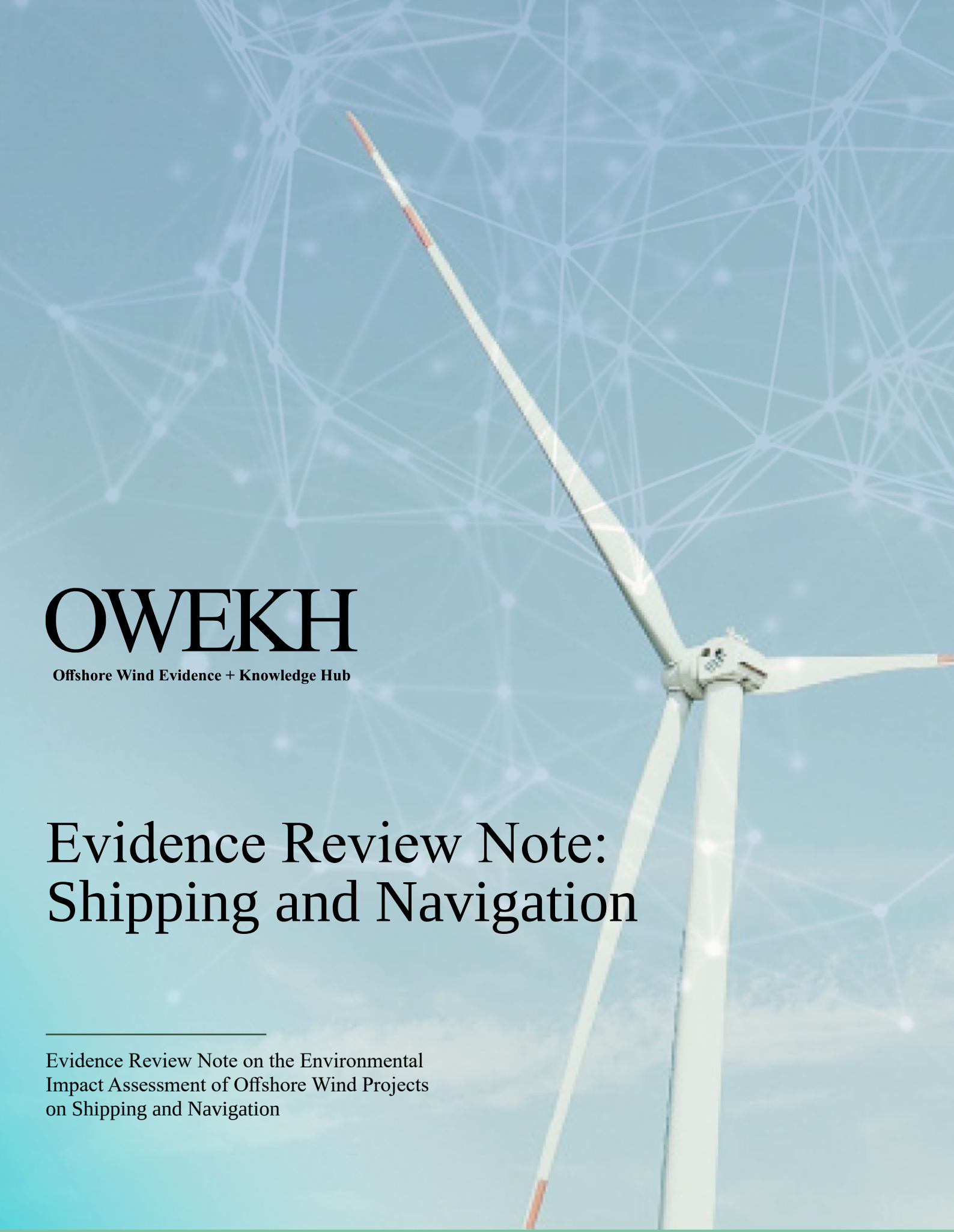

OWEKH

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Evidence Review Note: Shipping and Navigation

Evidence Review Note on the Environmental Impact Assessment of Offshore Wind Projects on Shipping and Navigation

Offshore Wind Evidence + Change Programme

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ISEP Impact Assessment

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Author's Note: Contributions to this document are made in a personal or professional capacity and do not necessarily imply endorsement of the entire document by the contributor or by the contributors' respective organisations.

About OWEKH

The Offshore Wind Evidence Knowledge Hub (OWEKH) is a centralised platform that supports evidence-based decision-making in the offshore wind sector. It brings together stakeholders to share best practice, access data, and apply learning and trusted knowledge, helping to inform development, proportionate impact assessment, policy and planning. Find out more at: owekh.com

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Executive Summary

This Evidence Review Note (ERN) provides comprehensive guidance on assessing the impacts of offshore windfarm (OWF) projects on shipping and navigation in the UK. Drawing on evidence from 76 Environmental Impact Assessments (EIAs), along with input from regulators and shipping and navigation professionals, the ERN aims to support more effective, proportionate, and consistent EIAs.

This ERN does not propose any changes to Navigational Risk Assessment (NRA) methodology and refers to the standard good practice and policy that is currently used. The NRA provides a detailed technical assessment of navigational hazards and risks, e.g. including calculations of collision probabilities, while the EIA summarises these findings and presents them in line with the requirements of the EIA regulations.

Several challenges have been identified in this latter component, i.e. the translation of the NRA into EIA reporting on shipping and navigation impacts. EIA scoping, reporting structures and terminology varies widely across projects, making it difficult to compare findings and increasing the complexity of assessments. Environmental Statements (ES) and EIA reports are often overly detailed and lengthy, which can obscure key conclusions and reduce their accessibility for stakeholders. There is an increasing need to better assess and screen for potential cumulative impacts and strategic-level considerations to identify any potential unacceptable risks earlier, prior to embarking on detailed EIA.

The analysis highlights the importance of mitigation measures in reducing adverse effects on shipping and navigation. Well-designed interventions are proven to be highly effective, usually bringing predicted impacts below significance thresholds in EIA and into tolerable thresholds for NRA. Better integration of digital tools such as GIS, interactive maps and dynamic reporting platforms present a transformative opportunity to enhance the clarity and accessibility of EIA outputs.

To address these issues, the ERN gives recommendations in six key areas in relation to shipping and navigation EIA:

- **Standardisation of Scoping**: Standardise scoping practices across the UK, to prioritise significant impacts while minimising unnecessary assessments.
- **Consistency and Clarity of Reporting**: Use standardised chapter structures, consistent terminology, and streamlined reporting formats. This will improve accessibility for all stakeholders, from technical specialists to the general public.
- **Proportionality of Reporting**: Focus on significant impacts and use technical appendices for detailed data, avoiding unnecessary duplication of NRA content, and ensuring concise ES, supported by digital tools. Use integrated digital platforms to enable improved reporting with interactive, user-friendly outputs through GIS-based mapping, dynamic visualisations, and the potential for enhanced monitoring reporting.
- **Monitoring and Enforcement**: Carry out robust management and monitoring of frameworks to ensure the implementation of controls, monitor the effectiveness of mitigation measures and enforce non-compliance.

- **Strategic Approach to Risk Assessment**: Create greater alignment between project-level assessments and wider strategic objectives, including cumulative effects across multiple OWF projects. This will improve efficiency and provide better context for decision-making.
- **Use of Cumulative Effects Assessment (CEA):** Adopt a consistent approach to assessing CEA for shipping and navigation. Identify any cumulative adverse effects, across regions or areas of sea where offshore wind is deployed, that need to be taken into account for future projects.

By implementing these recommendations, the offshore wind sector can reduce costs, increase certainty and streamline the consenting process. Clearer and more accessible reporting will foster trust and engagement among stakeholders. A consensus-led and evidence-based approach will balance the need for renewable energy development while safeguarding the needs of shipping and navigation.



Rampion, 2022

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List of Abbreviations and Acronyms

Acronym / Name / Abbreviation	Description
AIS	Automatic Identification System
ALARP	As Low as Reasonably Practicable
COLREGs	Convention on the International Regulations for Preventing Collisions at Sea, 1972, as amended
CBRA	Cable Burial Risk Assessment
CEMP	Construction Environmental Management Plan
CES	Crown Estate Scotland
DCO	Development Consent Order
DAERA	Department for Agriculture, Environment and Rural Affairs (NI)
DECC	Department of Energy & Climate Change
Defra	Department for Environment, Food & Rural Affairs
DESNZ	Department for Energy Security and Net Zero
DfT	Department for Transport
EIA	Environmental Impact Assessment
ERCoP	Emergency Response Cooperation Plan
ES	Environmental Statement
HMCG	His Majesty's Coastguard
HSE	Health & Safety Executive
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
IA	Impact Assessment
IEMA	Institute of Environmental Management and Assessment (now ISEP)
IEP	Industry Evidence Programme
ISEP	Institute of Sustainability and Environmental Professionals (formerly IEMA)
IMO	International Maritime Organization
MCA	Maritime and Coastguard Agency
MGN	Marine Guidance Note
MHWS	Mean High Water Springs
MMO	Marine Management Organisation
NGO	Non-Governmental Organisation
NPS	National Policy Statement
NSP	Navigational Safety Plan

Acronym / Name / Abbreviation	Description
NRA	Navigational Risk Assessment
NRW	Natural Resources Wales
OWF	Offshore Wind Farm
OWEC	Offshore Wind Evidence and Change Programme
OWEKH	Offshore Wind Evidence and Knowledge Hub
PINS	Planning Inspectorate
RYA	Royal Yachting Association
SAR	Search and Rescue
SMS	Safety Management System
SOLAS	International Convention for the Safety of Life at Sea, 1974, as amended
TCE	The Crown Estate
TTG	Technical Topic Group
UKHO	United Kingdom Hydrographic Office
UNCLOS	United Nations Convention on the Law of the Sea
VHF	Very High Frequency
VTMP	Vessel Traffic Management Plan

Glossary of Terms

Term	Meaning
Aspect	The factor (i.e. emergency response, navigational safety) that may be impacted by the direct and indirect significant effects of the OWF.
Impact	A potential change brought about by the proposals. An impact can be broad or specific, for example, an impact can be on the shipping activities of a whole shipping company, or on the route of a single ship. In NRA the equivalent term is 'hazard'.
Effect	The assessment of an impact on a receptor. It should take the context into account, including the characteristics of the impact (i.e. duration, magnitude, reversibility, certainty, direct, indirect, cumulative, transboundary, etc.) the presence and nature of receptors (i.e. sensitivity, importance, rarity, legal protection, etc.) and any other factors or considerations (i.e. if the effect is beneficial or adverse for the receptor). In NRA the equivalent term is 'risk'.
Matter	A subdivision of an aspect, such as a specific impact on a receptor during a particular phase of development.
Outline Environmental Management Plan (oEMP)	An outline Environmental Management Plan (oEMP) is a document(s) included at the pre-consent stage of an application which sets out the responsibilities and environmental standards that the planning applicant (and any contractors) will comply with. An oEMP serves as a framework and baseline from which the final EMP will be developed post-consent. Depending on the project, EMPs may be divided by phase and presented as Construction EMPs (CEMP), Operations EMPs (OEMP) and Decommissioning EMPs (DEMP). For shipping and navigation, depending on the project a Vessel Traffic Management Plan (VTMP) may be part of the EMP, or a separate document.
Phase	The phase of a project lifecycle. Typically divided into construction, operation and decommissioning, to differentiate the changing impacts of a project across the phases.
Receptor	Something that is being impacted. A broad category which can include human beings, species, receiving environment, resources, or a specific entity, location or asset.
Source	Any origin or point of emission of a physical, chemical, biological, or social factor that may cause an environmental impact.
Significance	A binary determination of whether an effect on a receptor is substantial and material, taking into account the context of the frequency of occurrence, impact, receptor and effect(s) identified, based on a scale of impact and threshold of significance. In NRA the equivalent term is 'risk tolerability', and the binary determination is if the risk is 'unacceptable' or not.

1. Introduction

1.1 Overview of OWEKH

The Offshore Wind Evidence and Knowledge Hub (OWEKH) has a mission to facilitate and streamline the consenting process for the offshore wind sector through a comprehensive, sector-wide online portal. This portal (owekh.com) offers a unified access point for critical data and information, including the latest guidance and best practice documents. Supported by a network of key stakeholders, including regulators, government departments, industry and practitioners, the portal fosters collaboration and data sharing across the offshore wind sector.

OWEKH is sponsored by The Crown Estate and supported by:

- Department of Agriculture, Environment and Rural Affairs (DAERA) Northern Ireland
- Department for Energy Security and Net Zero (DESNZ)
- Department for Environment, Food & Rural Affairs (DEFRA)
- The Institute of Sustainability and Environmental Professionals (ISEP)
- Natural Resources Wales (NRW)
- Marine Management Organisation (MMO)
- Offshore Wind Evidence and Change (OWEC) Programme
- Offshore Wind Industry Council (OWIC)
- Planning Inspectorate (Observer)
- Welsh Government.

The portal's data component provides access to a diverse range of datasets from public, private, and non-governmental organisation (NGO) sources, all relevant to OWF development. Meanwhile, the knowledge component analyses this data to generate evidence-based insights and guidance.

By consulting with key stakeholders including regulators, industry and statutory bodies, OWEKH ensures that these insights are translated into high-quality and actionable Evidence Review Notes (ERNs). ERNs aim to bring consistency, efficiency, and standardisation to the assessment, planning and development of OWF projects.

An evidence-led approach supports impact assessments and informs consenting decisions by offering clear and consistent guidance which can be easily and widely disseminated to interested parties. OWEKH's efforts are designed to accelerate the sustainable growth of offshore wind energy, aligning with the UK Government's Clean Power objectives. This may also link to emerging requirements of Environmental Outcome Reports (EOR).

This Evidence Review Note (ERN) is intended as a referenceable best practice guide which distils key insights from a review of Environmental Statements/Reports, submitted for offshore wind projects. It is intended to support strategic decision-making across the sector—by regulators, developers, consultants, and advisors—through the identification of common assessment practices, recurring challenges, and evidence gaps.

The findings are designed to inform more consistent and effective environmental assessments and to guide future planning and engagement. This document should be used alongside project-specific evidence and expert input.

1.2 Introduction to the Shipping and Navigation ERN

This ERN provides the latest guidance for the EIA of OWF projects on shipping and navigation.

Section 1: Introduces OWEKH and the ERN concept.

Section 2: A summary of the key evidence that has been reviewed to inform recommendations.

Section 3: Key recommendations and guidance for future projects.

Section 4: Calls for further research and evidence gaps.

Section 5: A summary of the key recommendations.

Section 6: Members of the Technical Topic Group who have contributed to the creation of the ERN.

Section 7: Key references and recommended further reading.

Annex A: OWF projects that have published EIAs.

Annex B: Guidance on writing the shipping and navigation ES or Environmental Report.

Annex C: Recommended standard wording for mitigations for outline Construction Environmental Management Plans (oCEMP), commitment registers, conditions and requirements.

This ERN should be read in conjunction with Evidence Review Note: *Evidence Review Note – Environmental Impact Assessment*, which provides overarching guidance on the structure and principles of EIA assessment and reporting across all offshore wind aspects.

Based on the Industry Evidence Program (IEP) [1] pilot and subsequent discussions with key stakeholders across the sector, there is wide agreement that current EIA practices can be significantly improved. More strategic, coordinated efforts are necessary to advance the practice of EIA, ensuring it is effective and efficient. Translating these improvements into actionable steps requires robust evidence and thorough scrutiny to secure acceptance from all stakeholders and to produce recommendations that are widely endorsed.

The ERN serves as a platform to address these needs by providing a standardised analysis of existing data, identifying key findings, and offering actionable insights by focusing on several key areas: Evidence-Based Practice; Proportionate Scoping; Avoiding Duplication of Effort; Standardisation and Consistency; Collaboration and Consensus; Continuous Improvement.

[1] IEMA, TCE, RHDHV (2018) Industry Evidence Programme Offshore Wind Farms - Pilot Industry Evidence Base.

2. Review of Evidence

2.1 Methodology

The review of evidence to support this Evidence Note consisted of three key elements:

1. A review of previous assessments of shipping and navigation undertaken as part of the EIA process for UK OWF.
2. A review of any other key reports or research related to the impact assessment of shipping and navigation for OWF, for example, decision notices, monitoring reports, academic and industry research, government guidance.
3. Stakeholder engagement with leading experts, consultees and regulators of shipping and navigation for the offshore wind sector.

Where documents have been referenced, the aim is to ensure a majority of these are available and accessible within OWEKH.

The EIA review looked at the identified impacts and proposed mitigation from the Environmental Statements[2] from 76 offshore wind farm EIAs completed in the UK that sought to assess and report on the projects' impacts on shipping and navigation. A full list of the OWF EIAs included in the review are contained in **Annex A** of this Evidence Review Note.

2.2 Assessment of Shipping and Navigation

EIA regulations are in force across all parts of the UK for major classes of development (including OWF) and require the identification and description of any likely significant effects of a development on certain factors. The factors most relevant to shipping and navigation EIA are human health, pollution and material assets. The factors most important to navigational safety are prevention of environmental pollution (from cargo or fuel oils), injury or loss of life to crew or passengers, and the protection of material assets. In addition to EIA regulations, various legislation, policies and guidelines are relevant to the assessment of the impacts of OWF on shipping and navigation.

These include:

Legislation and conventions

- Convention on the International Regulations for Preventing Collisions at Sea (COLREGs) (IMO, 1972, as amended).
- International Convention for the Safety of Life at Sea (SOLAS) Chapter V (IMO, 1974, as amended).
- United Nations Convention on the Law of the Sea (UNCLOS) (UN, 1982).

[2] Environmental Statement (ES) is the term used in Wales and England; the term 'EIA Report' is used in Scotland. Where this Evidence Review Note refers to an ES, this can also be taken to refer to EIA Reports for Scottish projects.

National policy

- National Policy Statement (NPS) for Renewable Energy Infrastructure (EN-3) (DESNZ, 2024).
- Overarching Policy Statement for Energy (EN-1) (DESNZ, 2023, paragraph 4.1.7).
- NPS for Electricity Networks Infrastructure (EN-5) (DESNZ, 2023).
- NPS for Ports (DfT, 2012).

Guidance

- Revised Guidelines for Formal Safety Assessment (FSA) for Use in the IMO Rule making Process (IMO, 2018).
- IALA Guideline G1162: The Marking of Offshore Man-Made Structures (IALA, 2021).
- MGN 372 Amendment 1 (M+F) Guidance to Mariners Operating in the Vicinity of United Kingdom (UK) OREIs (MCA, 2022).
- MGN 654 Safety of Navigation: Offshore Renewable Energy Installations (OREIs) – Guidance on UK Navigational Practice, Safety and Emergency Response (MCA, 2021).
- MGN654 Annex 1 Methodology for Assessing Marine Navigational Safety & Emergency Response Risks of Offshore Renewable Energy Installations (OREI) v3.1 (MCA, 2023).
- MGN654 Annex 5 Offshore Renewable Energy Installations: Requirements, guidance and operational considerations for SAR and Emergency Response v4 (MCA, 2024).
- Standard Marking Schedule for Offshore Installations (DECC, 2011).
- The RYA's Position on Offshore Renewable Energy Developments: Paper 1 (of 4) – Wind Energy (RYA, 2019).
- Regulatory expectations on moorings for floating wind and marine devices (HSE & MCA, 2017).
- Interaction Between Offshore Wind Farms and Maritime Navigation (PIANC, 2018).

2.2.1 Scope of Review

This ERN is focused on the assessment of impacts on shipping and navigation only. Typically, the shipping and navigation chapter of an ES will have some crossover with other chapters, and for the purpose of safety of navigation, will also address aspects arising from other marine users, commercial fisheries, civil and military aviation, tourism and socio-economics. The recommendations in this ERN are in relation to the EIA of shipping and navigation as typically presented in an ES or subsequent consent conditions. This ERN does not propose any changes to NRA methodology.

2.2.2 Review of OWF Shipping and Navigation Assessments

The review looked at and identified impacts on shipping and navigation and proposed mitigation from the ES from 76 OWF EIAs completed in the UK. A full list of EIAs included in the review is in **Annex A.**

The shipping and navigation chapter of the EIA aims to examine the likely significant effects of the construction, operation and decommissioning of an OWF on shipping and navigation. At the same time, the chapter will report on, and be informed by, the outcomes of the supporting NRA. The NRA is normally included as an annex to the chapter.

It is evident that the shipping and navigation chapter is typically structured along the lines of a policy and legislation section followed by consultation and engagement, methodology and baseline data, assessment and mitigation. Following standard EIA methodology, the shipping and navigation chapters will normally also cover interrelationships, cumulative effects and transboundary effects. Where the potential for significant adverse impacts is identified, mitigation measures are set out and any established conditions, requirements or commitments are recorded.

Typical navigation features to be identified are set out in MGN654 (MCA, 2021) and can include existing OWFs (particularly relevant for extensions), traffic patterns, traffic densities, IMO-adopted ships' routing measures, water depths, nearby ports and harbours, and pilotage areas. A vessel traffic survey will provide data on volumes of vessel traffic and the types of vessels involved (cargo, tankers, recreational, fishing etc.).

Shipping and navigation effects were identified as a topic in all 76 projects included in the review. Based on the review, over 956 'pre-mitigation' impacts were assessed and reported across project phases, with categorisation of the impacts ranging from 'no impact' to 'major adverse effects'.[3] In simple terms, no impacts would indicate no concerns, and major adverse effects would refer to impacts which are potentially significant for commercial, fishing, recreational or emergency services vessels relating to safety or commercial consequences.

In terms of shipping and navigation, the effects for decommissioning are considered by most assessments to be very similar to those for construction. In EIA reporting, these two phases are often combined in shipping and navigation chapters.

[3] In EIA terminology. See Section 2.3.6 for a discussion of terminological differences between EIA reporting and NRA reporting terminology.

Typical impacts can be summarised as follows:

- Vessel displacement (increasing/changing journey times and distances and associated increased shipping emissions):
    - Ship routeing schemes.
    - Commercial vessels.
    - Fishing vessels.
    - Recreational craft.
- Collision risk (presence of new vessels and structures and new patterns of traffic increase risk).
- Allision risk (presence of new vessels and structures and new patterns of traffic increase risk).
- Interaction risk (anchor or fishing gear snagging) on subsea cables.
- Access to ports and harbours.
- Emergency response:
    - Access restrictions/challenges.
    - Response delays.
- Communication disruptions (turbines interfering with radar and other communications systems).
- Under keel clearance and grounding risk (reduction due to changes in the seabed, the presence of subsea cables and other infrastructure).
- Loss of station or breakout of the wind turbine generator (floating specific).

The recorded impacts vary in significance depending on the specific location of the wind farm, the characteristics of the existing shipping environment, and the design and layout of the wind farm. Proposed location and extent of the boundary of the wind farm is the main variable in terms of increasing impact or potential impact, with locations near major ports or shipping routes, or the cumulative effects of locations near other proposed offshore developments, being particularly important in determining the significance of impacts.

Given the importance of siting, a primary mitigation following the mitigation hierarchy[4] is to anticipate and avoid major impacts on shipping and navigation through zonal and site selection. As part of the spatial planning process, wind farm sites should be selected to avoid hard constraints (such as designated anchorages, Traffic Separation Schemes (TSS)) or soft constraints (including shipping routes), where possible. Therefore, at the outset impacts have, in many cases, been avoided outright. Once direct conflicts are removed, assessments look at changes in risk to existing users. Hazard identification workshops involving the participation of affected stakeholders are a key feature of understanding risk for the NRA.

Once overall location or zone of development has been decided, the next phase of the mitigation hierarchy can be applied to further avoid, prevent, reduce or offset impacts. Based on the review of the ES, a relatively standard suite of mitigations is commonly implemented as set out in MGN654 (MCA, 2011):

[4] IEMA (2024) Implementing the Mitigation Hierarchy from Concept to Construction.

- Refinement of site/zone (amendments to red line boundary), turbine number and siting (layout design), cable routing and scheme design.
- Cable burial and protection (ensuring subsea cables are buried at sufficient depths to minimise the risk of anchor snagging and damage).
- Promulgation of information (notice to mariners, charts and other publications, cable exposures, start and completion of construction, major maintenance).
- Marking and lighting (appropriate aids to navigation to clearly mark structures, identification markings).
- Safety zones (designated zones to restrict vessel access and reduce collision risk).
- Marine coordination (vessel traffic management systems and procedures to improve communication and coordination between vessels operating in and around the wind farm).
- Emergency response plans (ERCoP, SAR lighting and marking, marine pollution response, SAR Checklist).
- Monitoring (hydrographic surveys, construction and post construction vessel traffic).

2.2.3 EIA and NRA

There is a close relationship between the EIA shipping and navigation topic and the NRA. The NRA typically forms an annex of the EIA and provides detailed technical information supporting the assessment of the impacts on shipping and navigation presented within the EIA.

The EIA as a whole covers a wider range of potential impacts to shipping, for example, the socio-economic chapter will identify commercial impacts of increased transit times. The shipping and navigation ES chapter does not include socio-economic impacts. While the EIA assesses the effects of a project on shipping and navigation, the NRA focuses more narrowly on the technical assessment of navigational safety risks. In contrast, the EIA considers a wider range of potential environmental effects and can include assessment of commercial impacts such as commercial shipping transit times or routes.

The NRA typically uses a quantitative risk assessment methodology such as HAZID, and sometimes modelling software, to assess the probability and consequences of collisions and other incidents. Qualitative assessments are less common but may also be employed. The EIA is based on the findings and conclusions of the NRA, but typically uses a qualitative approach to present the significance of impacts based on factors such as magnitude and duration. Magnitude is covered in the NRA risk scoring, but duration is not. It is assumed the change of risk will be for the lifetime of the wind farm. The NRA provides a detailed technical assessment of navigational hazards and risks, e.g. including calculations of collision probabilities, while the EIA summarises these findings and presents them in line with the requirements of the EIA regulations.

The NRA provides essential data for the EIA, for example, vessel traffic patterns, navigational hazards, and the results of collision risk modelling. As such, it is necessary for the NRA to be completed before the ES chapter. Crucially, the NRA identifies potential risks to shipping and navigation, which are then reported in the EIA. The NRA also evaluates the effectiveness of mitigation measures in reducing navigational safety risks and informs the reporting of residual impacts within the EIA.

The requirements for the NRA data and analysis are consistent and do not vary between projects. While the NRA serves as a key technical input for the EIA, providing data and analysis to support the assessment of impacts on shipping, the

reporting of the NRA in the EIA may vary depending on the project (and the ES authors).

Both the EIA (indirectly) and the NRA (directly) rely on established guidance documents (primarily MGN 654) to ensure consistency and compliance with regulatory requirements. See **Section 2.3.6** for key differences between the approaches.

2.2.4 Analysis of EIA Data and Reports

The IEP[5] undertook a review of offshore wind impact assessment in 2018, to develop an evidence base to drive proportionate impact assessment in the sector. As part of this study, the ES of 50 different OWFs were reviewed, and consultation held with key stakeholders in the industry.[6] In 2024 the IEP review was updated to include an additional 26 EIAs for OWFs since the IEP review was undertaken to support the development of this ERN.

The methodology was based on a review of the original ES and then identifying and aggregating the findings to establish trends in impact identification, mitigation and monitoring. Further work was undertaken to review Decision Notices to assess conditions and requirements imposed. Where possible, post-consent monitoring reports have been used to further inform implementation of mitigations, requirements and conditions.



The Crown Estate

[5] IEMA, TCE, RHDHV (2018) Industry Evidence Programme Offshore Wind Farms - Pilot Industry Evidence Base.

[6] Ibid.

2.2.5 Terminological and Methodological Inconsistency Between EIAs

There is a strong reliance and interaction between the shipping and navigation chapter reporting as part of the EIA and the NRA. The NRA provides key information utilised in the EIA but is also required to support compliance with other legislation, policy and guidance as set out in this report.

There are inherent differences in the approach, methodology and terminology of the NRA and the EIA chapter, including:

Baseline data

The NRA normally establishes a detailed baseline of the existing shipping and navigation environment, which is then summarised and presented within the EIA. It includes information on:

- Navigational features (e.g. shipping routes, oil and gas infrastructure, submarine cables).
- Marine traffic (e.g. vessel types, traffic density, seasonal variations).
- Maritime incidents (e.g. collisions, groundings).

Impact identification

There is a clear overlap of the types of impacts assessed in the EIA and the NRA, because the EIA relies on the NRA. The NRA uses a hazard-based approach to identifying potential risks, while the EIA focuses on the assessment of specific impacts as potential changes brought about by the proposals at all stages of the project lifecycle. It is notable that decommissioning is not included in the NRA and assessment is not an application requirement.

Mitigation

Both the EIA and the NRA discuss mitigation measures to address identified impacts. The NRA often focuses on technical solutions to reduce navigational safety risks, while the EIA may consider a broader range of mitigation options, including those that address the commercial impacts (most commonly in the socio-economic chapter). The shipping and navigation chapter does not propose additional mitigation over what is proposed in the NRA.

Impact assessment reporting

The NRA typically employs quantitative risk modelling to determine inherent and residual risk, with likelihood and severity scores fed into the modelling. The EIA uses this information to qualitatively assess the significance of impacts. This involves considering impact assessment concepts such as magnitude, duration, sensitivity, cumulative and interaction effects. A key difference is the use of criteria and language to describe the output or conclusion of the assessment, with NRAs focused on concepts such as 'acceptability' 'tolerability', and 'as low as reasonably practicable' (ALARP). The EIA chapters follow the terminology of significance of effect, typically following a four-part separation of impacts into 'no impact (or negligible)', 'minor', 'moderate' and 'major'.

The methodology for NRA is unlikely to change, and the MCA recommends under MGN 654 (MCA, 2021) that assessment should follow IMO Formal Safety Assessment (FSA) (IMO, 2018). Risks, following this methodology, are based on a classic two-part risk-based matrix approach of 'severity of consequence' and 'frequency of occurrence'. This is not dissimilar from the EIA assessment concept which typically follows a risk-based approach looking at 'magnitude of effect' and 'sensitivity of receptor' in a two-way matrix. However, following the completion of

the NRA, the EIA may employ different language from the NRA, using EIA related terms to describe impacts and effects, such as 'direct and indirect, 'cumulative', 'transboundary', 'permanent and temporary', 'positive and negative'. Regardless of the terminology used in the EIA reporting, the impacts described in the EIA are based on the risks identified in the NRA hazard log.

The NRA typically categorises risks into 'broadly acceptable' (i.e. low risk), 'tolerable' (i.e. medium risk, tolerable if ALARP) and 'unacceptable' (i.e. high risk and in need of mitigation to reduce to tolerable and ALARP). Therefore, the NRA is predicated on designing out any 'unacceptable' risk and in this way, it differs from the EIA.

EIA is a broader tool, and is applied to all environmental, social and physical aspects of a development. When assessing all the impacts of a project, it is often unavoidable that major adverse effects on certain aspects or factors will be identified. Crucially, this does not automatically mean the project is unacceptable (though such findings may help inform decision making). The purpose of both the NRA and the EIA is to identify impacts and seek to mitigate them. However, in some cases, residual impacts may remain after mitigation. A key aim of the EIA is to clearly and transparently communicate these residual impacts to stakeholders (including the public and decision makers), enabling informed decisions based on the predicted significant effects on people and the environment.

The difference in terminology and method is not an inherent problem as the EIA and NRA are designed for different purposes. However, what is problematic is the diversity in approach to reporting in the ES chapters across different OWF projects. Some projects largely abandon EIA terminology to follow the NRA style reporting, and some seek to fully translate the NRA terminology (following the FSA method) into EIA terminology. Others try to create some form of hybrid reporting using both, or blending terms between the NRA and the EIA. The diversity of approaches is unhelpful for stakeholders, bringing inconsistency of reporting across and between projects, leading to inefficiencies in the review of documentation and hindering understanding and comprehension.

Figure 1: Different approaches to reporting from 34 Shipping and Navigation chapters, 2011 - 2024

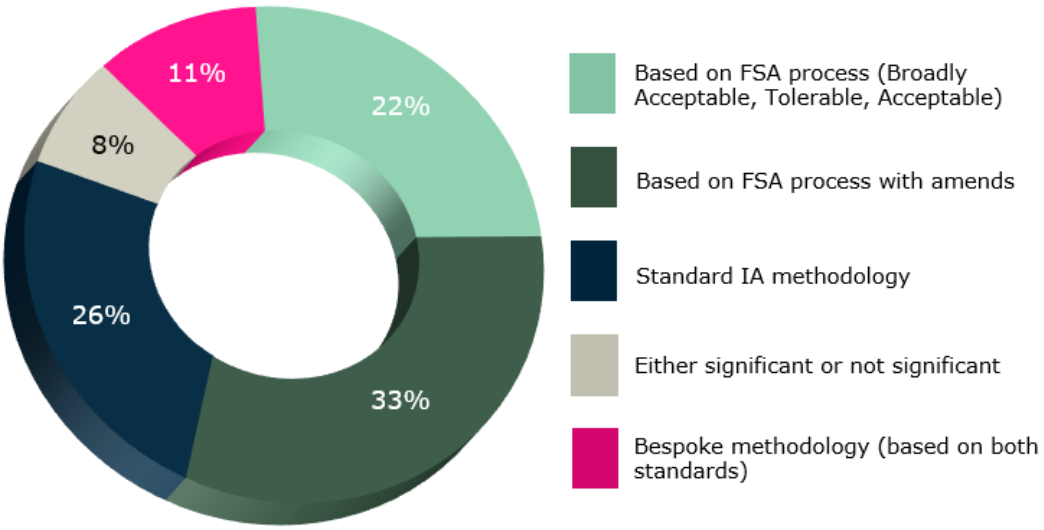


Figure 2: Example Risk Ranking Matrix for Shipping and Navigation from Forthwind ES (2022)

To illustrate a hybrid approach, the Forthwind ES provides					
	Catastropic	Tolerable with Additional Controls	Tolerable with Modifications	Unacceptable	Unacceptable
	Major	Tolerable with Monitoring	Tolerable with Additional Controls	Tolerable with Modifications	Unacceptable
	Minor	Broadly Acceptable	Tolerable with Monitoring	Tolerable with Additional Controls	Tolerable with Modifications
	Insignificant	Broadly Acceptable	Broadly Acceptable	Tolerable with Monitoring	Tolerable with Additional Controls
		Extremely Remote	Remote	Reasonably Probable	Frequent
		Frequency			

Forthwind ES divides significance of effect into five categories:

- **Broadly acceptable:** Significance of effect is low and deemed not significant in EIA terms.
- **Tolerable with monitoring:** Significance of effect is low/intermediate and deemed not significant in EIA terms.
- **Tolerable with additional controls:** Significance of effect is intermediate and requires additional mitigation.
- **Tolerable with modifications:** Significance of effect is intermediate/high and requires modifications to the project design to be deemed not significant in EIA terms.
- **Unacceptable:** Significance of effect is high and deemed significant in EIA terms.

The Forthwind ES provides a summary of the differences in terminology between the ES chapter (which uses EIA terminology) and the NRA (which uses FSA terminology).

Table 1: Example Conversion Table for EIA and NRA Language from Forthwind ES (2022)

EIA Term	NRA Term	Definition
Project design parameter	Cause	An event or activity that may create an effect.
Effect	Hazard	The potential to threaten human life, health, property or the environment.
Development design measure	Mitigation measure	A means of controlling a single element of effect, usually expressed as embedded (standard or good practice measures utilised in place) or additional (in addition to embedded controls for reducing effect to ALARP).
Significance of effect	Risk	The combination of the frequency of occurrence and the severity of consequence of an effect which results in a statement of significance.
Receptor(s)	User(s)	An effect sufferer(s).

This approach appears broadly the same as that taken from the Rampion 2 ES (2023) where the ES chapter explains:

- Effects determined to be of Broadly Acceptable significance are low risk and not significant in EIA terms.
- Effects determined to be of Tolerable significance are intermediate risk and not significant in EIA terms.
- Effects determined to be of Unacceptable significance are high risk and significant in EIA terms.

Rampion uses the following tables, using different but comparative language:

Table 2: Example impact ranking matrix for shipping and navigation from Rampion 2 ES

Consequence	**Major**	**Tolerable**	**Tolerable**	**Unacceptable**	**Unacceptable**	**Unacceptable**
	Serious	**Broadly Acceptable**	**Tolerable**	**Tolerable**	**Unacceptable**	**Unacceptable**
	Moderate	**Broadly Acceptable**	**Broadly Acceptable**	**Tolerable**	**Tolerable**	**Unacceptable**
	Minor	**Broadly Acceptable**	**Broadly Acceptable**	**Broadly Acceptable**	**Tolerable**	**Tolerable**
	Negligible	**Broadly Acceptable**	**Broadly Acceptable**	**Broadly Acceptable**	**Broadly Acceptable**	**Tolerable**
		Negligible	**Extremely Unlikely**	**Remote**	**Reasonably Probable**	**Frequent**
		Frequency				

The Rampion 2 authors provide a conversion table to illustrate some of the differences in the terminology:

Table 3 Example conversion table for EIA and NRA language from Rampion 2 ES

ES term	NRA term	Definition
Effect	Risk	The combination of frequency of occurrence and severity of consequence of an impact.
Embedded environmental measures	Embedded mitigation measures	Measures that have been adopted into the design to address environmental effects.
Impact	Hazard	A potential threat to human life, health, property or the environment.
Receptor	User	Sufferer of effect(s).

See **Section 5** for recommendations on how to improve consistency of terminology and reporting.[7]

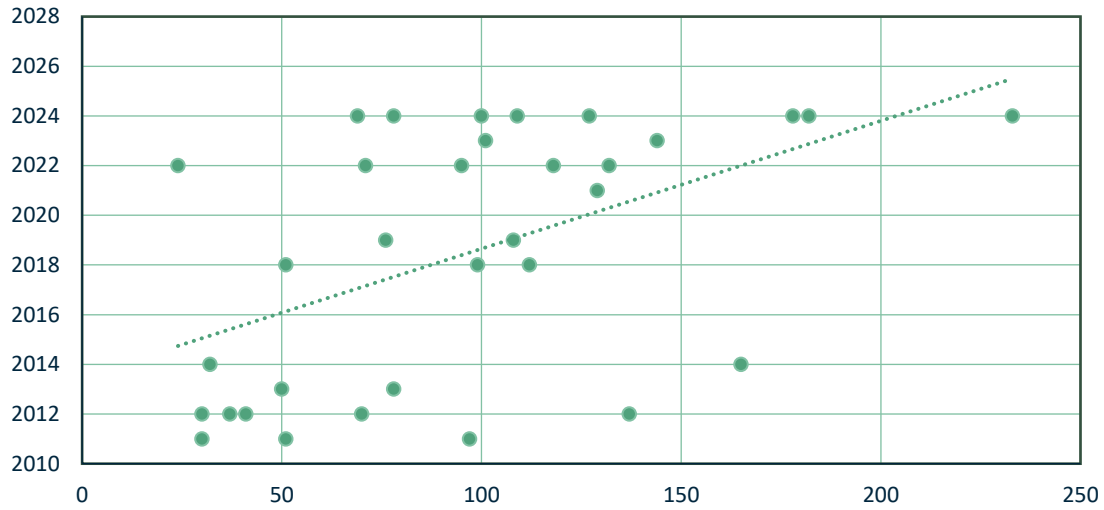
2.2.6 Proportionality

There is an issue of the proportionality of reporting with the EIA, with complaints from many stakeholders that the documentation has increased over time, without necessarily aiding clarity. Stakeholders have expressed concerns regarding duplication and replication of content between the NRA and EIA, and as with many other chapters, there has been a trend towards larger chapters. Stakeholders and developers are aware of a greater number of receptors and greater nuance for those receptors, in conjunction with larger wind farms in more congested areas. With the accumulation of knowledge over time, the expectation would be that methods and language would become more standardised and chapters could become more concise.

[7] The MCA has made it clear that NRA terminology must remain consistent with the FSA as this is widely understood by navigation stakeholders.

This does appear to be the case as indicated by the trend line shown in Figure 3 below, which shows 34 ES chapters from 2011-2024, with a trend line showing the page length increasing over time from less than 50 pages to over 250, and a noticeable increase from 2018 in chapter length. Stakeholders state that the increase is largely due to the increase in the size of windfarms over time, and an increase in cumulative interaction between projects, and their complexity, as the number of operational and proposed wind farms increases over time. Given that the both the size and number of wind farms is set to continue to increase this trend is likely to continue.

Figure 3: Page length and date of 34 shipping and navigation chapters, 2011 - 2024



2.2.7 Additional Evidence

In addition to EIAs, the review also considered reports and data arising from the Decision Notices, published monitoring reports, academic research, government and non-governmental guidance including the references in **Section 7**.

2.2.8 Expert Stakeholder Input

As well as documentary sources, the review included stakeholder feedback from workshops, questionnaires, individual and organisational submissions of evidence, and expert opinion. A list of representatives of organisations that have collaborated and reviewed this ERN is provided in **Section 6**.

3. Guidance

3.1 EIA Scoping vs Scope of NRA

The scoping process for EIA is distinct and different from the scope of the NRA:

- The NRA process identifies many potential hazards (i.e. across Category A-C below). It includes all of them in the assessment, following the NRA guidance (as described earlier in this ERN).
- The EIA scoping process is different, in that non-significant effects can be scoped out of the reporting, and are encouraged to be scoped out, as the purpose of EIA reporting is to focus on 'likely significant effects'.

This is a critical point, as the underlying NRA that supports the shipping and navigation chapter may identify many hazards deemed 'broadly acceptable' (i.e. lower-risk). In EIA language, these will equate to non-significant effects and will not require detailed reporting in the EIA chapter. As EIA scoping is undertaken before the NRA, without technical assessment, it is rare that any impacts are scoped out of the shipping and navigation aspect of the EIA.

3.2 EIA Scoping of Shipping and Navigation

As set out above, unlike most other EIA aspect assessments, the scope of the main assessment of Shipping and Navigation is predominantly undertaken within the NRA. The NRA has its own guidance on scope as discussed earlier in this document. Therefore, this section of the ERN discussion is focused less on the scope of the assessment itself, and focuses instead on the scope of the EIA chapter reporting. The scope of EIA reporting is still an issue that would be included within an EIA Scoping Report, and therefore the following recommendations pertain mainly to identifying which matters arising from the NRA should be included within the respective EIA chapter.

The following tables have been developed as a guide for OWF project developers seeking to agree the scope of EIA reporting prior to applying for planning consent. The tables set out the type of evidence and assumptions that should be provided to consenting authorities at scoping. They should be used by competent authorities, regulators and statutory bodies when reviewing a scoping request to help inform their judgement on a proportionate scope for the EIA chapter reporting, based on the latest evidence available and key stakeholder consensus.

A review of 76 EIAs for OWFs and associated evidence reveals variance in the exact language and descriptions of impacts. However, a clear and consistent trend is identifiable in the impact sources, the mitigations typically proposed, and the predicted impacts.

In general, shipping and navigation impacts are evaluated in terms of their significance based on the confluence of their (potential) frequency of occurrence and the potential severity of their consequences. The following tables and recommendations divide the impacts into three categories. The references A, B, and C are for the purposes of distinguishing categories only; they are not intended for coding. These categories are a tool to encourage focus on the key areas for reporting, rather than being definitive labels. They are not intended to be referenced as specific categories used in the presentation of impacts, but rather to support clarity and structure during reporting.

1. **Category A:** Impacts that have potential for significant adverse effects (EIA terms) and are unacceptable (in NRA terms) and require mitigation to be put in place.
2. **Category B:** Impacts that are unlikely to result in significant adverse effects (EIA terms) and are tolerable (in NRA terms) with proposed mitigation in place.
3. **Category C:** Impacts that are unlikely to result in significant adverse effects (EIA terms) and broadly acceptable (in NRA terms) with proposed mitigation.

For the purpose of EIA scoping, it is unlikely that Category A impacts will be reported in the EIA chapter. Any risks identified as unacceptable in the NRA would inevitably lead to design changes to reduce the risk to tolerable levels, at which point it would be Category B by the time the EIA reporting takes place. Category B impacts have the potential to reduce aspects of the assessment and reporting scope, if the applicant provides sufficient information and commits to specified mitigation, requirements, and commitments. There are likely to be many Category C impacts identified in the NRA, but these impacts should not be included in EIA chapter reporting as they are not significant effects.

The following tables and guidance have been developed following the mitigation hierarchy as advocated by ISEP. The mitigation hierarchy is a systematic approach used to minimise adverse effects of a project or scheme on the environment and people. It is a series of steps or principles to guide decision-making and prioritise action. The hierarchy comprises four stages, with the most desirable first: avoid, prevent, reduce, and finally, offset. The mitigation hierarchy indicates that avoidance is the priority and offsetting should only be relied on as a last resort.[8]

Based on the review of the evidence and the aggregated findings of the 76 OWF project ES, a four-step process is recommended for scoping the shipping and navigation chapter following completion of the NRA:

- **Step 1:** Identify any Category A impacts. These are highly unlikely to present in the final NRA as any risks of this nature will have led to iterative design changes to remove them.
- **Step 2:** Identify any Category C impacts from the NRA that do not require further study, action or reporting within the EIA Chapter.
- **Step 3:** Set out the range of Category B impacts highlighted within the NRA that will be included in the EIA chapter. Commit to implementing the appropriate mitigation in all cases, to monitor, mitigate and control these impacts and risks, including adoption of other risk controls identified during the NRA process.
- **Step 4:** Focus the ES primarily on reporting the Category B risks, with a focus on setting out what monitoring, mitigation and controls are required and how they are secured. Category C impacts should be identified in the NRA but not reported in the EIA chapter.
- While these steps may be similar to the NRA process, they are different because NRA reporting is likely to be comprehensive, include technical detail, and use NRA terminology. The EIA reporting can be selective, focus only on reporting the likely significant effects and does not need to replicate the technical details from the NRA (it can cross reference the NRA directly). It will use EIA terminology, translating NRA terminology where necessary.

[8] IEMA (2024) Implementing the Mitigation Hierarchy from Concept to Construction.

3.3 Step 1: Screening for Category A Impacts

Category A OWF impacts are risks identified as 'unacceptable' in the NRA. These impacts are generally best avoided through project location siting and design.[9] Consideration of alternatives, the design process and the NRA work in combination to apply the mitigation hierarchy and avoid these impacts (risks). In the highly unlikely event that a project attempted to proceed with Category A (unacceptable risks in the NRA) impacts, it would be reported in the EIA as a major significant adverse effect. It would be subject to formal objections from key stakeholders and regulators, would be a material consideration for decision makers, and would inevitably result in the project being refused consent.

Based on the review of 76 previous EIAs for OWF, the evidence suggests that the major variables involved in categorising an impact as either Category A or Category B are:

- The proximity of major ports or shipping routes within ten nautical miles of a proposed wind farm.
- The cumulative impact of a proposed wind farm alongside other proposed wind farm developments in proximity (determined through a cumulative screening exercise).
- Expert stakeholder engagement and consultation.

Where there is evidence arising from the variables listed above, and considering the generic and non-exhaustive list of shipping and navigation impacts below, the impacts will be identified and evaluated through the NRA.

- Vessel displacement.
- Collision risk.
- Allision risk.
- Interaction risk on subsea cables.
- Port access.
- Emergency response.
- Under keel clearance.

A workshop involving statutory bodies, regulators and key stakeholders (e.g. HAZID) should take place as part of the NRA process to determine if, with the provision of the standard suite of mitigations set out in MGN654 (MCA, 2021) and summarised below (details in **Annex B**), the windfarm (or extension) is likely to result in an unacceptable hazard.

- Cable burial and protection (ensuring subsea cables are buried at sufficient depths to minimise the risk of anchor snagging and damage).
- Promulgation of information (Notice to Mariners, navigational charts and other publications).
- Marking and lighting (appropriate aids to navigation to clearly mark structures and safety zones).
- Safety zones (designated zones to restrict vessel access and reduce allision/collision risk).
- Marine coordination (vessel traffic management systems and procedures to improve communication and coordination between vessels operating in and around the wind farm).

[9] Ibid.

If there are no unacceptable hazards identified within the NRA and all hazards have been reduced to tolerable or ALARP with proposed mitigation, then the ES should concisely report the Category B impacts identifed in the NRA. In less than 50 pages, it should be possible to highlight the development, provide the key findings of the NRA, the results from the consultation, and the mitigation to be secured.

If unacceptable hazards are identified or hazards are not ALARP, re-consider the refinement of site/zone developable area (where possible within the lease area), turbine number and siting, cable routing and scheme design. Repeat the NRA process until stakeholders agree that unacceptable hazards are likely to be avoidable or mitigatable to tolerable levels.

If agreement cannot be reached and the developer wishes to proceed, set out the full details of the assessments in the NRA and ES chapter for consideration by the consenting authorities. In these scenarios there is a risk that the project will not proceed if the unacceptable risks cannot be resolved through the scheme refinement.

3.4 Step 2: Scoping Out Category C Impacts

At the same time as identifying Category A impacts through the NRA, there is an opportunity to consult with stakeholders regarding Category C impacts.

Category C impacts are identified where there is clear evidence that the aspect will have no (or negligible) impact on shipping and navigation. They are considered unlikely to occur, and have minor consequences if they do occur, which means they are unlikely to lead to any significant adverse effects. Category C impacts should not be included in the EIA chapter, in order to reduce the report length, and remain focused on significant effects. These risks will still be assessed within the NRA to ensure compliance with MGN654.

3.5 Step 3: Assessing Category B Risks and Impacts

Category B impacts are potential impacts to shipping and navigation that routinely require some form of standard action. This could be monitoring, control measures or other mitigation to manage the impact and reduce its consequence or frequency to minimise risk and impact. Category B impacts make up the majority of impacts assessed in the NRA and carried forward to the EIA.

ES chapters should consider the recommendations of this ERN in terms of the matters covered, the terminology used and the deployment of standard mitigations. Some bespoke elements of reporting will be required, but based on the review of 76 ES for OWF, it is clear that industry has moved towards a standardised approach in practice, which is not reflected in reporting.

This ERN does not propose any changes to NRA methodology and refers to the standard good practice and policy currently used.

Regarding the translation of NRA findings into the ES chapter, the following recommendations are made. They should be set out in the scoping report as the proposed methodology. An ES should address the risks set out in **Table 4** and commit, at scoping, to the incorporation and implementation of the standard mitigations wherever possible, taking project-specific needs and context into account.

Table 4 sets out the Category B impacts with potential to have significant adverse effects without mitigation. These impacts should be carefully managed following the mitigation hierarchy.[10] With mitigations in place and appropriately secured through conditions, requirements and commitments, any residual effects should be reduced to below a level at which they would be considered significant adverse effects.

For shipping and navigation, the EIA scoping report should clearly explain the NRA process, referencing the correct NRA MCA guidelines. It should establish that the EIA Chapter reporting will not replicate the NRA findings in their entirety but will instead focus on key Category B impacts, mitigations and commitments. An indication of the likely key impacts, their mitigation and required commitment is set out below.



Ben Barden, 2022

[10] Ibid.

Table 4: Category B Impacts[11]

Ref	Generic impact	Information to support scoping		
		Rationale	Advice and evidence for scoping	Commitment required
ERN-SN-B1	Potential impacts on **shipping routes** (the lengthening and changing thereof) where this is a *likely or higher than likely* impact to shipping and navigation during the *construction phase and beyond.*	Potential impacts on **shipping routes** (the lengthening and changing thereof). Where *avoidance* of *all* impacts on **shipping routes** (the lengthening and changing thereof) is not possible, prevent or minimise impacts by deploying guard vessels, marking and charting, establishing safety zones, the promulgation of information and any other necessary mitigation identified during the NRA process. With these measures in place, the impacts should not result in significant adverse effects. For potential impacts on **shipping routes** (the lengthening and changing thereof), the primary mitigation step of avoidance will be the OWF location selection and array design.	Mapping of vessel traffic patterns in the NRA. Description and location of routes, volumes of traffic and seasonal variation. • Proposed early and ongoing consultation with shipping companies, fishing organisations, and other relevant stakeholders.	Marking and charting and promulgation of information. Providing timely and accurate information to mariners about project vessel activities, safety zones and other relevant navigational information through Notice to Mariners, industry bulletins, and other appropriate channels.
ERN-SN-B2	For potential impacts on **adverse weather routeing** (the restriction of	For potential impacts on **adverse weather routeing** (the restriction of options thereof), the primary mitigation step of avoidance is OWF project design (i.e. OWF	Mapping of vessel traffic patterns from NRA. Description and location of adverse weather routes for safe navigation and options for seeking shelter.	Detailed mitigation plans in an oCEMP to implement prevention, reduction and offsetting set out in

[11] Some of these may start as Category A risks at the beginning of the NRA process but are expected to be Category B by the end of the NRA. Therefore from an EIA reporting perspective, they are likely to be Category B at the point at which the EIA reporting starts.

Ref	Generic impact	Information to support scoping		
		Rationale	Advice and evidence for scoping	Commitment required
	options thereof), where this is *likely or higher than likely* impact to shipping and navigation during the *construction phase and beyond.*	design that allows for safe navigation in adverse weather conditions and opportunities for seeking shelter).	Methodology for further assessment and development of mitigation to prevent, reduce, or offset the effects. Proposed consultation with key stakeholders and regulators to support the above.	the EIA or identified through the NRA. Additional commitments identified through the NRA process may be required.
ERN-SN-B3	Impacts from **increased risk of collision** which are a p*otentially highly consequential* impact to shipping and navigation during the *construction phase and beyond.*	Where *avoidance* of *all* impacts on **increased risk of collision** is not possible, prevent or minimise impacts through the development of a Vessel Traffic Management Plan (VTMP), deploying guard vessels, marking and charting, establishing safety zones, the promulgation of information and any other necessary mitigation identified in the NRA process. With these measures in place, the impacts *should not result in significant adverse effects*. For potential impacts on **increased risk of collision,** the primary mitigation step of avoidance is OWF project location selection and array design.	Mapping of vessel traffic patterns in the NRA. Description and location of routes, volumes of traffic and seasonal variation. Quantitative collision risk modelling, collision frequency and collision scenarios in the NRA. International regulations for preventing collisions at sea (COLREGs) and safety of life at sea (SOLAS). Proposed early and ongoing consultation with shipping companies, fishing organisations, and other relevant stakeholders.	Safety zones to prevent collision, along with guard vessels, marking and charting and promulgation of information. Providing timely and accurate information to mariners about project vessel activities, safety zones, and other relevant navigational information through Notice to Mariners, UKHO resources, industry bulletins and other appropriate channels.
ERN-SN-B4	Impacts from **increased risk of allision** which are a p*otentially*	Where *avoidance* of *all* impacts on **increased risk of allision** is not possible, prevent or minimise impacts through the development	Mapping of vessel traffic patterns in the NRA and description and location of routes, the volumes of traffic and seasonal variation.	Safety zones to prevent allision, along with guard vessels, marking and charting and promulgation of information.

Ref	Generic impact	Information to support scoping		
		Rationale	Advice and evidence for scoping	Commitment required
	highly consequential impact to shipping and navigation during the *construction phase and beyond.*	of a VTMP, deploying guard vessels, marking and charting, establishing safety zones, the promulgation of information and any other necessary mitigation identified in the NRA process. With these measures in place, the impacts *should not result in significant adverse effects*. For potential impacts on **increased risk of allision**, the primary mitigation step of avoidance is OWF project location selection and array design.	Quantitative allision risk modelling, allision frequency and allision scenarios in the NRA. International regulations for preventing COLREGs and SOLAS. Proposed early and ongoing consultation with shipping companies, fishing organisations and other relevant stakeholders.	Providing timely and accurate information to mariners about project vessel activities, safety zones, and other relevant navigational information through Notice to Mariners, UKHO resources, industry bulletins and other appropriate channels.
ERN-SN-B5	Impacts on **third party of project vessel collision risk** which are a *potentially highly consequential* impact to shipping and navigation during the *construction phase*.	Where *avoidance* of *all* impacts on **third party of project vessel collision risk** is not possible, prevent or minimise impacts using robust marine coordination procedures to manage the movement of vessels within the wind farm area and its surroundings. Do this through the development of a VTMP, deploying guard vessels, marking and charting, establishing safety zones, the promulgation of information and any other necessary mitigation identified in the NRA process. With these measures in place, the impacts *should not result in significant adverse effects*.	Quantitative collision risk modelling, collision frequency and collision scenarios in the NRA. International regulations for preventing COLREGs and SOLAS. Proposed early and ongoing consultation with shipping companies, fishing organisations and other relevant stakeholders.	Providing timely and accurate information to mariners about project vessel activities, safety zones and other relevant navigational information through Notice to Mariners, industry bulletins and other appropriate channels. Using technologies such as AIS to monitor vessel movements and identify potential conflicts in real time. Marine coordination procedures such as establishing designated traffic routes for project vessels, procedures for safe vessel interactions and designated

Ref	Generic impact	Information to support scoping		
		Rationale	Advice and evidence for scoping	Commitment required
		For potential impacts of **increased risk of collision and allision**, the primary mitigation step of avoidance will be OWF project location selection and array design.		safety zones around specific infrastructure during the construction phase. Details of the implementation and monitoring of the above detailed in an oCEMP.
ERN-SN-B6	**Interaction impacts on subsea cables** where they are a *potentially highly consequential* impact on shipping and navigation during the *construction, operation and decommissioning phases.*	Subsea cables can pose a risk to shipping and navigation if they are not properly protected or if their locations are not clearly marked. Anchoring, fishing activities or dredging operations in the vicinity of cables can lead to **interaction impacts** such as damage or snagging, resulting in disruptions to power transmission and potential safety hazards. When a Cable Burial Risk Assessment (CBRA) is carried out, if cable protection (such as rock placement or concrete mattresses) is used where target burial depth is not achieved, cables are clearly marked on nautical charts and appropriate signage is used, the impacts *should not result in significant adverse effects*.	CBRA: Conducting thorough assessments to determine the appropriate depth and method of cable burial to minimise the risk of interaction with anchors and fishing gear.	CBRA carried out, informing the clear marking of cables on signage *in situ* and on nautical charts. Appropriate cable protection. Post-installation hydrographic surveys Details of the implementation and monitoring of the above detailed in an oCEMP Promulgation of Information: Providing information about cable locations and protection measures to relevant stakeholders, including fishing organisations and dredging companies.
ERN-SN-B7	Impacts to shipping and navigation (e.g. from grounding) from **changes to water depth**	OWF structures and subsea cables can reduce the available water depth, potentially impacting vessels with deep drafts, particularly large commercial ships and some specialised vessels.	Accurate Hydrographic Surveys to ensure that the charted depths are accurate and reflect any changes resulting from the wind farm development. Providing real-time tidal and meteorological information to vessels,	Liaison with MCA and GLA, a commitment to sufficient cable burial depth and promulgation of information.

Ref	Generic impact	Information to support scoping		
		Rationale	Advice and evidence for scoping	Commitment required
	caused by OWF structures during the *construction, operation and decommissioning phases.*	Insufficient under-keel clearance can lead to grounding or restrictions on vessel movements, impacting safety and efficiency. Where *avoidance* of impacts through site selection has not been possible, if sufficient cable burial depth is ensured, nautical charts are updated with cable locations, and real-time meteorological and tidal information is shared to and between vessels, the impacts *should not result in significant adverse effects*.	allowing them to adjust their passage plans based on the latest water level predictions.	
ERN-SN-B8	Impacts to **emergency response operations** for shipping and navigation during the *construction, operation and decommissioning phases.*	While the presence of OWF does not inherently preclude **emergency response operations**, the presence of structures, increased vessel traffic, and potential disruptions to communications could pose challenges for search and rescue (SAR), oil spill response, and other emergency situations. Where *avoidance* of impacts has not been possible through site selection and OWF design, if Emergency Response Cooperation Plans (ERCoPs), SAR checklists, and on-site emergency response resources are implemented, the impacts *should not result in significant adverse effects.*		ERCoP in place, SAR checklists agreed by MCA, regular training and information sharing for relevant parties, on-site emergency response resources. Details of the implementation and monitoring of the above detailed in an oCEMP.

Improving scoping is key to efficient and proportionate assessment and reporting. The central role of scoping in delivering proportionate EIA is clearly advocated in the IEMA Proportionate EIA Strategy.[12]

While the scope of the NRA is firmly articulated in MGN654, the scope of the EIA reporting could be more streamlined. It is necessary to put greater focus on evidence and early stakeholder engagement to provide sufficient confidence that the scope of EIA reporting can be more streamlined, without reducing the protection offered from the underlying NRA process.

Recommendation 1 – Standardisation of Scoping

Adopt a consistent UK-wide approach to the scope of EIA reporting for all OWF ES and EIA reports. Follow the advice in **Section 3** and **Annex B** of this ERN to standardise the approach and improve efficiency for all stakeholders.

3.6 Consistency and Clarity of EIA Reporting

The review of 76 previous assessments has identified a variety of reporting styles of impacts on shipping and navigation within the ES and EIA reports. This variance in reporting increases the burden on all stakeholders reading and interpreting the reports, and can hinder the understanding of the impacts, especially for non-experts. Improvements have been identified around:

- Chapter structure and accessibility.
- Clarity and consistency of impact reporting.
- Proportionate reporting.
- Standardised survey requirements.
- Improved monitoring and enforcement.

To address this variability, *Evidence Review Note – Environmental Impact Assessment*, sets out a recommended standard 12-section ES chapter structure. This ERN aligns with the standard structure and provides detailed guidance in **Annex B** on how shipping and navigation considerations can be integrated within the framework.

[12] IEMA (2017) Delivery Proportionate EIA: A Collaborative Strategy for Enhancing UK Environmental Impact Assessment Practice.

3.6.1 Chapter structure and accessibility

The purpose of NRA and EIA are different, but they feature significant overlap, with reuse or reliance on data and findings from the NRA informing the EIA. Removing the EIA chapter in its entirety risks failing to meet the needs and requirements of the EIA process. Removing the NRA would fatally undermine the information informing the EIA process. Therefore, there is a requirement for both documents and processes. However, there is no reason for each different development and its supporting consultants to adopt different structures, methods or terminology in their ES or the incorporation of the NRA into the EIA.

It is recommended that the EIA should not try to repeat or reproduce the NRA. Instead, it should include a concise explanation of the NRA, reference the appendix where it is provided, and give a methodological equivalent, including how it translates to the EIA methodology applied throughout the rest of the ES. It should use consistent terminology, structure and mitigation. This approach will benefit authors, reviewers, stakeholders and decision makers by providing shorter, more consistent reporting.

There is a range of good practice already available, and numerous examples of different approaches to chapter composition. Developing consistency and common approaches across the key author groups will go a long way to resolving some of the issues identified.

3.6.2 Clarity of Impact Reporting

NRA has its own process set out in MGN654 (MCA, 2021), which has been designed to identify and mitigate all hazards. This follows existing standards of hazard analysis, usually based on national guidance and regulation such as the *Methodology for Assessing Marine Navigational Safety & Emergency Response Risks of Offshore Renewable Energy Installations* (OREI, 2023), and the *Revised Guidelines for Formal Safety Assessment* (IMO, 2018), and often uses industry recognised software. This is all normally detailed in an appendix to the ES containing the NRA.

As a result of this, approaches to Impact Assessment (IA) reporting for shipping and navigation often do not follow the methodology of other ES EIA reporting. They can use hazard or risk terminology, or a hybrid or bespoke version of the two. This creates inconsistency in several ways:

- Chapters often switch between Formal Safety Assessment (FSA) and EIA terminology. For example, a recent shipping and navigation chapters explicitly notes aligning its frequency and severity of consequence definitions with FSA criteria. In contrast, another explains that in order to create a proportionate assessment, the FSA methodology is integrated into the definition of impact magnitude for the EIA. When terms are used interchangeably without clear definition, this can cause confusion.
- There is no standardised approach to presenting the significance of impacts. Some shipping and navigation chapters use a combination of in-text descriptions and tables to highlight frequency of occurrence, severity of consequence, mitigation and residual effect for each impact. Others use a series of individual tables for each impact scenario, detailing the frequency, severity and significance, with mitigation discussed in the surrounding text. This makes it difficult to quickly compare the significance of various impacts.
- Shipping and navigation chapters use different categories for impacts. For example, one divides impacts by receptor (commercial vessels, fishing vessels, recreational craft, emergency response) while another categorises

impacts based on whether they relate to vessel movements and navigation, physical interaction, or other receptors. This can make it challenging to compare impact assessments across projects.

- It would be beneficial to all stakeholders if standard mitigation, as set out in conditions or requirements of the project licence, contained the same guidance each time, whether provided by Marine Licence Authorities via PINS or the Scottish Government. Where this is not practicable, clear guidance for each jurisdiction should be provided.

While most shipping and navigation chapters present impacts by development phase (construction, operation and maintenance, decommissioning) the level of detail provided for each phase varies. Some note that when impacts are relevant to multiple phases, they are only discussed under the phase where they are deemed most significant. Others consistently present cumulative risk rankings for vessel displacement and allision risk across all phases. Where the effects and risks are similar, construction and decommissioning are sometimes combined, or treated distinctly but with significant duplication of text.

Adding to these inconsistencies, summary tables lack standardisation, and most chapters do not include a clear and concise summary table that lists all assessed impacts and their significance levels. This makes it difficult to easily identify key significant impacts. These significant impacts are often embedded within lengthy textual descriptions, rather than being clearly highlighted in tables or figures. Bold text or highlighting is used in some chapters to label significant impacts, but the methods and presentation vary greatly.

Overall, consistent approaches in presenting, organising and highlighting impacts within shipping and navigation chapters could be improved to help decision makers quickly identify significant effects, reduce reporting of non-significant effects and avoid unnecessary repetition of NRA content.

Recommendation 2 – Consistency and Clarity of Reporting

Adopt a consistent approach to the terminology and description of shipping and navigation impacts for all OWF environmental statements. This will improve efficiency and clarity for all stakeholders.

Standardised terminology and approaches must be sufficiently inclusive of standard terminology and approaches used in the MPS, UK NPS and NRA. They must be sufficiently signposted or supported to be easily understood by generalists and planning officers who may not be experts in shipping and navigation.

See **Annex B** for a standard chapter outline and guidance on terminology.

3.7 Proportionate Reporting

The review of 76 assessments assessments revealed that the impacts of OWF on shipping and navigation have now been studied in the UK for over 25 years. **Figure 3** shows the trend has been for longer chapters over time, which correlates with the increasing size and scale of OWF.

In the 2001 ES for Scroby Sands, the assessment of effects relating to shipping and navigation, including diagrams and suggested mitigation, was 14 pages. In 2011 chapters were around 30 pages, for example Beatrice (30 pages), Neart na Gaoithe (30 Pages)[13] and Triton Knoll (37 pages). In 2023/4 the average was 150+ pages, for example, Whitecross (101)[14], Five Estuaries (127 pages)[15], Mona (178 pages), Morecambe (182 pages) and Morgan (233 pages). These chapters are in addition to the NRAs, which are appended.

While it is accepted that the scale of new OWF is significantly larger and more complex than earlier projects, and that assessment techniques, technology and our understanding of impacts have all improved, many stakeholders, including IEMA,[16] believe that reporting for many EIA topics has become disproportionate to the significance of the impacts.

Stakeholders have provided context for increasing chapter lengths, for example, recent round 4 projects in the Irish Sea have been described as having a particularly complex cumulative scenario with significant effects on shipping and navigation. Recent instances of longer page lengths on some projects have been attributed to multiple concurrent NSIPs being progressed with immediate geographical adjacency, which necessarily adds complexity to assessment and reporting. However, in general, as set out in the recommendations of this ERN, a large accompanying NRA does not necessarily require a long ES chapter to set out the conclusions of the NRA for the EIA.

While there appears to be a general increase in ES chapter length over time across all topics, for shipping and navigation, the length and detail of the chapter is very much dependent on the location and scale of the OWF. Key factors are the presence of ports, shipping lanes, cumulative impacts with other OWF and aggregates, as well as newer technologies like floating wind. Nevertheless, there is clearly scope for streamlining reporting through avoidance of duplication and greater use of cross referencing, for example, to reduce the chapter length, which will aid comprehension, and reduce time and cost.

[13] In addition to the 162 page NRA.

[14] In addition to the 129 page NRA.

[15] In addition to the 339 page NRA.

[16] IEMA (2017) Delivery Proportionate EIA: A Collaborative Strategy for Enhancing UK Environmental Impact Assessment Practice.

3.8 Concise Reporting

There are a number of immediate and relatively straightforward steps that can be taken to reduce the length of ES chapters:

- Do not provide summaries or explainers of publicly available national laws, policies or guidance. These can be cross-referenced without the need for long descriptions, summaries or explainers. Experts, key statutory consultees and regulators will not need the summary, and anyone else can easily look up the reference if needed.
- Do not include extensive baseline information. This should be presented as concise summaries using tables and figures as necessary, and only then when directly pertinent to the impact assessment. Necessary baseline data needed as evidence can be included in technical appendices as needed, and much of the baseline data provided in the shipping and navigation chapter can be found in the NRA, such as vessel characteristics, navigational features, and marine traffic data.
- Chapters should start with a clear executive summary of any significant effects, in plain English and without excessive use of acronyms or obscure terms. Where no significant effects have been identified, this should be clearly stated in the introduction.
- The NRA is a key supporting document for shipping and navigation chapters. By effectively referencing the NRA for detailed analysis and data, the main EIA chapter can focus on summarising key findings and conclusions.
- To ensure the ES is clear and concise, keep individual ES chapters to a maximum of 50 pages. Technical appendices can be used where large tables and baseline data is needed.
- *Evidence Review Note – Environmental Impact Assessment* provides recommendations on overall chapter length and format for consistency and usability across all disciplines. This ERN builds on it with topic-specific guidance and recommendations.



Ben Barden, 2022

3.8.1 Use of Digital Reporting

The use of digital tools and methodologies in EIA offers significant opportunities to improve the clarity, efficiency, and proportionality of reporting in the context of OWF. By leveraging digital technologies, the assessment of shipping and navigation can be streamlined, ensuring that reports focus on significant impacts while remaining accessible to diverse stakeholders. Future access, accountability and availability for any statutory purpose needs to be considered at time of preparation, and in consultation with stakeholders. Recommendations for using digital impact assessment approaches to reporting are set out below.

Table 5: Digital Approaches to Shipping and Navigation Reporting

Approach	Recommendations
Interactive and dynamic Reporting	Replace static PDF documents with interactive digital reports that enable users to navigate directly to relevant sections, such as mitigation measures or significant impacts.
	Use open-access web-based platforms to host digital reports, integrating dynamic features like interactive maps and timelines, and 3D visualisations.
Enhanced use of GIS and mapping tools	Incorporate GIS-based impact mapping to visually represent spatial relationships between proposed OWF developments and navigation and shipping constraints and visualisations.
	Use layered maps to display baseline data, routeing maps, safety zones and predicted impacts, allowing stakeholders to toggle between views.
Clear and engaging visualisations	Utilise infographics, charts and visual summaries to condense complex findings into understandable formats for experts and the public.
	Present mitigation strategies and post-consent monitoring plans through interactive flowcharts and dashboards.
Stakeholder accessibility and inclusivity	Ensure all digital outputs meet Web Content Accessibility Guidelines (WCAG) to accommodate diverse user needs, including those with disabilities.
	Develop intuitive user interfaces that allow non-specialists to explore key findings without technical barriers.
Integrated reporting and monitoring	Link post-consent reporting tools with real-time monitoring dashboards to provide updates on the effectiveness of mitigation measures post-consent. This keeps stakeholders informed and enhances transparency.
Templates and standards for digital reporting	Adopt industry-wide templates for digital reporting, ensuring consistency across OWF projects.
	Standardise methodologies for incorporating digital tools into EIAs, particularly for shipping and navigation, to reduce variability and improve comparability.

By embracing digital impact assessment approaches, the offshore wind sector can ensure that reporting on shipping and navigation is proportionate, accessible and aligned with best practices, ultimately supporting sustainable development and safety. It enables surveys to be designed to provide data for multiple chapters and use-cases, with information collected and shared using good data management practices.

Recommendation 3 – Proportionality of Reporting

Adopt a proportionate approach to the reporting of shipping and navigation impacts for all OWF ES to reduce burden and improve clarity for all stakeholders.

Review the approach to reporting and duplication between the NRA and ES chapter, so it is proportionate and consistent.

Use proven and effective digital tools wherever possible to make data more accessible and ease handover between project phases.

See **Annex B** for a standard chapter outline and guidance on proportionality.

3.9 Addressing Significant Adverse Effects

Regarding Category A impacts, significant adverse effects may be identified that are not easily mitigated. In these cases, the impacts will be a material consideration of the planning decision. However, in general EIA practice, decision makers may still grant permission for a project to proceed. They would base this on the overall planning balance of impacts and benefits across a range of environmental, social and economic considerations, in line with national planning policy and national and international laws. However, where this relates to unacceptable risks to health and safety at sea identified in the NRA, this is highly unlikely to happen. This guidance focuses on using the mitigation hierarchy, starting with avoidance through site allocation and leasing rounds, followed by early-stage screening and consultation to identify unacceptable hazards. Avoidance is then pursued again through further siting and design modification.

There may be instances where a significant impact (for example a commercial impact) is identified, that with compensation or other arrangements may become acceptable to decision makers, while still being recognised as an adverse impact in EIA terms.

3.10 Monitoring and Enforcement

The requirements and enforceable conditions within a Development Consent Order, Section 36 and Marine Licences are essential and represent an important component of the examination of an application. These conditions should be accompanied by a robust monitoring protocol to ensure the conditions are implemented. These monitoring conditions should be agreed in advance with national stakeholders and standardised to form consistent practice for all parties. See **Annex C** for recommended conditions.

Recommendation 4 – Monitoring and Enforcement

Enforceable conditions within a DCO/S36 are essential and represent an important component of the examination of an application.

Ensure monitoring conditions are accompanied by a robust monitoring protocol to ensure they are implemented. Agree conditions in advance with national stakeholders and standardise them to form consistent practice for all parties.

See **Annex C** for recommended conditions.

4. Further Calls for Evidence and Research

This section identifies the need for more detailed, far-reaching and policy-based issues to be addressed, through further studies or research.

4.1 Strategic Level Assessment for Foreseeable Significant Effects

This section provides advice on how to consider shipping and navigation regarding offshore wind and strategic plans. This includes integration with marine planning, strategic assessment of relevant plans and strategic environmental assessments. It promotes the principles of the mitigation hierarchy, as part of a strategic approach to the identification and assessment of significant effects on shipping and navigation for all OWF impact assessments, in order to avoid and reduce impacts at the project level.

The least mitigatable effects identified in this review are presence and proximity of an OWF to major shipping routes or ports, or cumulative effects of multiple projects. These can largely be assessed at a strategic level at plan or site selection. Discussion of impacts on these factors should be assessed at the strategic level, and if deemed unacceptable, the plans or sites should not be progressed to project level assessment, or be adapted. Stakeholder feedback indicated that historically, certain projects and project extensions did not include adequate strategic assessment of navigation risks, but more recent practice (e.g. Round 5 Celtic Sea) shows this is now implemented more routinely.

All stakeholders, but particularly those responsible for offshore wind leasing, and those bodies responsible for marine spatial planning, should ensure that offshore wind strategic plans align with the Marine Policy Statement (MPS), National Planning Policy Statements for Energy, and UK Marine Plans, to integrate shipping and navigation considerations early in the planning process. In the context of a more strategic approach to shipping and navigation, The Crown Estate and The Crown Estate Scotland are trying to better integrate marine spatial planning with national and regional transmission infrastructure planning, and are taking account of major shipping and navigation constraints. Nationally, work is taking place to support identification and investment in UK ports and harbours. This will enable the future growth of offshore wind and have a significant influence on routing and traffic. Further work is ongoing to ensure navigation and shipping is a key regional consideration within marine plans, and at a strategic level, to ensure these risks are considered at the earliest possible stage.

Developers will benefit from undertaking their own early shipping and navigation studies to support site selection, layout design and development of mitigation, prior to the EIA process. This de-risks developments by avoiding costly and time-consuming iterations of design through the EIA by ensuring that key shipping and navigation constraints are identified, assessed and mitigated. This takes the form of constraints assessments or preliminary NRAs.

Recommendation 5 – Strategic Approach to Risk Assessment

Take a strategic approach to the identification and assessment of significant effects on shipping and navigation for all future offshore wind rounds and marine spatial planning for OWF, in line with the principles of the mitigation hierarchy.

4.2 Cumulative Effects

The study of cumulative effects in EIA typically refers to the impacts of the proposed project as well as other ongoing (or foreseeable) projects which may have overlapping impacts on the same receptors. This form of cumulative effects assessment (CEA) is common practice and follows available guidance such as PINS advice on CEA[17] as well advice published by the MMO[18] and Natural England.[19] In impact assessment practice, this form of CEA can be referred to as inter-cumulative effects, as it relates to a cumulative assessment of effects of multiple projects. It is also good practice, and a requirement of the EIA regulations, to consider the interactions of impacts on different factors within a project. These are sometimes referred to as intra-cumulative effects.

When considering inter-cumulative effects across multiple projects, it is common practice to look at thresholds (i.e. for pollution) or carrying capacities (i.e. for species and landscapes) to determine if a cumulative effect will cross a tipping point whereby the additionality or the effect in aggregate will lead to further harm.

In the context of the shipping and navigation, it is a requirement for the NRA to examine cumulative effects.

- Deviations of shipping routes between adjacent cumulative developments can reduce sea room, create potential choke points and increase vessel encounters.
- Increases of vessel traffic as a result of overlapping OWF, including sharing ports, could result in increased risk through increased traffic, leading to higher frequency of risks, such as collision. The evidence review process should also examine the extent to which cumulative effects are currently applied to shipping and navigation, and how can practice and outcomes can be improved.

Recommendation 6 – Use of Cumulative Effects Assessment

Adopt a consistent approach to assessing CEA for shipping and navigation, across all parties. Undertake a meta-review of evidence to identify cumulative adverse effects, across the regions or areas of sea where offshore wind is deployed, that need to be taken into account for future projects.

Once the review is complete, incorporate the recommendation into **Annex B** for recommended standardisation of CEA.

[17] Nationally Significant Infrastructure Projects: Advice on Cumulative Effects Assessment - GOV.UK

[18] A strategic framework for scoping cumulative effects (MMO 1055) - GOV.UK

[19] Development of a generic framework for informing Cumulative Impact Assessments (CIA) related to Marine Protected Areas through evaluation of best practice - NECR147

4.3 Addressing Beneficial Effects

Legislation and regulation in EIA are increasingly placing more emphasis on the beneficial effects of a project, rather than just avoiding or mitigating adverse effects. Less attention is given to how an EIA can identify positive aspects of a project, but this is not particularly relevant for shipping and navigation. It is unlikely that, for example, the presence of OWF will enable a shipping company to streamline its routes. Positive outcomes may, however, be discovered for shipping and navigation, such as a reduction in accidents due to enhanced monitoring during construction and decommissioning. Any positive safety benefits should be identified in the NRA and acknowledged in the EIA reporting.

4.4 Standardising Approach to Commercial Impacts to Operators

MGN654 deals primarily with effects on navigational safety, and not deviations of shipping routes. There is no industry-specific guidance for how to identify, evaluate or address commercial impacts on operators due to the presence of OWF. An agreed and consistent approach the assessment of such impacts would improve the EIA for shipping and navigation, and ensure all potential impacts are adequately addressed. This this is very difficult in practice, though, due to factors such as type and size of vessel impacted, distance of the impact, route and frequency, and scheduling of the impacted vessel.

Recommendation 7 – Consideration of Commercial Impacts

Develop a consistent approach to assessing the impact of OWF on commerical shipping activities, to complement the MGN654 guidance on navigational safety.



The Crown Estate, 2014

5. Summary of Recommendations

Building on the overarching recommendations in *Evidence Review Note – Environmental Impact Assessment*, sections 3 and 4 of this ERN have set out the rationale for recommendations to improve the practice of assessment and management of the impacts of OWF projects on shipping and navigation.

The following recommendations are made for practitioners, developers and reviewers of EIAs for OWF projects with regards to shipping and navigation:

5.1 Standardisation of Scoping

Adopt a consistent UK-wide approach to the scope of EIA reporting for all OWF ES and EIA reports. Follow the advice in **Section 3** and **Annex B** of this ERN to standardise the approach and improve efficiency for all stakeholders.

5.2 Consistency and Clarity of Reporting

Adopt a consistent approach to the terminology and description of shipping and navigation impacts for all OWF environmental statements. This will improve efficiency and clarity for all stakeholders.

Standardised terminology and approach must be sufficiently inclusive of standard terminology and approaches used in the MPS, UK NPS and NRA. It must be sufficiently signposted or supported so it can be easily understood by generalists and planning officers who may not be experts in shipping and navigation.

See **Annex B** for a standard chapter outline and guidance on terminology.

5.3 Proportionality of Reporting

Adopt a proportionate approach to the reporting of shipping and navigation impacts for all OWF ES to reduce burden and improve clarity for all stakeholders.

Review the approach to reporting and duplication between the NRA and ES chapter, so it is proportionate and consistent.

Use proven and effective digital tools wherever possible to make data more accessible and ease handover between project phases.

See **Annex B** for a standard chapter outline and guidance on proportionality.

5.4 Monitoring and Enforcement

Enforceable conditions within a DCO/S36 are essential and represent an important component of the examination of an application.

Ensure monitoring conditions are accompanied by a robust monitoring protocol to ensure they are implemented. Agree conditions in advance with national stakeholders and standardise them to form consistent practice for all parties.

See **Annex C** for recommended conditions.

5.5 Strategic Approach to Risk Assessment

Take a strategic approach to the identification and assessment of significant effects on shipping and navigation for all future offshore wind rounds and marine spatial planning for OWF, in line with the principles of the mitigation hierarchy.

5.6 Use of Cumulative Effects Framework

Adopt a consistent approach to assessing CEA for shipping and navigation, across all parties. Undertake a meta-review of evidence to identify cumulative adverse effects, across the regions or areas of sea where offshore wind is deployed, that need to be taken into account for future projects.

Once the review is complete, incorporate the recommendation into **Annex B** for recommended standardisation of CEA.

5.7 Commercial Impacts Assessment

Develop a consistent approach to assessing the impact of OWF on commercial shipping activities, to complement the MGN654 guidance on navigational safety.



Ben Barden, 2022

6. Collaboration and Review

Through participation in the Shipping and Navigation Technical Topic Group (TTG), representatives from the following organisations have contributed to this document.

Technical Topic Group representatives	
Anatec	The Crown Estate
AtkinsRéalis	Trinity House
Institute of Sustainability & Environment Professionals (ISEP)	UK Chamber of Shipping
Maritime and Coastguard Agency (MCA)	UK Hydrographic Office
NASH Maritime	

Document Update Roadmap

The ERN is a dynamic document designed to evolve with advancements in knowledge, technology, and regulatory frameworks. The following update schedule is proposed:

- Launch ERN as pilot for use on projects.

Short-term updates (6-12 months):

- Incorporate user feedback from pilot and update ERN.
- Assess the adoption rate of key recommendations and adjust where uptake is low.
- Launch updated and formal ERN.

Long-term updates (1+ years):

- Bi-annual meetings of the Shipping and Navigation TTG will be held to review evidence and feedback.
- After 12 months the TTG will conduct a comprehensive review of the ERN's effectiveness, incorporating stakeholder surveys and case studies.
- The TTG will maintain the ERN as a live document, revising it on a regular and ad hoc basis to reflect new legislation, policy updates and stakeholder consensus.

7. References

DESNZ (Updated January 2024). *National Policy Statement for Renewable Energy Infrastructure (EN-3).*

Fothergill, J (2021). *The State of Digital Impact Assessment Practice. IAIA.*

IALA (2021). *IALA Guideline G1162: The Marking of Offshore Man-Made Structures.*

IALA (2021). *Recommendation O-139 The Marking of Man-Made Structures.*

IEMA (2020). *Digital Impact Assessment Primer.*

IEMA (2024). *Implementing the Mitigation Hierarchy from Concept to Construction.*

IEMA (2024). *Roadmap to Digital Environmental Assessment.*

IEMA, TCE, RHDHV (2018). *Industry Evidence Programme Offshore Wind Farms - Pilot Industry Evidence Base.*

IMO (1972/7). *Convention on the International Regulations for Preventing Collisions at Sea (COLREGs).*

IMO (1974). *Safety of Life at Sea (SOLAS) Chapter V.*

IMO (2018). *Revised Guidelines for Formal Safety Assessment (FSA) for Use in the IMO Rule-Making Process.*

MCA (2016). *MGN 654 Safety of Navigation: Offshore Renewable Energy Installations (OREIs) – Guidance on UK Navigational Practice, Safety and Emergency Response.*

PINS (2015). *Advice Note 17: Cumulative Effects Assessment.*

Renewable UK (2013). *Cumulative Impact Assessment Guidelines – Guiding principles for cumulative impacts assessment in offshore wind farms.*

RYA (2019). *The RYA's Position on Offshore Renewable Energy Developments: Paper 1 (of 4) – Wind Energy.*

Scottish Government (2013). *Planning Advice Note 1/2013: Environmental Impact Assessment.*

UN (1982). *United Nations Convention on the Law of the Sea (UNCLOS).*

ANNEX A: Offshore Wind Farms

The following 79 OWF have undertaken EIAs and published information on the potential impacts in the ES and EIA reports. These assessments have informed the development of this ERN.

Atlantic Array	Kincardine
Awel y Môr	Lincs
Barrow	London Array I
Beatrice	Lynn
Beatrice Extension	Mona
Berwick Bank	Moray West
Blyth Offshore Demonstrator	Morecambe Offshore Windfarm Generation Assets
Burbo Bank	Morgan Offshore Wind Project
Burbo Bank Extension	Muir Mhor
Docking Shoal	Navitus Bay
Dogger Bank Creyke Beck	Neart na Gaoithe
Dogger Bank South	Norfolk Boreas
Dogger Bank Teesside	Norfolk Vanguard East
Dogger Bank C	Norfolk Vanguard West
Dudgeon	North Falls
Dudgeon and Sheringham Shoal Extensions	North Hoyle
East Anglia One	Ormonde
East Anglia One North	Ossian
East Anglia Two	Outer Dowsing
East Anglia Three	Pentland
European Offshore Wind Deployment Centre (EOWDC)	Race Bank
Five Estuaries	Rampion
Forthwind	Rampion 2
Galloper	Rhyl Flats
Greater Gabbard	Robin Rigg
Green Volt	Salamander
Gunfleet Sands 1	Scroby Sands
Gunfleet Sands 3	Seagreen One A
Gunfleet Sands 3	Sheringham Shoal
Gwynt Y Môr	Teeside
Hornsea One	Thanet
Hornsea Two	Thanet Extension
Hornsea Three	Triton Knoll
Hornsea Four	Walney 1
Humber Gateway	Walney 2
Hywind	Walney 3
Inch Cape	West of Duddon Sands
Inner Dowsing	Westermost Rough
Kentish Flats	Whitecross
Kentish Flats 2 Extension	

ANNEX B: Recommended ES Structure and Format

This Annex provides topic-specific guidance for integrating shipping and navigation assessment into the Environmental Statement (ES) using the standard 12-section chapter structure set out in the overarching *Evidence Review Note - Environmental Impact Assessment*. It is intended for technical authors preparing the shipping and navigation chapter, as well as EIA coordinators and reviewers seeking consistency across topics.

Chapter Section	Shipping and Navigation Considerations
1.Executive Summary	Discusses potential major impacts and proposed mitigations in an accessible, jargon-free manner. (*Target length: 1 page.*)
2. Introduction	Confirm that the chapter covers shipping and navigation from Mean High Water Springs (MHWS) seaward. State the relationship to any separate chapters. Briefly outline relevant interrelations with other topics such as commercial fisheries. (*Target length: 1 page*.)
3. Policy and Legislative Framework	Refer to relevant UK and devolved policy and legislation. Reference relevant National Policy Statements (i.e. EN-1, EN-3), Marine Policy Statement and marine plans. Include guidance sources. This should be largely standardised with some variation for national location (i.e. Scotland, Northern Ireland), local planning guidance and locations near other countries (transboundary effects). *(Target length: 1-2 pages.)*
4. Study Area and Scope of Assessment	Define the marine study area and typical buffers (e.g. 2 km). Clarify differences between assessment area, geophysical survey extent and cumulative area. State any data exclusions or overlaps with onshore coverage. (*Target length: 1-2 pages.*)
5. Consultation	Summarise statutory and non-statutory consultation with stakeholders. Present key issues raised at scoping, and during pre-application dialogue. Indicate how feedback influenced methodology, survey scope or mitigation. (*Target length: 1-2 pages.*)
6. Assessment Methodology	Describe the process for identifying and assessing known and potential risks and receptors. Include classification systems based on NRA risk assessment. Note any limitations (e.g. survey resolution) and how uncertainty has been addressed. (*Target length: 2-3 pages.*)
7. Baseline Environment	Summarise existing conditions and the environment, including any existing or potential offshore developments within the scoping area. Use summary tables, figures and mapping. Technical details should be in appendices or a supporting baseline report. (*Target length: 4-6 pages.*)
8. Design Parameters and Maximum Design Scenario (MDS)	Identify which aspects of the design could affect shipping and navigation (e.g. layout). Outline the process of consultation that has already taken place among key stakeholders. This should include the method of consultation (including stakeholder and public consultations and

Chapter Section	Shipping and Navigation Considerations
	communications), a list of stakeholders included in the process, and key issues to be considered as part of the shipping and navigation EIA. (*Target length: 4-6 pages.*)
9. Mitigation and Enhancement Measures	Detail embedded mitigation such as site selection, siting design, micro-siting and design constraints, including marking and lighting and wind turbine rotor blade tip clearance. Outline additional measures including Marine Traffic Control for project vessel during construction, creation of an Emergency Response Co-operation Plan (ERCoP) with the relevant Maritime Rescue Co-ordination Centre from construction phase onwards, appropriate and clear marking on Admiralty Charts, suitable array cable and export cable protection, buoyed construction and decommissioning areas and safety zones of appropriate configuration, extent and application to specified vessels, and planned briefings for contractors. Note any potential for public benefit (e.g. interpretation, data sharing). (*Target length: 2-3 pages.*)
10. Assessment of Effects	Structure assessment by project phase. Address: Category A impacts (e.g. collision risk, vessel displacement). Category B impacts (e.g. changes to shipping routeing) Include justification for significance conclusions. If no significant effects are expected, explain why. Present any effects remaining after mitigation, with a clear binary statement on significance for the purpose of EIA. (*Target length: 10-14 pages.*)
11. Additional Assessments	Include topic-specific detail on: • Cumulative effects (e.g. with other wind farms, aggregate dredging, cables). • Transboundary effects (if features span jurisdictions). • Interaction of effects (where not already covered ,e.g. fisheries, physical processes or unexploded ordnance). (*Target length: 4-8 pages.*)
12. Monitoring	Describe monitoring and enforcement mechanisms (e.g. Safety Management System (SMS), ERCoP, Notices to Mariners). Confirm data management and reporting (e.g. AIS, Kingfisher Information Service). (*Target length: 1-2 pages.*)
13. Summary of Commitments	Provide a concise commitments table with: Description of key commitments. When they will be implemented. How they will be secured (e.g. DCO requirement). Ensure consistency with other commitments registers or summary documents. (*Target length: 1-2 pages.*)
14. Appendices and Technical Outputs	It is expected that as a minimum, an NRA is provided as a technical appendix.

B1.1. Guidance on presentation of mitigation

The summary of significant impacts and proposed mitigations section of the shipping and navigation chapter should feature a summary table including all Category A and B impacts, proposed mitigations and the final assessment of impact significance. The table should follow the format described below:

Column 1: Description of impact – including the development phase of impact occurrence (construction, operation, decommissioning).

Column 2: Frequency of occurrence.

Column 3: Consequence of occurrence.

Column 4: Potential significance before mitigation.

Column 5: Mitigations applied.

Column 6: Residual significance after mitigation.

Column 7: Ongoing monitoring (yes/no).

ANNEX C: Recommended Conditions and Requirements

The following standard template for the shipping and navigation commitments register and elements of the NRA (as referenced in the oCEMP (or equivalent) should be used. It will record, track and verify any assumptions and proposed mitigations measures, and can be submitted with the scoping report to identify any assumptions and proposed mitigation measures. It should be updated and submitted again as part of the application documentation to demonstrate and confirm how the assumptions and mitigations have been informed by and validated through the EIA.

The inclusion of this standard information may assist applicants and determining authorities to identify and monitor compliance with the proposed mitigations and commitments during submission and examination of the EIA documentation. These are validated by the NRA process, and additional risk controls not in the list below may be proposed.

This Annex complements the general commitments guidance provided in *Evidence Review Note – Environment Impact Assessment* and provides wording tailored to shipping and navigation. The following sections can also be used to provide standardised conditions and requirements to implement and secure key mitigations.

C1.1 Standard Commitments

The following standard commitments are expected to be committed to by all developers at the scoping phase (even though they may not be undertaken until later in the process) to provide confidence to regulators and statutory bodies that the standard necessary post-consent mitigations are agreed.

ID	Description
1	Promulgation of information and warnings through local notifications to mariners and other appropriate maritime safety information (MSI) dissemination methods.
2	Continuous watch by multi-channel VHF, including Digital Selective Calling (DSC).
3	Safety zones of appropriate configuration, extent and application to specified vessels.
4	Provision of Aids to Navigation as determined by the General Lighthouse Authority through development of an Aids to Navigation Management Plan and/or Lighting and Marking Plan, including buoyed construction area.
5	Monitoring by radar, AIS, closed circuit television (CCTV) or other agreed means.
6	Creation of an ERCoP and SAR Checklist with the HMCG for the construction and operation phases.
7	Use of guard vessels where appropriate.

ID	Description
8	Wind turbine blades kept to a minimum of 22m clearance above MHWS (fixed foundations) and floating turbines to a minimum of 22m above sea level to ensure sufficient air draught clearance.
9	Development and adherence to a turbine layout design plan in compliance with MGN654, which includes for two lines of orientation, or where a single line of orientation is proposed, an appropriate safety justification.
10	Reducing navigable depth by no more than 5% (referenced to Chart Datum).
11	Marking of site on nautical charts.
12	Development of a Vessel Traffic Management Plan including marine coordination procedures.
13	Development of a Marine Pollution Contingency Plan.
14	Hydrographic Surveys in line with MGN654 Annex 4.
15	Cable burial or protection.
16	Construction and post-construction vessel traffic monitoring.