI works:

- Above-water noise, vibration and lighting;
- Habitat loss, alteration and/or fragmentation (including increased SSC/smothering); and
- Underwater noise.

The following relevant QI of the Lower River Shannon SAC were taken forward for assessment:

- Bottlenose dolphin (*Tursiops truncatus*)

The following sections assess the likelihood for significant effects to Annex II bottlenose dolphin and summarise the screening for relevant European sites.

6.2.2.1 Above-water Noise, Vibration and Lighting

As harbour and grey seals are the only marine mammal with the potential to be disturbed by above-water noise (i.e. due to haul out behaviour) no other marine mammals are considered. The MUL Area does not overlap with SACs designated for Annex I harbour seal or grey seal or known haul-outs for these species. Galway Bay Complex SAC is the closest SAC designated for harbour seal and its boundary is over 86 km by sea from the MUL Area boundary. The Blasket Islands SAC is the closest SAC designated for grey seal and its boundary is over 170 km by sea from the MUL Area boundary. There have been no live sightings or grey or harbour seals within the MUL Area within the last 10 years (See **Section 4.2.2.2 and 4.2.2.3)**. Given that more suitable haul out habitats and prey opportunities within the Lower Shannon estuary and off the west coast of Ireland, it is not expected that harbour or grey seals will have any interaction with the proposed SI works capable of causing above-water noise, vibration and lighting impacts within the MUL Area, and therefore no likely significant effects are predicted.

Likely significant effects due to above-water disturbance can therefore be ruled out for bottlenose dolphins in the Lower River Shannon SAC.

6.2.2.2 Habitat Loss, Alteration and/or Fragmentation (Including Increased SSC/Smothering)

As above, the proposed SI works do not overlap spatially with European sites designated for harbour seal and grey seal, therefore there is no risk of direct habitat loss to haul-out sites or supporting habitats for these species. The proposed SI works overlap with the Lower River Shannon SAC (designated for bottlenose dolphin), therefore there is potential for interaction between the proposed SI works and supporting habitats for bottlenose dolphin.

There is potential for minimal benthic habitat loss due to intrusive sampling methodologies (grab sampling, boreholes, SPT's and JUB/spud legs) and water quality deterioration from survey activities or survey vessels, leading to impacts on bottlenose dolphins or smothering of benthic and pelagic prey species due to increased SSC. However, it is expected that the geographical extent of this impact would likely be limited mainly to the MUL Area. The extent of sediment to be removed is limited (maximum of 63 No. grab samples and 51 No. boreholes) within the MUL Area. Summing these areas equates to a total area of impact of 417.9 m^2 which is 0.00897% of the MUL Area (466 ha). The MUL Area does not overlap any critical habitat for bottlenose dolphin (See **Section 4.2.2**) and there will be plenty of alternative foraging habitat and prey sources available. While the precise sampling locations are not known within the MUL Area, the conclusion remains the same. **Likely significant effects due to habitat loss, alteration or fragmentation for marine mammals can therefore be ruled out for bottlenose dolphin.**

6.2.2.3 Underwater Noise

There is the potential for underwater noise generated during the boat-based geophysical and geotechnical surveys, as well as from survey vessels, to result in injury and/or disturbance to QI marine mammal species.

This SISAA has drawn upon the results of the Subsea Noise Technical Report (provided under separate cover with the MULA documents) to inform this assessment of underwater noise effects. Full details of the technical report have not been repeated here, but the main conclusions relevant to this screening are outlined below. The assessment has used the latest guidance (National Marine Fisheries Service, 2024), reflecting the current best available method for assessing impact from noise on marine mammals. Based on this guidance, auditory impacts to marine mammals can be defined as non-reversible auditory injury (previously referred to as permanent threshold shift (PTS)), or as a temporary threshold shift (TTS) in hearing sensitivity, which can have negative effects on the ability to use natural sounds (e.g. to communicate, navigate, locate prey) for a period of minutes, hours or days.

To assess the impacts of the geophysical and geotechnical surveys within the MUL Area, the geophysical survey assumed that the vessel, SSS, MBES and chirper/pinger SBP, parametric SBP sources were active and hull mounted. The geotechnical surveys assumed that a rotary coring, SPT, cable percussive drilling and a tug vessel were active.

The results have been summarised below to present the conservative ‘worst-case scenario,’ and it should be noted that no mitigation (i.e. soft-start measures, or marine mammal observers) has been applied at this stage. The maximum range with risk of auditory injury is 580 m for harbour porpoise during the geophysical survey.

6.2.2.3.1 Geophysical Survey

- For bottlenose dolphin, auditory injury could occur within <10 m of the sound source, and TTS could occur within 370 m.
- For harbour porpoise, auditory injury could occur within 580 m of the sound source, while TTS could occur within 1.4 km.
- For all marine mammals, behavioural disturbance could occur out to 1.4 km when applying the criterion strictly (unweighted for hearing groups).

6.2.2.3.2 Geotechnical Survey

- For bottlenose dolphin, auditory injury and TTS could occur within <10 m of the sound source.
- For harbour porpoise, auditory injury could occur within 130 m of the sound source, while TTS could occur within 640 m.

- For all marine mammals, behavioural disturbance could occur out to a maximum of 810 (for LF hearing group) when applying the criterion strictly (unweighted for hearing groups).

Risk ranges for behavioural disturbance were modelled applying the criterion strictly (unweighted for marine mammal hearing frequency). This means that, while the impact zones for behavioural disturbance appear large (up to a maximum 1.4 km for the geophysical surveys), the main energy will often be outside of the hearing range of the receiving marine mammal. The reason for these behavioural disturbance ranges is partly due to assumed 24-hour active survey duration in the modelling, however this 24-hour window is unlikely, particularly for geophysical surveys in this area. Additionally, these behavioural risk ranges are unlikely to be realised due to the constant presence of medium to large vessels in the area, including sonar-like sources (e.g. depth-gauges, fish-finders & echo-sounders), meaning the local animals are not naïve to the types of noise emitted from the activity and that the activity will often not be the loudest source of these types of noise.

Behavioural disturbance includes avoidance and changes in behaviour, and will be temporary and short term in duration, with rapid recovery once the survey vessel has left the area. **In summary, in the absence of mitigation and in light of the precautionary principle, likely significant effects due to underwater noise disturbance cannot be excluded for all marine mammal SACs considered in this SISAA:**

- Lower River Shannon SAC.

6.2.3 Annex II Migratory Fish

This section assesses the potential for likely significant effects on those SACs designated for Annex II migratory fish species, where there is potential for connectivity with the MUL Area and the proposed SI works. The assessment is based on the precautionary principle and has been undertaken in the absence of mitigation.

The S-P-R assessment (**Table 5-1**) concluded that the following impacts have the potential to affect Annex II migratory fish species as a result of the SI works:

- Habitat loss, alteration and/or fragmentation (including increased SSC/smothering); and
- Underwater noise.

The following relevant QIs of the Lower River Shannon SAC were taken forward for assessment:

- Sea Lamprey (*Petromyzon marinus*) [1095]
- River Lamprey (*Lampetra fluviatilis*) [1099]
- Salmon (*Salmo salar*) [1106]

The following sections assess the likelihood for significant effects to Annex II migratory fish species and summarise the screening for relevant European sites.

6.2.3.1 Habitat loss, alteration and/or fragmentation (including increased SSC/smothering)

The MUL Area overlaps the Lower River Shannon SC which is designated for the following Annex II migratory fish species: sea and river lamprey and Atlantic salmon. There is potential for the SI works to cause direct habitat loss, smothering due to increased SSC and water quality impacts to migratory fish habitats within this SAC.

Boat-based geophysical surveys will involve a small nearshore vessel within the estuary utilising non-intrusive methods, therefore there is no potential for impacts to supporting habitats of migratory fish of the Lower River Shannon SAC due to boat-based geophysical surveys within the MUL Area.

Proposed locations for intrusive geotechnical and environmental sampling are presented in the drawings included in the Project Description report accompanying the MULA. However, as final sampling locations will be subject to the analysis of the geophysical survey findings, the entire estuarine area within the MUL Area must be considered for sampling, in line with the precautionary principle.

There is potential overlap with the migratory routes of these species, migrating to/from their natal rivers e.g., lamprey and salmon from the Mulkear river, with the potential for interaction with increased SSC and water quality impacts in the water column as a result of intrusive SI works (grab sampling, borehole drilling, SPT's, JUB/spud legs). As such any fish migrating or traveling through the MUL Area could be impeded during the SI works. 51 No. boreholes will be drilled within the MUL Area and 63 No. environmental grab samples will be taken within the MUL Area. Summing the areas equates to a total area of impact of 417.9 m^2 which is 0.00897% of the MUL Area (466 ha).

Therefore, intrusive and extractive geotechnical surveys and environmental surveys within the Lower River Shannon SAC have the potential to directly remove, alter or fragment supporting habitats of migratory fish QIs of the Lower River Shannon SAC.

The likelihood of significant effects cannot be excluded for the supporting habitats of migratory fish QIs of Lower River Shannon SAC:

- Sea Lamprey [1095]
- River Lamprey [1099]
- Salmon [1106]

6.2.3.2 Underwater Noise

The proposed geophysical and geotechnical surveys within the MUL Area will produce underwater noise which has the potential to impact Annex II migratory fish.

The injury criteria used in the fish noise assessment are based on Popper et al. (2014), which does not set out specific TTS limits for Peak Pressure Level (L_{pk}) and for disturbance limits for impulsive noise for fishes. The lack of weighting for fishes reflects a lack of

scientific consensus about the best method for applying frequency dependence to received levels for fishes, rather than a statement that fishes can hear all frequencies equally. Thus, fishes generally cannot hear above 10 kHz, and if they can, the sensitivity is generally very poor (Nedwell, Edwards, Turnpenny and Gordon, 2004). Where received levels at frequencies above 10 kHz are the driver of risk ranges for fishes, an effective filter for noise above 10 kHz is applied.

While there is no accepted guidance that prescribes a suitable weighting for fish, it remains unrealistic to allow high-frequency noise from continuous noise drive large risk for fishes, as they evidently cannot register them nor their acoustic system adversely affected. This is not true for peak pressure, and L_{pk} thus remain completely unweighted.

As detailed in **Section 5.3.4** above, the migratory fish species which are QIs of the Lower River Shannon SAC have potential connectivity with the MUL Area are: sea and river lamprey and Atlantic salmon. This SISAA Report has drawn upon the results of the underwater noise assessment presented in full in the accompanying Subsea Noise Technical Report to inform this assessment of underwater noise effects on migratory fish. The thresholds for harm to fish species have been based on the sound exposure guidelines for fish proposed by the Washington State Department of Transport Biological Assessment Preparation for Transport Projects Advanced Training Manual (WSDOT, 2020) and the Canadian Department of Fisheries and Ocean Effects of Seismic energy on Fish: A Literature review (Worcester, 2006). The full details of this assessment have not been repeated here, but the main conclusions of the noise assessment relevant to Annex II migratory fish found, that no impact would occur beyond 10 m of the sound sources for auditory injury while TTS could occur within 20 m. Given, that the MUL Area directly overlaps the Lower River Shannon SAC for which these migratory fish are designated there is potential for minimal underwater noise impacts to these migratory fish species as they migrate through the affected river stretch. However, as stated above in **Section 4.1** the Shannon estuary is subject to permanent marine inundation with a tidal flow in a generally west to east reach Limerick City. Turbidity levels are often high in the upper estuary due to the large riverine inputs of suspended material; with strong currents also frequent within the estuary therefore there is an existing level of ambient noise contributors within the MUL Area. Therefore, given the nature and scale of the proposed SI works, minimal risk range distances noted above and the ambient noise levels that exist within the estuary due to other vessels, tidal inundation and turbidity. **Likely significant effects to migratory fish species of the Lower River Shannon SAC due to underwater noise can be screened out.**

6.2.4 Birds

This section assesses the likelihood of significant effects on those SPAs where there is potential for connectivity with the MUL Area and the proposed SI works. The assessment is based on the precautionary principle and has been undertaken in the absence of mitigation.

The S-P-R assessment (**Table 5-1**) outlined the following potential sources of impacts to birds as a result of the SI works:

- Above water noise, vibration and lighting;
- Habitat loss, alteration and/ or fragmentation (including increased SSC/smothering and accidental pollution); and,
- Underwater noise.

Relevant SPAs and QI bird species have been listed in **Table 5-2** above. The following sections assess the likelihood for significant effects to these SPAs and species and summarise the screening for relevant European sites.

European sites taken forward for assessment for bird species are listed in **Table 6-1** below. The following sections assess the likelihood for significant effects to birds and summarise the screening for relevant European sites.

Table 6-1: European sites selected for consideration in the Screening for Appropriate Assessment for Birds

European Site (Code)	Distance from the MUL Area (km)	List of Relevant Bird QI/ SCI[10]
River Shannon and River Fergus Estuaries SPA (004077)	Within SAC boundary	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]

[10]Qualifying interests that have not been identified as relevant to this specific assessment are excluded from this table.

European Site (Code)	Distance from the MUL Area (km)	List of Relevant Bird QI/ SCI[10]
		Shoveler (*Spatula clypeata*) [A857] Wetland and Waterbirds [A999]
Lough Derg (Shannon) SPA. (004058)	19 km	Cormorant (*Phalacrocorax carbo*) [A017] Tufted Duck (*Aythya fuligula*) [A061] Goldeneye (*Bucephala clangula*) [A067] Common Tern (*Sterna hirundo*) [A193] Wetland and Waterbirds [A999]

6.2.4.1 Above Water Noise, Vibration and Lighting

SI works activities (below the HWM) with the potential to interact with SCI bird species within the MUL Area are as follows:

- Land-based geophysical and archaeological surveys; and
- Boat-based geophysical surveys.

The MUL Area overlaps the River Shannon and River Fergus Estuaries SPA (designated for wintering bird species including those on passage during spring/autumn migration). The land-based geophysical and archaeological surveys will involve a small team of surveyors walking along the estuary (below the HWM) using non-intrusive hand-held equipment such as pole-mounted devices. Boat-based geophysical surveys will likely take place at high tide, when waterbirds are generally at their roost sites and not foraging on mudflats, however, there is potential for disturbance of roosting birds above the high tide mark along the estuary quay walls and embankments within Limerick City. The physical presence of survey vessel within the estuary and the noise associated with the operation of survey equipment, could result in a limited degree of disturbance to wintering waterbirds in the vicinity of the survey vessel. Birds present on the surface waters near the survey vessels could be temporarily displaced from their chosen feeding/resting locations. Geotechnical sampling (boreholes and SPT's) will introduce above-water noise and vibration to any birds feeding or resting in close proximity to the survey vessel or JUB/spud barge. If these activities are undertaken in the overwintering period (usually October to March), likely significant effects due to disturbance cannot be excluded in the absence of mitigation. Therefore, above-water disturbance to the SCI birds of River Shannon and River Fergus Estuaries SPA cannot be ruled out at this stage.

While River Shannon and River Fergus Estuaries SPA is the only SPA for wintering birds that overlaps with the proposed SI works, SPAs within 20 km were also be considered due to the potential for these species to travel to the MUL Area to forage, e.g. seabird and duck species. **Therefore, the following SPAs for wintering species are screened in:**

- River Shannon and River Fergus Estuaries SPA
- Loug Derg (Shannon) SPA

Therefore, likely significant effects to wintering waterbirds as a result of above-water disturbance cannot be excluded for River Shannon and River Fergus Estuaries SPA and Lough Derg (Shannon) SPA.

6.2.4.2 Habitat Loss, Alteration and/or Fragmentation (Including Increased SSC/Smothering)

Wetlands habitat is a SCI of River Shannon and River Fergus Estuaries SPA for wintering birds, which overlaps with the MUL Area. Wetlands provide food, shelter and breeding habitat for many species. Habitat loss, alteration and/ or fragmentation to these wetlands has the potential to have a significant effect on bird QIs for which these SPAs are designated. As outlined in **Section 6.2.1** above, the land-based geophysical surveys will involve a small team of surveyors walking along the estuary (below the HWM) using non-intrusive hand-held equipment such as pole-mounted devices. During these non-intrusive surveys, no sediment or vegetation will be removed, however, there could be temporary disturbance to wetland habitat during access/egress to sampling locations.

The boat-based geophysical surveys will involve a small nearshore vessel within the MUL Area utilising non-intrusive techniques, therefore there will be no interaction with wetland habitats.

Geotechnical boreholes, environmental grab sampling (and archaeological sampling, if required) are intrusive and have the potential to remove or alter SPA wetland habitats within the River Shannon and River Fergus Estuaries SPA. Where a Jack-up Barge (JUB) is used as a platform to undertake the geotechnical surveys, the legs will result in the disturbance to sediments during the placement operations (i.e. “spudding”). 51 No. boreholes will be drilled and 63 No. grab samples will be taken within the MUL Area. The wetland habitat area for the River Shannon and River Fergus Estuaries SPA is estimated as 32,261 ha (NPWS, 2012), summing the total area of impact from the proposed SI works (417.9 m^2) relative to the estimated area of wetland habitats within the SPA (32,261 ha), the percentage of wetland habitat that has the potential to be impact by the proposed works equates to 0.00013%. Therefore, given the nature and scale of the proposed SI works and the very minimal impact on wetland habitats relative to the total area of the SPA (0.00013%) potentially impacted by the proposed SI works.

The likelihood of significant effects can be excluded at the River Shannon and River Fergus Estuaries SPA due to habitat loss, alteration or fragmentation of wetland habitats.

6.2.4.3 Underwater Noise

There is potential for diving seabirds to interact with the marine surveys while underwater noise is being produced. The following SPAs are designated for the protection of diving species, including cormorant, tufted duck, goldeneye and common tern.

- River Shannon and River Fergus Estuaries SPA

- Lough Derg (Shannon) SPA

Hartley Anderson Limited (2020) provide a summary of the available evidence on the auditory abilities and effects of underwater noise of diving birds, however, this evidence is very limited. Findings from more recent empirical research on a cormorant subspecies suggest that at least some diving birds have underwater hearing sensitivity is at least as good as their aerial sensitivity (Larsen et al., 2020). A 2024 study of auks found that frequencies of sensitive hearing overlap with many anthropogenic noise sources, indicating susceptibility to disturbance from a range of noise types (Smith et al., 2024).

While seabird responses to approaching vessels are highly variable (e.g. Fliessbach et al. 2019), flushing disturbance would be expected to displace most diving seabirds from close proximity to the survey vessel a, thereby limiting their exposure to the highest sound pressures generated. Similarly, behavioural disturbance of seabirds due to acoustic survey activities is most likely to be temporary displacement associated with the physical presence of the vessel, comparable to that experienced by routine shipping traffic (Hartley Anderson Limited, 2020) and when the survey vessel has left the area, birds can resume diving activities. Therefore, despite the findings of Smith (et al., 2024), impacts on bird fitness will not lead to population-level effects at SPAs.

Given the limited extent of sound-producing activity, the limited time diving birds spend underwater, and given that birds are likely to be temporarily displaced to the surrounding area due to the presence of the vessel, it is considered that there is a very low likelihood of interaction between underwater noise sources and diving birds during the proposed SI works. **Therefore, no likely significant effects to diving birds due to underwater noise are expected, and no further assessment is required.**

6.3 In-combination effects

Even if projects are unlikely to have significant effects on their own, the effects in-combination with those of other plans or projects could be significant. An in-combination screening assessment has been carried out to identify other projects/plans that could act in-combination with the SI works to affect site conservation objectives (in accordance with OPR, 2021).

MARA has identified the following key steps for assessing in-combination effects:

- Defining the Cumulative Effects Spatial Scope (CESS);
- Defining the Cumulative Effects Temporal Scope (CETS);
- Impact identification;
- Pathway identification;
- Prediction;
- Identification of Plans or Projects that could act in combination;
- Screening Stage Cumulative Effects Assessment conclusion; and
- Managing cumulative impacts - to be carried out as part of Stage 2 AA process.

6.3.1 Cumulative Effects Spatial Scope (CESS)

The CESS was based on the maximum impact range identified in the accompanying SISAA when considering impacts of the proposed SI works. Beyond this maximum distance, the proposed SI works will have no effect and therefore no potential pathway to cumulative effects with other projects. The maximum impact range identified for the SI works was a conservative 1.4 km for behavioural disturbance to marine mammals, however, based on the precautionary principle and ensuring all potential projects and plans in combination are assessed a CESS of 5km from the boundary of the MUL Area was applied.

6.3.2 Cumulative Effects Temporal Scope (CETS)

The CETS was based on the potential for temporal overlap with the proposed SI works. As the proposed SI will have a five-year licence, projects likely to take place within the next six years were identified as potentially relevant, allowing for a precautionary one-year buffer to allow for the time between submission of this MULA and an MUL being granted.

6.3.3 Impact Identification

Potential impacts related to the proposed SI works are described in **Section 5.2.1** of this SISAA Report. In the absence of mitigation, the proposed SI works individually have the potential to give rise to likely significant effects, due to above-water disturbance, habitat loss/disturbance and underwater noise disturbance.

In order for other plans/ projects to act in-combination with the proposed SI works, they must also give rise to the above impacts.

6.3.4 Pathway Identification and Prediction of Impacts

6.3.4.1 Above-water Disturbance

Above-water disturbance due to the presence of humans, vessels and equipment, noise, vibration and lighting have the potential to occur during the SI works. The SI works and related effects will be temporary and of relatively short duration which will be limited to within the MUL Area. Therefore, it is considered that only projects which also have the potential to cause above-water disturbance and which are likely to occur at the same time as the SI works and are within the MUL Area have the potential to act in-combination.

It is considered unlikely that high-level plans have the potential to contribute to above-water disturbance occurring at the same time and in the same place as the SI works.

6.3.4.2 Habitat Loss and/or Disturbance

There is potential for habitat loss and/or disturbance due to intrusive sampling methodologies (i.e. boreholes, SPT's and grab sampling) within the MUL Area.

The SI works and related effects will be temporary and of short duration and will occur only within the MUL Areas at each of relevant work's locations. Therefore, it is considered that only projects occurring at the same time as the SI works and within the MUL Area have the potential to act in-combination.

It is considered unlikely that high-level plans have the potential to contribute directly to habitat loss and/or disturbance occurring at the same time and in the same place as the SI works.

6.3.4.3 Underwater Noise Disturbance

The proposed SI works will give rise to underwater noise, which, in the absence of mitigation, will lead to likely significant effects. Therefore, other projects in the upper Shannon Estuary with the potential to emit underwater noise within the CESS should be considered in-combination with the proposed SI works.

It is considered unlikely that high-level plans have the potential to contribute directly to underwater noise disturbance occurring at the same time and in the same place as the SI works.

6.3.5 Identification of Plans or Projects

Tetra Tech RPS undertook a desk study using internet searches, planning databases and other available sources, as outlined below, to identify other plans, projects and activities likely to overlap with the CESS and CETS of the proposed SI works, which have the potential to give rise to in-combination effects.

6.3.5.1 Plans

Following the identification of likely pathways for in-combination impacts, it is considered that for a plan to be able to act in-combination with the proposed SI works, it must determine the precise location of a project or designate specific land uses. A review was undertaken of national, regional and local plans using planning portals and expert knowledge. While the proposed Limerick Flood Relief project aligns with the objectives of high-level plans such as the National Development Plan and the National Marine Planning Framework (NMPF), without geographically specific actions or objectives, there is no pathway to interaction with the proposed SI works that could lead to likely significant effects.

The Climate Action Plan (DECC, 2025) outlines a list of actions for 2025, including AD/25/7 “Development of Sectoral Adaptation for the Flood Risk Management Sector”. Through informing the design of the Limerick FRS the proposed SI works directly support this action through ensuring that adaptation measures are well informed by reliable and up to date local data.

Other potentially relevant plans include the Water Framework Directive, Water Services Policy Statement, Water Quality and Water Services Infrastructure and the Biodiversity Action Plan however, given the temporary nature of the proposed SI works and the lack of specific detail available at the plan level, it is considered more appropriate to consider in-combination impacts with projects, as they are submitted to relevant consenting authorities.

There are no anticipated in-combination effects from plans and therefore plan-level in-combination effects are screened out from further assessment.

6.3.5.2 Projects

Other projects could potentially give rise to either direct impacts on habitats or species (loss of habitat, disturbance to species) or indirect impacts (e.g., activities which could affect water quality or hydrology which could in turn affect the status/health of populations of water dependant habitats or species).

A search of foreshore licence and MUL applications/determinations which could interact with the SI works was conducted using the relevant consenting authority websites (DHLGH - foreshore applications, MARA - MULs, An Coimisiún Pleanála (ACP) - Strategic Infrastructure Development (SID) - marine developments, Environmental Protection Agency (EPA) – Dumping at Sea (DaS) permits). A full list of all relevant consent applications is available in Appendix A.

The MUL application for the proposed SI works discussed above will not overlap temporally with the main Flood Relief Scheme. This MULA and associated SI works will be conducted and completed prior to any ancillary or infrastructure works commencing as part of the overall Flood Relief project. Therefore, there is no potential for cumulative effects between the proposed SI works and the overall Limerick Flood Relief project.

One DaS licence overlaps the MUL Area. The Shannon Foynes Port Company dredges within the MUL Area (S0009-03) at Shannon Foynes Port in Limerick City with a permit end date of 31/12/2026. There is potential for spatial and temporal overlap if the proposed SI works MUL is granted before the DaS expires. Therefore, based on the precautionary principle there is potential for spatial or temporal overlap with the proposed SI works and some potential for in-combination effects due to habitat loss/disturbance, above-water disturbance effects and underwater noise effects within the MUL Area.

No MUL applications overlap the proposed SI works within the Shannon estuary, the nearest MUL application is located at Anguish Co. Limerick, 22 km west of the MUL Area. Therefore, no MUL applications are considered to act in-combination with the proposed SI works and are not considered further as they are outside the CESS and CETS.

Three foreshore licence applications within the CESS have been granted licences, as discussed below. There are two ACP permissions and one foreshore licence which are relevant to the Limerick FRS. These works are ongoing as part of the wider scheme therefore there is potential for spatial and temporal overlap of works which may cause cumulative effects. These are explained in more detail below.

LCCC was granted a foreshore licence (FS007190) to undertake upgrades and additions to flood protection measures around King's Island in Limerick City. This licence was for a period of 35 years from the commencement date (18/04/2024). As of 10/02/2026, construction for this project is still ongoing[11]. Therefore, there is possible spatial or temporal overlap with the proposed SI works and some potential for in-combination effects due to habitat loss/disturbance and above-water disturbance effects within the MUL Area.

LCCC were granted planning permission (ACP306270) to construct a Flood Relief Development on King's Island in Limerick City, <1km from the proposed MUL Area. This was approved subject to conditions on 21/05/2021. Construction works are ongoing and within the CESS of the proposed SI works therefore there is potential for spatial and temporal overlap with the proposed SI works.

LCCC were granted planning permission (ACP312559) for ground investigation (GI) works to inform the option selection and design of the proposed Limerick FRS within the proposed MUL Area. This was approved with conditions on 20/09/2022. This GI work has been fully completed.

Shannon Foynes Port Company were granted a foreshore licence (FS006975) to undertake maintenance dredging in and around the Limerick docks. The licence was for a period of eight years from the commencement date (29/05/2023). Therefore, there is potential for spatial and temporal overlap.

[11] xhttps://www.floodinfo.ie/frs/en/kings-island/news/ King's Island Project News

6.3.6 Screening Stage In-combination Effects Assessment Conclusion

Based on the above review of other projects occurring within the CESS and CETS of the proposed SI works, there is potential that the following projects could act in combination and likely significant effects in-combination cannot be excluded at this stage:

- Shannon Foynes DaS (S0009-03);
- Limerick City and County Council (FS007190);
- Shannon Foynes Port Company (FS006975); and
- Limerick City and County Council (ACP306270).

In the absence of mitigation measures, there is the potential for in-combination effects with other projects and therefore in-combination effects are screened in for further assessment.

7 Summary and Conclusions

7.1 Summary

In accordance with the relevant legislation and the methodology followed, supporting information to inform a Stage 1 Screening for Appropriate Assessment was compiled. This SISAA report has been compiled in order to ascertain whether the proposed SI works are likely to have a significant effect on any European site.

Table 7-1 summarises the findings of this assessment and lists the two European sites for which likely significant effects cannot be excluded alone, or in-combination with other plans or projects, without further evaluation or analysis, or the application of mitigation measures.

Table 7-1: Summary of European sites and relevant qualifying interests screened in for Likely Significant Effects

European Site	Distance to MUL Area	Relevant QI/ SCI	Likely Significant Effect
Lower River Shannon SAC	Within SAC boundary	Mudflats and sandflats not covered by seawater at low tide [1140]	Habitat loss, alteration or fragmentation, including increased SSC/smothering/water quality
			Invasive species
		Estuaries [1130]	Habitat loss, alteration or fragmentation, including increased SSC/smothering/water quality
			Invasive species
		Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260]	Habitat loss, alteration or fragmentation, including increased SSC/smothering/water quality
			Invasive species
		Petromyzon marinus (Sea Lamprey) [1095]	Habitat loss, alteration or fragmentation, including increased SSC/smothering/water quality
		Lampetra fluviatilis (River Lamprey) [1099]	Habitat loss, alteration or fragmentation, including increased SSC/smothering/water quality
		Salmo salar (Salmon) [1106]	Habitat loss, alteration or fragmentation, including increased SSC/smothering/water quality
		Tursiops truncatus (Common Bottlenose Dolphin) [1349]	Underwater noise
River Shannon and River Fergus	Within SAC boundary	Cormorant (*Phalacrocorax carbo*) [A017] Whooper Swan (*Cygnus cygnus*) [A038]	Above water noise disturbance

European Site	Distance to MUL Area	Relevant QI/ SCI	Likely Significant Effect
Estuaries SPA		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]	
Lough Derg (Shannon) SPA	19 km from MUL Area	Cormorant (*Phalacrocorax carbo*) [A017] Tufted Duck (*Aythya fuligula*) [A061] Goldeneye (*Bucephala clangula*) [A067] Common Tern (*Sterna hirundo*) [A193] Wetland and Waterbirds [A999]	Above water noise disturbance

7.2 Conclusion

Tetra Tech RPS has prepared this report to provide the necessary information to MARA for them to complete a Screening for Appropriate Assessment of the potential for likely significant effects on European sites, in view of their conservation objectives, arising from the SI works either individually or in combination with other plans or projects. The potential impacts of the SI works have been considered in the context of the European sites potentially affected, their QI/ SCI and their conservation objectives, through the application of the S-P-R model, which considered the potential extent of effects from the SI works and the potential in-combination effects with other plans or projects. Measures intended to avoid or reduce the harmful effects of the proposed development on European sites (i.e. “mitigation measures”) have not been taken into account in this SISAA. The overall findings are as follows:

The SI works are not connected with or necessary to the management of the nature conservation interest of any European site. The SI works, in the absence of mitigation, are likely to cause significant effects on two European sites, as listed in **Table 7-1** above. In the absence of mitigation measures, there is potential for in-combination effects with other projects and therefore in-combination effects with relevant projects will be considered for further assessment.

On the basis of objective information, it is our opinion that it cannot be excluded that the SI works, individually or in combination with other plans or projects, will have a significant effect on a European site. It is respectfully submitted that MARA should conduct an Appropriate Assessment and therefore a Natura Impact Statement (NIS) will be prepared to assist MARA in conducting an Appropriate Assessment.

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Appendix A
List of Projects for In-combination Assessment

Table A.1: List of projects identified following a search of the relevant databases undertaken on the 01/05/2026

No.	Application reference no.	Project	Approximate Distance from MUL Area	Project Status	In-combination Effects Assessment
1	S0009-03	Shannon Foynes Port Company maintenance dredging.	Overlaps	Permit end date 31/12/2026.	Spatial overlap with MUL Area within Limerick City portion of SI works. Within the Cumulative Effects Spatial Scope (CESS). Possible temporal overlap.
2	ACP312559	Limerick Flood Relief Scheme SI works	Overlaps	Granted, works completed.	Spatial overlap with MUL Area within Limerick City portion of SI works. Within the Cumulative Effects Spatial Scope (CESS).
4	ACP306270	King's island FRS works	<1km	Granted – approved subject to conditions 21/05/2021	Within the Cumulative Effects Spatial Scope (CESS). Possible temporal overlap.
5	FS007190	King's Island FRS	<1km	Determination	Within the Cumulative Effects Spatial Scope (CESS). Possible temporal overlap.
6	FS006975	Shannon Foynes Port Company Maintenance Dredging	Overlaps	Determination	Within the Cumulative Effects Spatial Scope (CESS). Possible temporal overlap.