Rampion 2 Wind Farm

Category 6: Environmental Statement

Volume 2, Chapter 13: Shipping and navigation

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Executive Summary

This chapter of the Rampion 2 Environmental Statement (ES) examines the likely significant effects that may arise as a result of Rampion 2 on shipping and navigation.

A desk-based review of literature and existing datasets has been undertaken to establish a baseline (i.e. what exists in the Proposed Development Consent Order (DCO) Limits at the time of writing). Key navigational features in proximity to Rampion 2 include the existing Rampion 1 (fully commissioned in November 2018), the Dover Strait Traffic Separation Scheme (TSS) and several marine aggregate dredging areas. There are also several ports and harbours located along the coast within the Study Area.

From historical incident data, there are notable numbers of incidents that have occurred within or in proximity to Rampion 2, with the majority of these occurring within the offshore export cable corridor close to the coast.

From vessel traffic survey data recorded on-site there are notable volumes of vessel traffic passing within or in proximity to Rampion 2. Cargo, tankers, recreational and fishing vessels are all prominent, with movements dictated by the navigational features highlighted.

Additionally, extensive consultation has been undertaken with key shipping and navigation stakeholders including the Maritime and Coastguard Agency (MCA), Trinity House, United Kingdom (UK) Chamber of Shipping, Royal Yachting Association (RYA) and member clubs, local ports, Regular Operators and marine aggregate dredging representatives. The outputs of this consultation has not only informed the assessment of effects but also driven refinement of the proposed DCO Order Limits (compared to those considered at the Scoping and Preliminary Environmental Information Report (PEIR) stages) to reduce the significance of some effects.

The assessment considers the construction, operation and maintenance and decommissioning phases of the Proposed Development, noting that effects during the latter are generally considered similar to the equivalent effects during the construction phase. Effects assessed include vessel displacement, vessel to vessel collision risk, port access, vessel to structure allision risk, under keel clearance, anchor interaction with sub-sea cables and emergency response provision.

A range of environmental measures are embedded as part of the Rampion 2 design to reduce any significant environmental effects on shipping and navigation, as far as possible. These include cable burial and protection, promulgation of information, an application for safety zones, compliance with Marine Guidance Note (MGN) 654, lighting and marking, a layout plan, and marine coordination.

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13. Shipping and navigation

13.1 Introduction

13.1.1 This chapter of the Environmental Statement (ES) presents the results of the assessment of the likely significant effects of Rampion 2 with respect to shipping and navigation during the construction, operation and maintenance and decommissioning phases of the Proposed Development. It should be read in conjunction with the project description provided in **Chapter 4: The proposed development, Volume 2** of the ES (Document Reference: 6.2.4) and the relevant parts of the following chapters:

- **Chapter 7: Other marine users, Volume 2** of the ES (Document Reference: 6.2.7) (noting that other marine users are considered in this chapter from a safety of navigation perspective);
- **Chapter 10: Commercial fisheries, Volume 2** of the ES (Document Reference: 6.2.10) (with commercial fishing activity considered in this chapter from a safety of navigation perspective);
- **Chapter 14: Civil and military aviation, Volume 2** of the ES (Document Reference: 6.2.14) (civil and military aviation receptors are considered in this chapter from a safety of navigation perspective including emergency response to a marine incident); and
- **Chapter 17: Socio-economics, Volume 2** of the ES (Document Reference: 6.2.17) (ports and harbours are considered in this chapter from a safety of navigation perspective).

13.1.2 This technical chapter describes:

- the legislation, planning policy and other guidance that has informed the assessment (**Section 13.2: Relevant legislation, planning policy, and other documentation**);
- the outcome of consultation and engagement that has been undertaken to date, including how matters relating to shipping and navigation within the Statutory Consultation periods, have been addressed (**Section 13.3: Consultation and engagement**);
- the scope of the assessment for shipping and navigation (**Section 13.4: Scope of the assessment**);
- the methods used for the baseline data gathering (**Section 13.5: Methodology for baseline data gathering**);
- the overall baseline (**Section 13.6: Baseline conditions**);
- embedded environmental measures relevant to shipping and navigation and the relevant maximum design scenario (**Section 13.7: Basis for ES assessment**);

- the assessment methods used for the ES (**Section 13.8: Methodology for ES assessment**);
- the assessment of shipping and navigation effects (**Section 13.9-13.11: Assessment of effects** and **Section 13.12: Assessment of cumulative effects**);
- consideration of transboundary effects (**Section 13.13: Transboundary effects**);
- inter-related effects (**Section 13.14: Inter-related effects**);
- a summary of residual effects for shipping and navigation (**Section 13.15: Summary of residual effects**);
- a glossary of terms and abbreviations is provided in **Section 13.16: Glossary of terms and abbreviations**; and
- a references list is provided in **Section 13.17: References**.

13.1.3 The chapter is also supported by the following appendix:

- **Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.4.13.1).

13.2 Relevant legislation, planning policy and other documentation

Introduction

13.2.1 This section identifies the legislation, policy and other documentation that has informed the assessment of effects with respect to shipping and navigation. Further information on policies relevant to the Environmental Impact Assessment (EIA) and their status is provided in **Chapter 2: Policy and legislative context, Volume 2** of the ES (Document Reference: 6.2.2).

Legislation and national planning policy

13.1.1 **Table 13-1** lists the legislation relevant to the assessment of the effects on shipping and navigation receptors. It is noted that although the legislation listed in **Table 13-1** are technically frameworks for legislation (incorporated into United Kingdom (UK) law through the likes of the Energy Act 2004 and the Merchant Shipping Act 1995), they are listed here since they are the materials directly referenced within this chapter and the Navigational Risk Assessment (NRA) (**Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.2.13.1)).

Table 13-1 Legislation relevant to shipping and navigation

Legislation description	Relevance to assessment
United Nations Convention on the Law of the Sea (UNCLOS) (United Nations (UN), 1982)	
UNCLOS defines the rights and responsibilities of all nations with respect to their use of the sea, throughout the world. Article 60(7) "*Artificial islands, installations and structures and the safety zones around them may not be established where interference may be caused to the use of recognised sea lanes essential to international navigation*".	Internationally recognised sea lanes and other identified routes are considered a key element of the shipping and navigation baseline and have been considered wherever "*interference may be caused*" including through vessel displacement, port access, collision risk and allision risk in the impact assessment. The methodology for baseline data gathering and baseline conditions are outlined in **Section 13.5** and **Section 13.6**, respectively and the impact assessment (which includes consideration of internationally recognised sea lanes) is provided in **Section 13.9**, **Section 13.10** and **Section 13.11**.
Convention on the International Regulations for Preventing Collisions at Sea (COLREGs) (International Maritime Organization (IMO), 1972/77)	
The COLREGs define the rules which must be adhered to by all vessels navigating internationally. Rule 8 Part (a) "*Any action taken to avoid collision shall be taken in accordance with the Rules of this Part and shall, if the circumstances of the case admit, be positive, made in ample time and with due regard to the observance of good seamanship.*" Rule 19 Part (b) "*Every vessel shall proceed at a safe speed adapted to the prevailing circumstances and conditions of restricted visibility A power-driven vessel shall have her engines ready for immediate manoeuvre.*"	The COLREGs in full are considered throughout with particular regard in the context of Rampion 2 to collision avoidance (Rule 8) and conduct of vessels in restricted visibility (Rule 19) when considering collision risk in the impact assessment. The impact assessment (which includes consideration of COLREGs) is provided in **Section 13.9**, **Section 13.10** and **Section 13.11**.
Safety of Life at Sea (SOLAS) Chapter V (IMO, 1974)	
SOLAS Chapter V is an international agreement that sets basic minimum criteria	SOLAS Chapter V in full is considered throughout with particular regard in the context of Rampion 2 to rendering assistance to persons in distress

Legislation description	Relevance to assessment
for all seafarers, dependent on the size and type of vessel[1]. Regulation 33 "*The master of a ship at sea which is in a position to be able to provide assistance on receiving a signal from any source that persons are in distress at sea, is bound to proceed with all speed to their assistance, …*" Regulation 34 "*Prior to proceeding to sea, the master shall ensure that the intended voyage has been planned using the appropriate nautical charts and nautical publications for the area concerned, …*".	(Regulation 33) and passage planning (Regulation 34) when considering allision risk, anchor interaction with sub-sea cables and emergency response capability. The impact assessment (which includes consideration of SOLAS Chapter V) is provided in **Section 13.9**, **Section 13.10** and **Section 13.11**.

13.2.2 **Table 13-2** lists the national planning policy relevant to the assessment of the effects on shipping and navigation receptors. It is noted that although the overarching guidance principles set out in EN-1 National Policy Statement (NPS) do not specifically refer to shipping and navigation they have been considered.

Table 13-2 National planning policy relevant to shipping and navigation

Policy description	Relevance to assessment
EN-3 NPS for Renewable Energy Infrastructure (Department of Energy & Climate Change (DECC), 2011)	
EN-3 NPS for Renewable Energy sets out guidance and requirements for nationally significant energy infrastructure projects (NSIP).	As Rampion 2 is an offshore wind project of more than 100 Megawatts (MW) the Proposed Development falls under this NPS.
Paragraph 2.6.153 "*Applicants should establish stakeholder engagement with interested parties in the navigation sector early in the development phase of the proposed offshore wind farm and this should continue throughout the life of the development including during the construction, operation and decommissioning phases. Such*	Stakeholder engagement is considered a key input to the shipping and navigation baseline and impact assessment. Consultation undertaken is outlined in **Section 13.3**. and in the **Consultation Report** (Document Reference: 5.1).

[1] SOLAS Chapter V applies to all ships on all voyages except warships, naval auxiliaries and other vessels owned or operated by a contracting government.

Policy description	Relevance to assessment
engagement should be taken to ensure that solutions are sought that allow offshore wind farms and navigation uses of the sea to successfully co-exist."	
Paragraph 2.6.154 "*Assessment should be underpinned by consultation with the Marine Management Organisation (MMO), MCA, the relevant General Lighthouse Authority (GLA), the relevant industry bodies (both national and local) and any representatives of recreational users of the sea, such as the RYA, who may be affected.*"	The stated organisations are considered key stakeholders for shipping and navigation. Consultation undertaken is outlined in **Section 13.3**.
Paragraph 2.6.155 "*Information on internationally recognised sea lanes is publicly available and this should be considered by applicants prior to undertaking assessments. The assessment should include reference to any relevant, publicly available data available on the Maritime Database.*"	Internationally recognised sea lanes, other identified routes and navigational features such as IMO routeing measures are considered a key element of the shipping and navigation baseline. The methodology for baseline data gathering and baseline conditions are outlined in **Section 13.5** and **Section 13.6**, respectively.
Paragraph 2.6.156 "*Applicants should undertake a Navigational Risk Assessment (NRA) in accordance with relevant Government guidance prepared in consultation with the MCA and the other navigation stakeholders listed above.*"	The NRA is considered a key input to the shipping and navigation impact assessment including compliance with MCA guidance documents. The NRA is provided in **Appendix 13.1, Volume 4** of the ES (Document Reference: 6.4.13.1) and its methodology was agreed during consultation with the MCA and Trinity House (**Section 13.3**).
Paragraph 2.6.160 "*The potential effect on recreational craft, such as yachts, should be considered in any assessment.*"	Small craft including recreational vessels are considered a relevant receptor to shipping and navigation. The impact assessment (which includes consideration of recreational vessels in transit) is provided in **Section 13.9**, **Section 13.10** and **Section 13.11** with active activities involving recreational vessels considered in **Chapter 7: Other marine users, Volume 2** of the ES (Document Reference: 6.2.7).

Policy description	Relevance to assessment
National Policy Statement for Ports (DfT, 2012)	
The NPS for Ports sets out the framework for decisions on proposals for new port development.	Although not directly applicable to Rampion 2, ports and port users are identified as potential receptors and therefore elements of the NPS are considered relevant.
Paragraph 5.14.2 "*Where the project is likely to have socio-economic impacts at local or regional levels, the applicant should undertake and include in their application an assessment of these impacts as part of the ES, ...*"	The socio-economic effect of Rampion 2 on local ports has been considered in **Chapter 17: Socio-economics, Volume 2** of the ES. For shipping and navigation the commercial impact on routes which could also impact on port use is considered in **Section 13.10**.
Paragraph 5.14.4 "*Applicants should describe the existing socio-economic conditions in the areas surrounding the proposed development and should also refer to how the development's socio-economic impacts correlate with local planning policies.*"	
Paragraph 5.14.5 "*Socio-economic impacts may be linked to other impacts.*"	
UK Marine Policy Statement (HM Government, 2011)	
The UK Marine Policy Statement provides a framework for preparing Marine Plans and taking decisions affecting the marine environment. Paragraph 3.4.7 "*Increased competition for marine resources may affect the sea space available for the safe navigation of ships. Marine plan authorities and decision makers should take into account and seek to minimise any negative impacts on shipping activity, freedom of navigation and navigational safety and ensure that their decisions are in compliance with international maritime law*".	Displacement of existing routes and activity and subsequent increases in collision risk have been considered. The impact assessment (which includes consideration of vessel displacement) is provided in **Section 13.9**, **Section 13.10** and **Section 13.11**.

13.1.2 The ES also considers proposed amendments to the NPSs. The emerging draft NPSs, including sections EN-1 and EN-3 which are relevant for renewables and shipping and navigation, were available for consultation between September and November 2021 with the outcome of the feedback received currently pending.

13.2.3 **Table 13-3** lists the emerging national planning policy considerations relevant to the assessment of the effects on shipping and navigation receptor, noting that the considerations highlighted here are broadly similar to those highlighted for the existing national planning policy.

Table 13-3 Emerging national planning policy relevant to shipping and navigation

Policy description	Relevance to assessment
Draft National Policy Statement for Renewable Energy Infrastructure (EN-3) (Department for Energy Security and Net Zero, 2023)	
Paragraph 3.8.199 "*Applicants should engage with interested parties in the navigation sector early in the pre-application phase of the proposed offshore wind farm to help identify mitigation measures, including alterations to navigation routes, to facilitate proposed offshore wind development. This includes the MMO or Natural Resources Wales (NRW) in Wales, MCA, the relevant General Lighthouse Authority, such as Trinity House, the relevant industry bodies (both national and local) and any representatives of recreational users of the sea, such as the RYA, who may be affected. This should continue throughout the life of the development including during the construction, operation and decommissioning phases.*"	Stakeholder engagement is considered a key input to the shipping and navigation baseline and impact assessment. Consultation undertaken is outlined in **Section 13.3** and commenced early in the development process for Rampion 2, including in relation to the approach to scoping. This aided with establishing the key stakeholders with whom engagement was required. Consultation has related to the construction, operation and decommissioning phases and the stated organisations are considered key stakeholders for shipping and navigation.
Paragraph 3.8.202 "*Prior to undertaking assessments applicants should consider information on internationally recognised sea lanes, which is publicly available.*" Paragraph 3.8.203 "*Applicants should refer in assessments to any relevant, publicly available data available on the Maritime Database.*"	Internationally recognised sea lanes, other identified routes and navigational features such as IMO routeing measures are considered a key element of the shipping and navigation baseline. The methodology for baseline data gathering and baseline conditions are outlined in **Section 13.5** and **Section 13.6**, respectively.

Policy description	Relevance to assessment
Paragraph 3.8.204 "*Applicants should undertake a Navigational Risk Assessment (NRA) in accordance with relevant government guidance prepared in consultation with the MCA and the other navigation stakeholders listed above.*"	The NRA is considered a key input to the shipping and navigation impact assessment including compliance with MCA guidance documents. The NRA is provided in **Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.4.13.1) and its methodology was agreed during consultation with the MCA and Trinity House (**Section 13.3**).
Paragraph 3.8.350 "*The Secretary of State should be satisfied that the scheme has been designed to minimise the effects on recreational craft and that appropriate mitigation measures, such as buffer areas, are built into applications to allow for recreational use outside of commercial shipping routes.*"	Small craft including recreational vessels are considered a relevant receptor to shipping and navigation. The impact assessment (which includes consideration of recreational vessels) is provided in **Section 13.9**, **Section 13.10** and **Section 13.11**.
Paragraph 3.8.194 "*To ensure safety of shipping applicants should reduce risks to navigational safety to as low as reasonably practicable (ALARP).*"	The IMO Formal Safety Assessment (FSA) methodology (IMO, 2018) has been applied for assessing effects on shipping and navigation receptors including application of the ALARP principle to ensure risks are within tolerable levels. The methodology for ES assessment is provided in **Section 13.8**.

Local planning policy

13.2.4 **Table 13-4** lists the local planning policy relevant to the assessment of the potential effects on shipping and navigation receptors.

Table 13-4 Local planning policy relevant to shipping and navigation

Policy description	Relevance to assessment
South Inshore and South Offshore Marine Plan (Department for Environment, Food & Rural Affairs (DEFRA), 2018)	
The South Inshore and South Offshore Marine Plan safeguards environments and enables sustainable use of its shipping channels.	The Dover Strait Inshore Traffic Zone (ITZ) is an IMO routeing measure and is located approximately 1.5nm from the proposed DCO Order Limits.

Policy description	Relevance to assessment
Policy S-PS-2 "*Proposals that require static sea surface infrastructure or that significantly reduce under-keel clearance must not be authorised within International Maritime Organization (IMO) routeing systems unless there are exceptional circumstances*". Policy S-PS-3 "*Proposals that require static surface infrastructure or that significantly reduce under-keel clearance which encroach upon high density navigation routes, or that pose a risk to the viability of passenger ferry services, must not be authorised unless there are exceptional circumstances*".	The ITZ has been considered as part of the baseline. The methodology for baseline data gathering and baseline conditions are outlined in **Section 13.5** and **Section 13.6**, respectively.

Other relevant information and guidance

13.2.5 A summary of other relevant information and guidance relevant to the assessment undertaken for shipping and navigation is provided here:

- *MGN 654 Safety of Navigation: Offshore Renewable Energy Installations (OREIs) – Guidance on UK Navigational Practice, Safety and Emergency Response* (MCA, 2016) – highlights the issues that need to be taken into consideration when assessing the impact on navigational safety and emergency response (search and rescue (SAR), salvage and towing, and counter pollution) caused by OREI developments. It is noted that the annexes to MGN 654, including the *Methodology for Assessing the Marine Navigational Safety & Emergency Response Risks of Offshore Renewable Energy Installations (OREI)*, are also considered.
- *Revised Guidelines for Formal Safety Assessment (FSA) for Use in the IMO Rule-Making Process* (IMO, 2018) – outlines the FSA methodology as a tool.
- *International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) Recommendation O-139 The Marking of Man-Made Structures* (IALA, 2021) and *IALA Guideline G1162: The Marking of Offshore Man-Made Structures* (IALA, 2021) – provides recommendations for developers with regard to the marking of structures fixed in position, which extend above or below the surface of the sea and which are obstructions to navigation (including OREIs).
- *The RYA's Position on Offshore Renewable Energy Developments: Paper 1 (of 4) – Wind Energy* (RYA, 2019) – enables developers to take account of recreational boating concerns when developing their ESs and NRAs.

13.3 Consultation and engagement

Overview

13.3.1 This section describes the stakeholder engagement undertaken for Rampion 2. This consists of early engagement, the outcome of, and response to, the Scoping Opinion in relation to the shipping and navigation assessment, non-statutory consultation and Rampion 2's statutory consultation. An overview of engagement undertaken for Rampion 2 as a whole can be found in **Chapter 5: Approach to the EIA, Volume 2** of the ES (Document Reference: 6.2.5).

13.3.2 Two Hazard Workshops have been undertaken – one pre-PEIR (23 February 2021) and one post-PEIR (6 August 2022) following refinements to the proposed DCO Order Limits.

13.3.3 It is noted that consultation in relation to marine aggregate dredging and port relations has been ongoing since the application for Rampion 1. This feedback has been incorporated into the assessment process for Rampion 2 as part of **Chapter 7: Other marine users, Volume 2** of the ES (Document Reference: 6.2.7).

Early engagement

Introduction

13.3.4 Early engagement was undertaken with a number of prescribed and non-prescribed consultation bodies and local authorities in relation to shipping and navigation. This engagement was undertaken to introduce the Proposed Development and the proposed approach to scoping the EIA.

Maritime and Coastguard Agency

13.3.5 Early engagement with the MCA was undertaken in the form of email correspondence (2 July 2020). MCA were content with the intended approach for the vessel traffic surveys in principle, although commented that October is considered quite early for a 'winter' survey[2].

Trinity House

13.3.6 Early engagement with Trinity House was undertaken in the form of email correspondence (2 July 2020). Trinity House commented that vessel traffic data from 2020 could be affected by the restrictions imposed in response to COVID-19, especially with regards to recreational traffic, and this will need to be assessed accordingly.

[2] The winter vessel traffic survey was undertaken between 1 and 15 November 2020, noting that although early in the season, October is generally considered a suitable time for winter surveys.

Royal Yachting Association

13.3.7 Early engagement with the RYA was undertaken in the form of email correspondence (1 July 2020). Key points raised by the RYA included:

- the proposal to undertake visual identification of recreational craft in combination with surveys for other receptors is welcomed;
- suggested that vessel traffic surveys are undertaken between mid-June and no later than the August bank holiday since bad weather at the end of August can give poor recreational vessel data. There is no preference for the timing of the winter vessel traffic survey;
- the plan to validate the vessel traffic survey with clubs and training centres is welcomed provided that there is a clear method for translating the findings of the NRA into the EIA hierarchy to eliminate identified impacts. Additionally, it would be useful to speak directly with clubs around the landfall location; and
- in addition to Automatic Identification System (AIS) data, the RYA Coastal Atlas identifies boating areas around the UK following consultation with member clubs.

Scoping Opinion

13.3.8 Rampion Extension Development Limited (RED) submitted a Scoping Report (RED, 2020) and request for a Scoping Opinion to the Secretary of State (administered by the Planning Inspectorate) on 2 July 2020. A Scoping Opinion was received on 11 August 2020. The Scoping Report sets out the proposed shipping and navigation assessment methodologies, outline of the baseline data collected to date and proposed, and the scope of the assessment. **Table 13-5** sets out the comments received in Section 4 of the Planning Inspectorate Scoping Opinion 'Aspect based scoping tables – Offshore' and how these have been addressed in this ES. A full list of the Planning Inspectorate Scoping Opinion comments and responses is provided in **Appendix 5.2: Responses to the Scoping Opinion, Volume 4** of the ES (Document Reference 6.4.5.2). Regard has also been given to other stakeholder comments that were received in relation to the Scoping Report.

Table 13-5 Planning Inspectorate Scoping Opinion responses – shipping and navigation

Planning Inspectorate ID number	Scoping Opinion comment	How this is addressed in this ES
4.9.1	"*The Inspectorate is unclear as to what refinement of offshore components or identification of additional impact pathways could occur that would lead to amendment of the study area. The ES should clearly set out the study area with reference to the "standard" 10 nautical miles (nm) buffer that is stated and its basis within relevant legislation and guidance.*"	The shipping and navigation study area used for the Scoping Report (RED, 2020) has been maintained despite a reduction in the size of the proposed DCO Order Limits in order to ensure consistency. Consequently, the study area considered in the ES is a minimum 10nm buffer of the proposed DCO Order Limits. The study area is presented and justified in **Section 13.4**.
4.9.2	*"There is a high degree of overlap in the assessment of effects on offshore recreational users across other marine users, shipping and navigation and socio-economics. The Inspectorate expects that these matters will be considered as part of the assessment(s) of inter-related effects."*	The effect on recreational users has been considered as an inter-related effect. The assessment of inter-related effects is provided in **Section 13.14**. The socio-economic effect of Rampion 2 has been considered in **Chapter 17: Socio-economics**, Volume 2 of the ES (Document Reference: 6.2.17).
4.9.3	*"The IMO FSA guidance will be followed when assessing impacts to shipping and navigation receptors, assessing each impact in terms of frequency and consequence. The ES should clearly set out how the risk assessment approach leads to an assessment of significance of effect are consistent/compatible with the terminology as set out in the Scoping Report."*	The *Revised Guidelines for FSA for Use in the Rule-Making Process* (IMO, 2018) have been applied to the impact assessment, noting that this differs from the standard assessment methodology being applied for other aspects. The methodology used for the preliminary assessment is outlined in **Section 13.1** with further detail provided in **Section 3** of **Appendix 13.1, Volume 4** of the ES (Document Reference: 6.2.13.1).
4.9.4	*"The Inspectorate notes the apparent importance of the "hazard workshop[s]" subsequent to the Scoping Opinion in refining the*	Points raised at the Hazard Workshops are outlined in **Section 13.3** and the Hazard Log – the main output of the Hazard

Planning Inspectorate ID number	Scoping Opinion comment	How this is addressed in this ES
	approach to the assessment. The scope, outcomes and agreements reached during this meeting should be specifically set out in the ES and NRA (such as in the form of technical appendices or other standalone reports).”	Workshops – is provided in full in **Annex B** of **Appendix 13.1, Volume 4** of the ES (Document Reference: 6.4.13.1).
4.9.5	*“The ES should explain how the assessment has factored in shipping and navigation effects on the nine marine aggregate dredging areas intersecting the study area. It is unclear if such effects are to be considered part of the ‘baseline’ conditions or whether a future baseline is required accounting for changes in dredging activity. Such effects may also need to be considered as part of the cumulative effects assessment of combined effects of the Proposed Development and aggregate activity on other receptors. The Inspectorate notes the Applicant’s identification of a “significant marine aggregate dredging route…within the north-west of the study area” in this regard.”*	Consultation with marine aggregate dredging stakeholders has been undertaken and marine aggregate dredgers have been considered as a receptor in the impact assessment, both for the assessment of Rampion 2 in isolation and as part of the Cumulative Effect Assessment (CEA). The preliminary assessment (which includes consideration of marine aggregate dredgers) is provided in **Section 13.9**, **Section 13.10** and **Section 13.11**.

Non-statutory consultation

Overview

13.3.9 Non-statutory consultation captures all consultation and engagement outside of statutory consultation, and has been ongoing with a number of prescribed and non-prescribed consultation bodies and local authorities in relation to shipping and navigation (see also Early Engagement above **Section 13.3)** . A summary of the non-statutory consultation undertaken since completion of the Scoping Report is outlined in this section.

Maritime and Coastguard Agency and Trinity House

13.3.10 Engagement with the MCA and Trinity House (jointly) has been ongoing since 29 July 2020 in the form of conference calls, email correspondence and the Hazard Workshops. This includes dedicated meetings to discuss refinements needed to the proposed DCO Order Limits to adequately address comments raised throughout the EIA process. Key points raised include:

- vessel traffic issues which persisted during the impact assessment for Rampion 1 will still be a factor for Rampion 2, including the ITZ which will need to be assessed carefully;
- the displacement of vessel traffic between the south of the existing Rampion 1 project and the Dover Strait TSS may be an issue, with a general squeezing of traffic flows and potential subsequent impact on pilotage;
- the Dover Strait Users Group is a good target audience and therefore would be useful to approach;
- the existing Rampion 1 project is considered a good layout for SAR and it is important that this is not impacted by Rampion 2 noting that, given the general area, SAR access is of particular importance;
- content with the NRA methodology, in line with MGN 543 [since superseded by MGN 654] and its annexes;
- infrastructure within a routeing measure is not allowed under the South Inshore and South Offshore Marine Plan, and the ITZ is part of the routeing measures referred to in the plan;
- support the structures exclusion zone to the west of Rampion 1 as a corridor provided it has sufficient width and the entry/exit of the southern end is unimpeded;
- the corridor would be beneficial and reduce risks associated with traffic transiting around the eastern and southern boundaries;
- the separation distance of at least 4.7nm between the corridor and TSS traffic provides sea room to minimise rights of way issues with traffic exiting the TSS; and
- the ITZ could be used as an escape channel.

UK Chamber of Shipping

13.3.11 Engagement with the UK Chamber of Shipping has been ongoing since 10 August 2020 in the form of conference calls and the Hazard Workshops. Key points raised include:

- access to the St. Helen's anchorage may be impacted and additionally collision risk between moving and anchored vessels requires consideration;
- the AIS data presented in the Scoping Report (RED, 2020) for cargo vessels and tankers is reflective of expectations in the area;

- the proposed NRA methodology is satisfactory and there are no considerable issues.
- whether or not a distance of 4.7nm between the structures exclusion zone to the west of Rampion 1 as a corridor and crossing traffic headed to the Solent would be sufficient would be dependent on the layout and level of traffic as well as issues such as potential for cluttered Radar or foggy conditions;
- initial thoughts were that the corridor appeared to be of benefit to Littlehampton Harbour (due to the 10.5nm reduction in route distance compared to deviating west around the array) and that the corridor would offer vessels additional options dependent on weather. However, it was also considered that the exit from the corridor could be a pinch point;
- regarding the future worst case dog leg route from the TSS passing east of the Preliminary Environmental Information Report Proposed DCO Order Limits (the project boundary available at the time), it was stated that one point of concern would be the risk posed to vessels travelling in opposite directions with visual interference from turbines factored in – this should be sought to be avoided from a shipping and navigation point of view;
- The change in the proposed DCO Order Limits is satisfactory, particularly with regard to the separation from the ITZ; and
- The indicative maximum design scenario layout includes an isolated structure in the south west which may be a concern in relation to allision risk.

Royal Yachting Association

13.3.12 Engagement with the RYA has been ongoing since 10 August 2020 in the form of conference calls, email correspondence and the Hazard Workshops. Key points raised include the following.

- The south eastern corner of the Scoping Boundary (the project boundary available at the time) is close to the Dover Strait TSS and this causes some concern. The NRA should consider small numbers of recreational craft engaged in long distance cruising passing through the area.
- The need to keep a safe distance when passing at the western extent of the Scoping Boundary may limit available sea room and squeeze small craft into a narrow channel given the likely presence of construction buoyage and the Owers / Looe.
- The portions of the Scoping Boundary developed will determine the effects of displacement of recreational traffic with interaction more likely the closer inshore the development is undertaken. Refinement of the Scoping Boundary is key.
- Initially recreational vessels were excluded from marinas and clubs due to COVID-19 but since the first lockdown (June 2020) the RYA has participated in campaigning to promote their return and a peak in recreational activity can be expected between mid-July and mid-August 2020.
- The seasonal difference in recreational vessel traffic between summer and winter periods observed in the data used in the Scoping Report (RED, 2020) is

to be expected noting that such traffic is largely located inshore of Rampion 1. The displacement of any larger recreational craft into inshore waters could result in interaction with small craft and should be considered in the NRA. Otherwise, smaller craft (such as dinghies) are unlikely to be affected by the presence of Rampion 2.

- East-west traffic through the study area ranging between the Solent and Eastbourne will be most affected by the presence of Rampion 2 as would north-south traffic out of Newhaven and Brighton.
- A large proportion of the recreational traffic in the area is under sail and therefore will be presented with additional challenges in certain weather conditions to make safe passage in proximity to the wind farm, particularly at the western extent of the Scoping Boundary (noting the previous point regarding the creation of a narrow channel) if sailing westwards into a prevailing south westerly wind.
- From consultation undertaken by the RYA, the national level of AIS uptake by recreational vessels is around 20% but the ratio may be higher in this area.
- Whether recreational traffic at Shoreham may be significant was queried, particularly in relation to traffic associated with the Sussex Yacht Club. Furthermore, whether there is significant traffic at Brighton and Littlehampton other than recreational boating (such as fishing, diving or sightseeing tours) was queried.
- Whether the high proportion of reported incidents being recreational vessels is a reflection of traffic volume, poor maintenance or lack of training was queried.
- There are few safe havens for recreational craft seeking shelter along this coast with those that are available very tide dependent for access. Mitigation measures and construction should avoid restricting access to safe havens.
- From a recreational boating point of view, Rampion 2 should be sited within the scoping envelope immediately to the west or to the south of Rampion 1 with the NRA to look very carefully at the risks to recreational boating when siting anywhere else within the scoping envelope.
- In recent years the silting up of Brighton Marina has become a challenge and it is postured that disruption to the seabed from construction methods could create coastal navigation problems.
- Consideration of the spacing between structures and use of Notifications to Mariners may serve as suitable mitigation measures for impacts associated with recreational vessels.
- Impacts relating to emergency response for recreational activity offshore of the array should be considered.
- Any assessment should be based on accurate surveys of recreational traffic and should avoid an emphasis on AIS as most recreational craft are not fitted with AIS transponders.

- Any assessment should determine recreational traffic densities north (inshore) and south (offshore) of the proposed development to ensure an accurate assessment.
- Recreational representatives recommend siting the development south or west of Rampion 1 to avoid navigational squeeze in the area between the development and Selsey Bill but also to avoid recreational traffic being squeezed between the southern boundary and Dover Strait TSS.
- The NRA should:
  - note the number of recreational vessels using and crossing the area;
  - include vessel traffic survey logs as an annex;
  - indicate the number of vessels carrying AIS and Radio Detection and Ranging (Radar) reflectors;
  - use vessel traffic surveys undertaken between 15 June and 15 August;
  - provide detailed assessments of how risk is determined ALARP;
  - compare the NRA surveys and the appropriate MMO full yearly AIS survey for the UK;
  - consider the RYA Coastal Atlas and general boating areas against the vessel traffic surveys; and
  - consider recreational vessel movements in adverse weather.
- AIS indicated that east-west craft tend to avoid Rampion 1 by taking a track north or south, i.e. recreational users are avoiding Rampion 1 by making early course corrections to minimise the distance travelled on passage along the South Coast.
- There is an offshore recreational passage (cruising) route to the south of Rampion 1 which crosses through the Rampion 2 array area.
- AIS data for the period Rampion 1 has been operating indicates that recreational traffic is displaced, rather than sailing through the offshore wind renewable site. Any assumption in the current NRA that states craft will continue to sail through the wind farm area should be corrected to reflect the scenario that craft will be displaced.
- The Proposed Development should not interfere with or undermine the use and siting of existing aids to navigation. These current markers are key navigational aids and boats wishing to transit to the south of the shallows will have a complicated navigational route, especially in a prevailing south west wind causing a leeward grounding risk, if the array area is closer inshore.
- Concerned that commercial traffic approaching Shoreham could be displaced into recreational areas (based on the Proposed DCO Order Limits and to avoid this there may be a need for some form of traffic separation if the Proposed Development displaces traffic inshore.
- With respect to the north-south cross-Channel passage traffic, together with the indication that recreational users appear to be avoiding transits through

Rampion 1, it is suggested that a navigation channel is provided between Rampion 1 and 2.

- Content that areas of concern had been addressed by the Assessment Boundary changes, but the main concern was an east-west route along which a small concentration of craft appeared to be transiting within the proposed DCO Order Limits.
- The main consideration for a drifting craft is SAR response time.
- The proposed DCO Order Limits represent a positive change from those previously considered with the clear gaps between Rampion 1 and Rampion 2 particularly useful.
- There may be a potential issue of crossing traffic between vessels transiting through the structures exclusion zones and this is a matter for consideration in the NRA.

Shoreham Port Authority

13.3.13 Engagement with Shoreham Port Authority has been ongoing since 12 August 2020 in the form of conference calls and the Hazard Workshops. Key points raised include:

- the area of search and wide design envelope (noting that this differs from the proposed DCO Order Limits) leads to similar concerns raised for Rampion 1, namely that there is significant uncertainty over what area will be developed;
- should access to the Dover Strait TSS be blocked from the east of Rampion 1 then vessels will be required to travel much further west out of Shoreham to access the TSS which would have implications on the attractiveness of Shoreham as a port for commercial use, noting that the majority of commercial traffic out of Shoreham utilises the TSS. The economic effects on the port need to be considered;
- any extension of Rampion 1 to the west may result in vessels holing up inshore of the site;
- there are no concerns with the offshore export cable corridor location;
- the effects of COVID-19 are still present (as of August 2020) with a downturn in pleasure craft and visitors to ports infrequent. No yachts from France, Belgium and Germany have visited in 2020. Commercial volumes at Shoreham are down around 30% and there remains uncertainty over the possible effects post Brexit. The 12-month dataset from 2019 will be reflective of commercial vessel movements;
- the indicative worst-case layout for shipping and navigation does reflect the worst case for shipping given that it blocks access to the Dover Strait TSS lanes from Shoreham;
- Notifications to Mariners for the existing Rampion 1 project became somewhat excessive.
- the main issue from Rampion 1 was the lack of sea room in the ITZ;

- vessels will take the safest option in adverse weather; and
- satisfied with the reduction to the extent of the proposed DCO Order Limits to the east in line with Rampion 1 in relation to access for routeing to/from Shoreham Port.

Newhaven Port & Properties

13.3.14 Engagement with Newhaven Port & Properties has been ongoing since 4 August 2020 in the form of conference calls and the first Hazard Workshop. Key points raised include:

- the south eastern corner of the Scoping Boundary (noting that this differs from the proposed DCO Order Limits) is too close to the Dover Strait TSS and could create a pinch point for vessel traffic;
- recreational traffic ceased entirely at Newhaven at the start of the COVID-19 outbreak but has now (as of August 2020) returned to normal levels;
- the pilot boarding station for Newhaven is far enough from the Scoping Boundary that there is not expected to be any effect on pilot operations;
- the AIS data presented in the Scoping Report (RED, 2020) is reflective of vessel traffic movements in the area, including non-AIS vessels; and
- the proposed NRA methodology is satisfactory.

CLdN

13.3.15 Engagement with CLdN (a European logistics company) has been ongoing since 1 October 2020 in the form of email correspondence. Key points raised include:

- CLdN have a number of vessels which pass by the Scoping Boundary every week, but they are transiting through the Dover Strait TSS and have no need to enter the site. There are no issues which will adversely affect CLdN's current trade routes; and
- a vessel breaking down is always an issue but that is the same for any offshore wind farm development.

United European Car Carriers

13.3.16 Engagement with United European Car Carriers (UECC) has been ongoing since 19 October 2020 in the form of email correspondence. Key points raised include:

- UECC has four vessels whose passage out of Southampton will be impacted by the south western corner of the Scoping Boundary. Feedback from the Masters is that this will not have much effect and safe sailing will remain. The vessels will have to make a small adjustment on one waypoint, but the total distance of the route will remain about the same.

Britannia Aggregates

13.3.17 Engagement with Britannia Aggregates has been ongoing since 30 October 2020 in the form of email correspondence. Key points raised include:

- Britannia Aggregates delivers cargoes into Shoreham and Newhaven (and occasionally Portsmouth and Southampton) that may be dredged on aggregate marine licence areas close to the Isle of Wight, in the central English Channel and in the Outer Thames/east coast; and
- some of the routes to and from the licence areas to these ports could be impacted by Rampion 2 depending upon where the new Wind Turbine Generators (WTG) are placed; in particular, the Shoreham to East Channel licences could entail a detour of 8 to 10nm (around the Scoping Boundary) which is significant in terms of time. These transit routes should be considered.

DEME Group

13.3.18 Engagement with DEME has been ongoing since 30 October 2020 in the form of email correspondence. Key points raised are as follows.

- The Scoping Boundary covers a relatively large region and there are concerns that DEME operated vessels sail in proximity to the area of search including over the export cable corridor and over the proposed area of build to reach destinations such as Shoreham and Newhaven. This may cause conflicts with transit routes and therefore these concerns should be taken into account when assessing the navigational risks and determining the areas where structures are installed.

Volker Dredging

13.3.19 Engagement with Volker Dredging Limited (VDL) has been ongoing since 5 November 2020 in the form of email correspondence. Key points raised are as follows.

- VDL holds marine aggregate licences for Areas 340 and 351 East of the Isle of Wight and also for Area 461 and GIE St Nicolas in the East English Channel. Cargoes are regularly landed at Shoreham and Newhaven from the Isle of Wight and East Channel concessions and it is important that steaming times are not increased as a result of Rampion 2. Even small increases in steaming distances can have a significant impact on the profitability of operations.

Littlehampton Harbour Board

13.3.20 Engagement with Littlehampton Harbour Board has been ongoing since 18 November 2020 in the form of conference calls, email correspondence and the Hazard Workshops. Key points raised include:

- less than 50% of the small commercial vessels operating out of Littlehampton are on AIS and it is anticipated that less than 20% of vessels inshore at Littlehampton are on AIS;
- vessels can spend anywhere between six hours and two days at the Littlehampton anchorage area awaiting suitable weather;

- any vessel operating within the Competent Harbour Authority area would likely require pilotage including any cable laying vessel that may be operating in the pilotage area for Rampion 2;
- the non-AIS vessels observed in the summer 2020 survey data is accurate for the routes taken;
- a route for a monthly (on average) 80 metre (m) coaster extending direct from the Dover Strait TSS to the east to the anchorage and from the harbour direct to the TSS should be included in any assessment with any detour potentially meaning that Littlehampton becomes less attractive to shipping as many vessels rushing to make the tide would have a further delay. For those without a chance of making entry on arrival locally, the detour is less of an issue but the long stay at the anchorage is our key risk with the cable;
- the PEIR indicative worst-case layout for shipping and navigation cuts off Littlehampton entirely;
- cable burial depth of 1m close to Littlehampton's charted anchorage for larger vessels is concerning but content that this will be addressed in the cable burial risk assessment (CBRA);
- cable burial at 1m depth within 1nm of Mean High Water Springs (MHWS) is also concerning given the frequency of small leisure craft, fishermen, racing safety/committee boats, temporary race marks, visiting yachts and lifeboats anchoring in this area. Buoyage similar to that in place around the existing cable landing at Worthing will help to mitigate this;
- all marine operations falling within Littlehampton's pilotage district should be consulted on with the Littlehampton Harbour Board in advance. Any operation of vessels over 20m in length at low under keel clearance or any vessels engaged in cable burial may be subject to pilotage;
- a target burial depth is not a mitigation in itself but simply an intent to mitigate. A mitigation would be a minimal depth of cover at time of installation and also a minimum depth of cover throughout the cable's lifetime;
- a 1m actual depth of cover is not expected to be sufficient to mitigate the risk of anchor interaction. It should be confirmed if analysis such as anchor penetration trials has or will be undertaken. The CBRA may account for this but should be reviewed and approved by the Littlehampton Harbour Board;
- monitoring of cable burial via annual bathymetry surveys and a remedial response plan if shallower depths of cover than agreed are detected is considered as an expected mitigation;
- a line of buoyage marking the cable route up to 1nm offshore from MHWS is expected to mitigate leisure mariners anchoring off the beach;
- a permanent relocation of the western two charted Arun Yacht Club seasonal race markers may be required;
- anchor interaction should be considered for recreational vessels with a most likely consequence of 'no interaction' challenged in favour of anchors of any type or size of vessel snagging on the cable or its protection resulting in

dumping of the anchor and therefore an inability to use the anchor in an emergency thereafter[3];

- the outcomes of the risk assessment issue are a matter of terminology rather than outright disagreement with the assessment of risks deemed 'tolerable' not being furthered;
- main concern is the cable burial and anchoring vessels in proximity to the export cables, with relocation of the anchorage location potentially required. Based on feedback from developments in the Wash there is a preference to address issues upfront including through involvement in the cable burial risk assessment;
- recreational users do not navigate internally within Rampion 1 in poor conditions;
- although the structures exclusion zone west of Rampion 1 is welcomed overall it may introduce new risks whilst mitigating others for vessels and would unlikely be justified for Littlehampton commercial shipping alone given the low volumes of vessel movements; and
- the proposed DCO Order Limits represent a positive change from those previously considered.

Cemex

13.3.21 Engagement with Cemex has been ongoing since 23 February 2021 in the form of the first Hazard Workshop and email correspondence. Key points raised include:

- fishing vessels avoid passing through the existing Rampion 1 project in winter and instead pass to the west. Any decision for routeing with a wider spacing between structures at Rampion 2 will be for the individual skippers;
- the risk of a marine aggregate dredger breaking down and drifting on the ebb tide into the export cable route should be considered;
- Radar performance should be incorporated into the assessment;
- the natural reluctance of seafarers to enter within the established development will inevitably result in compression of traffic routes between the north west boundary and the Owers buoy and similarly between the south east boundary and the western limit of the south west lane of the Dover Strait TSS;
- the presence of the array area is likely to displace to the south, vessels making for the Dover Strait ITZ with the consequence that an increase in head-on or near head-on encounters will occur between vessels approaching the ITZ and vessels leaving the south west bound TSS;
- AIS indicates that during winter commercial fishing vessels following the significant transit route to/from the south towards/departing Shoreham avoid passing through the existing Rampion 1 project. In the case that this practice is adopted with respect to Rampion 2 there will then be significant displacement

[3] Anchor interaction with sub-sea cables is assessed in **Section 13.10**.

of commercial fishing vessels to the east or west of the Proposed Development (based on the PEIR Assessment Boundary). This will increase the number of encounters between fishing vessels in transit and marine aggregate dredgers working the current active extraction areas;

- the potential increase in encounters referred to should be considered in the context of potential reduced Radar performance of vessels navigating in close proximity to the wind farm structures. Radar performance considerations should be based on evidence of the Radar performance of relevant vessel types navigating in close proximity to the offshore structures proposed for the development as opposed to being based on generic Radar performance studies;
- current active aggregate areas are hemmed in to the south and west by the northern limit of the array area and the eastern limit of the export cable corridor potentially reducing available sea room for marine aggregate dredgers to operate and take avoiding action in the case of encounters with other vessels;
- given the close proximity of current aggregate areas the adequacy of the proposed cable burial depth of 1m must be confirmed and the possibility of it being breached by the anchor penetration of a drifting vessel attempting to come to her anchor without power must be assessed;
- the draft Hazard Log generally underplays the potential impact of the development on general navigation in the area (interrelationship of all impacts) and the impact on marine aggregate dredgers and commercial fishing vessels in particular;
- the proposed DCO Order Limits represent a positive change from those previously considered;
- in the event of a breakdown/emergency anchoring, it is likely that anchors of marine aggregate dredgers will penetrate through 1.5m of seabed and this is a concern; and
- the Radar index of a monopile will be different to that of a multileg foundation and this should be accounted for when comparing against other developments (including Rampion 1) in terms of effects of wind turbines on Radar use).

Tarmac Marine

13.3.22 Engagement with Tarmac Marine has been ongoing since 23 February 2021 in the form of the first Hazard Workshop and email correspondence. Key points raised include:

- the issue of marine aggregate dredgers in transit from port to dredging areas and dredging activity itself require consideration, particularly in relation to the risk of a vessel losing power leading to a drifting allision incident. A suitable clearance may be determined in consultation with British Marine Aggregate Producers Association (BMAPA) but should be sufficient to allow emergency anchoring in such circumstances;
- the minimum width of the pinch point between the Owers Light Buoy and the array area of 1.9nm (for the PEIR Assessment Boundary) is sufficient but there

is a preference for a lit buoy to be placed on the array side to better define the gap for navigation;

- there is a need for sufficient clearance between the southern limit of aggregate area 396 and the nearest turbine in case of a loss of propulsion during future dredging operations;
- the location of the substation south east of area 396 (for the PEIR indicative array layout) would need siting somewhat further away from the licence boundary;
- suggested that RED consider the use of leading lights/lines to highlight the lay of cables from the wind farm;
- the changes to the proposed DCO Order Limits look helpful on the whole, with the gap between the Owers Light Buoy and the Proposed Development array area also beneficial;
- the buffers maintained from the aggregate areas appear to ensure that works can safely continue up to the edges of the areas.

Hanson Marine

13.3.23 Engagement with Hanson Marine has been ongoing since 23 February 2021 in the form of the first Hazard Workshop. Key points raised include:

- the minimum distance to aggregate area 435 of 1nm is the minimum acceptable for a contingency response in deploying of an anchor. However, there is concern over the proposed proximity to other aggregate areas should they ever be used as a third party;
- concerned regarding the potential for a concentration of commercial, fishing and leisure craft into the Owers Light Buoy east/west transit area. The pinch point of 1.9nm (for the PEIR Assessment Boundary) should be an adequate distance with buoyage;
- concerned regarding the potential impact of increased craft activity and movements across the aggregate area where the wind farm may significantly condense local activity. This also applies with craft coming from the south heading to a nearby port that will funnel into the areas en route to land;
- concerned regarding Radar interference from the wind farm and, in addition, the impact the wind farm may have on Very High Frequency (VHF) communications and request further investigation; and
- suggested that RED consider the use of leading lights/lines to highlight the lay of cables from the wind farm.

Other stakeholder approaches

13.3.24 In addition to the stakeholders outlined above, the following stakeholders have been informally approached for feedback on Rampion 2 or participated in the Hazard Workshop:

- Cruising Association (CA);

- BMAPA;
- Associated British Ports (ABP) Southampton;
- Langstone Harbour;
- Chichester Harbour Conservancy;
- King's Harbour Master (KHM) Portsmouth; and
- Royal National Lifeboat Institution (RNLI).

13.3.25 It is noted that a number of Regular Operators have been approached for feedback but have not responded; full details of the Regular Operators approached is provided in **Section 4** of **Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.4.13.1).

Non-Statutory Consultation Exercise – January / February 2021

13.3.26 RED carried out a non-statutory Consultation Exercise for a period of four weeks from 14 January 2021 to 11 February 2021. This non-statutory Consultation Exercise aimed to engage with a range of stakeholders including the prescribed and non-prescribed consultation bodies, local authorities, Parish Councils and general public with a view to introducing the Proposed Development and seeking early feedback on the emerging proposals.

Statutory consultation

13.3.27 The PEIR was published as part of statutory consultation which provided preliminary information on shipping and navigation within **Chapter 13: Shipping and navigation, Volume 2** of the ES (Document Reference: 6.2.13).

13.3.28 Rampion 2's first statutory consultation exercise ran from 14 July to 16 September 2021, a period of nine weeks. The PEIR (RED, 2021) was published as part of Rampion 2's first statutory consultation exercise which provided preliminary information on shipping and navigation within Chapter 13: Shipping and navigation (RED, 2021).

13.3.29 Following feedback to the Statutory Consultation exercise in 2021 it was identified that some coastal residents did not receive consultation leaflets as intended. Therefore, the first Statutory Consultation exercise was reopened between 7 February 2022 to 11 April 2022 for a further nine weeks. The original PEIR published as part of the first Statutory Consultation exercise in 2021 was unchanged and re-provided alongside the reopened Statutory Consultation exercise in early 2022.

13.3.30 The following statutory consultation exercises focussed on changes made to the onshore cable route, onshore substation, and National Grid interface point and did not consider offshore aspects of the Proposed Development.

13.3.31 The second Statutory Consultation exercise was undertaken from 18 October 2022 to 29 November 2022. This was a targeted consultation which focused on updates to the onshore cable route proposals which were being considered following feedback from consultation and further engineering and environmental works. As part of this second Statutory Consultation exercise, RED sought

feedback on the potential changes to the onshore cable route proposals to inform the onshore design taken forward to DCO application.

13.3.32 The third Statutory Consultation exercise was undertaken from 24 February 2023 to 27 March 2023. This was a targeted consultation which focused on a further single onshore cable route alternative being considered following feedback from consultation and further engineering and environmental works. As part of this third Statutory Consultation exercise, RED sought feedback on the potential changes to the onshore cable route proposals to inform the onshore design taken forward to DCO Application.

13.3.33 The fourth Statutory Consultation exercise was undertaken from 28 April 2023 to 30 May 2023. This was a targeted consultation which focused on the proposed extension works to the existing National Grid Bolney substation to facilitate the connection of the Rampion 2 onshore cable route into the national grid electricity infrastructure. As part of this fourth Statutory Consultation exercise, RED sought feedback on the proposed substation extension works to inform the onshore design taken forward to the DCO Application.

13.3.34 **Table 13-6** provides a summary of the key themes of the feedback received in relation to shipping and navigation and outlines how the feedback has been considered in this ES chapter. A list of comments received during the statutory consultation period and the responses to comments is provided in the **Consultation Report** (Document Reference: 5.1).

Table 13-6 Statutory Consultation feedback

Stakeholder	Theme	How this is addressed in this ES
Shoreham Port	Traffic will be cut off from direct access to the Dover Strait TSS resulting in a need for larger vessels to pass west of Rampion 1 and Rampion 2. This will have a negative impact on the commercial viability of the port.	The proposed DCO Order Limits represent a reduction in total area covered compared to the PEIR Assessment Boundary (see **Section 6.1** of **Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.4.13.1)), including at the eastern extent in proximity to the Dover Strait TSS and Shoreham Port to the east of the proposed DCO Order Limits. There is also an MGN 654 compliant navigation corridor which may be used by vessels accessing Shoreham Port. Reduced access to local ports and harbours including commercial risk is considered in **Section 13.9**, **Section 13.10 and Section 13.11**.

Stakeholder	Theme	How this is addressed in this ES
Shoreham Port	Some Masters from the east may use the ITZ to reach Shoreham, but in such cases the collision risk will be greater due to the mixing of commercial shipping with leisure craft.	The proposed DCO Order Limits represent a reduction in total area covered compared to the PEIR Assessment Boundary (see **Section 6.1** of **Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.4.13.1)) including no longer intersecting the ITZ, reducing the collision risk associated with commercial shipping within the ITZ. The collision risk associated with vessel displacement is considered in **Section 13.9**, **Section 13.10 and Section 13.11**.
Trinity House	Intermediate Peripheral Structure (IPS) marking is not being phased out and reference to this being the case should be removed.	IPS marking will be agreed in consultation with Trinity House as noted in **Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.4.13.1).
Trinity House	Layout should not adversely affect the current lines of orientation at Rampion 1.	The proposed DCO Order Limits represent a reduction in total area covered compared to the PEIR Assessment Boundary (see **Section 6.1** of **Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.4.13.1)) including establishing a minimum 1nm clearance from Rampion 1 via two structures exclusion zones which serve as helicopter refuge areas (HRA).
RYA	Recreational activity is unlikely to have returned to normal by August 2020 and the survey only partially fell within the recommended period of 15 June to 15 August (see **Paragraph 13.3.12**). Accuracy of NRA may be reduced as a result and recommended that additional surveys are undertaken in summer 2022.	A further 14 days of vessel traffic survey data from 16 to 30 June 2022 has been assessed including recreational craft and is incorporated into the baseline characterisation of vessel movements in **Section 13.6**.

Stakeholder	Theme	How this is addressed in this ES
RYA	No further concerns with respect to sea room (navigational squeeze) at the western extent of the PEIR Assessment Boundary with previous concerns addressed by the reduction from the Scoping Boundary.	Noted in the assessment of collision risk associated with vessel displacement which is considered in **Section 13.9**, **Section 13.10 and Section 13.11**.
RYA	Assumptions in relation to the sufficient experience of crews of recreational craft should be supported by peer reviewed data and literature to provide justification.	International requirements (SOLAS Chapter V (IMO, 1974)) require all vessels proceeding to sea to adhere to IMO guidelines (as enforced by the MCA) and ensure that they take appreciation of the risks to which they are exposed. This includes ensuring the vessel's navigation is planned, and that there is continuous monitoring of the vessel's position including weather, tides, navigational warnings and contingency planning. Whilst it is recognised that not all recreational users adhere to this, as it is a requirement, it is assumed that the majority do. If the RYA has evidence to suggest this assumption is incorrect this evidence can be assessed.
RYA	The 860m spacing between structures should be made a condition for the development of Rampion 2.	The final array layout will be agreed with the MCA and Trinity House post-consent as per DCO requirements or Deemed Marine Licence (dML) but will be within the parameters set out in the ES including the 830m minimum spacing (a small decrease from PEIR associated with the reduction in the proposed DCO Order Limits) (see **Section 13.7**).
RYA	Given the inability of a recreational craft adrift to anchor and risk of capsize in the event of an allision incident the RYA disagrees with the ranking of frequency of impact as negligible and moderate	The assessment of drifting allision risk for recreational vessels gives due consideration to the limited options available in terms of emergency action and the level of emergency response resources in

Stakeholder	Theme	How this is addressed in this ES
	consequences for drifting allision risk for a recreational vessel. Consideration should be made as to whether the development will allow sufficient time for a response (such as the RNLI) to reach a drifting craft before a collision/allision occurs.	the region. The frequency of occurrence has subsequently been amended to 'extremely unlikely'. However, given the reduced speed at which a drifting allision would likely occur, the severity of consequence remains 'moderate' (see **Section 13.10**).
RYA	MGN 654 has now been superseded and the NRA should be reviewed and revised with respect to the recreational aspects of MGN 654.	This chapter and the NRA are compliant with MGN 654, including the updated MGN checklist (see **Annex A** of **Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference 6.4.13.1).
Littlehampton Harbour Board	Do not believe there is fair consideration of the economic impacts of displacement to all types of leisure and commercial vessels using Littlehampton and local waters due to vessel traffic assessments occurring during the COVID-19 pandemic and an over reliance on AIS data.	A further 14 days of vessel traffic survey data from 16 to 30 June 2022 has been assessed (including vessels not broadcasting on AIS) and is incorporated into the baseline characterisation of vessel movements in **Section 13.6**. Commercial risk associated with Littlehampton Harbour is assessed in **Section 13.9**, **Section 13.10 and Section 13.11**.
Littlehampton Harbour Board	The degree of export cable protection and cable burial depth requires full assessment to ensure the risks of both anchor interaction and reduction in under keel clearance in these areas is properly mitigated.	The need for and location of any external cable protection will be determined via the CBRA post consent, with cable burial to be the preferred option for cable protection (see C-41, C-45, C-96 **Table 13-14**).
Littlehampton Harbour Board	Concerned with sufficiency of engagement with Littlehampton's commercial fishing fleet.	Separate consultation has been undertaken as part of **Chapter 10 Commercial fisheries, Volume 2** of the ES (Document Reference: 6.2.10) and liaison with fishing fleets via a Fisheries Liaison Officer (FLO) is ongoing.

Stakeholder	Theme	How this is addressed in this ES
Hanson Aggregates Marine	The risk of anchor snagging across any cable route between landfall and the array area or between the turbine infrastructure requires consideration.	Assessed in the consideration of increased interaction with sub-sea cables in **Section 13.10**.
Hanson Aggregates Marine	Consideration of marine aggregate dredger routeing between Area 435 and the beaches at Pevensey and Eastbourne needs to be incorporated in the assessment as this data may be excluded or not have occurred during the survey period. Ship movements consisting of two to three weeks of activity can occur associated with beach/coastal protection projects at these locations.	The long-term AIS data analysis (see **Annex E** of **Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.4.13.1)) did not indicate marine aggregate dredging activity between Area 435 and beaches at Pevensey and Eastbourne; however, a more general consideration is given to east-west transits of all vessel types within the impact assessment.
MCA	The PEIR chapter and NRA require review and update to reflect MGN 654, including the MGN checklist.	This chapter and the NRA are compliant with MGN 654, including the MGN 654 checklist (see **Annex A** of **Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.4.13.1)).
MCA	The terminology and language used in the NRA reflects EIA reporting when it should be consistent with the NRA methodology.	The NRA terminology is amended to reflect the FSA methodology.
MCA	Queried whether grounding risk has been considered.	Grounding risk has been considered as an element of the vessel displacement impact in **Section 13.9**, **Section 13.10** and **Section 13.11**.
MCA	Queried whether any more up-to-date Marine Accident Investigation Branch (MAIB) and RNLI data has been considered post-2017 and when Rampion 1 was installed.	The most recently available MAIB and RNLI incident data at the time of the baseline being updated for the ES has been used (2010 to 2019) (see **Table 13-9**).
UK Chamber of Shipping	Concerned with navigational safety around the full extent of the PEIR Assessment Boundary and	The proposed DCO Order Limits represents a reduction in total area covered compared to the

Stakeholder	Theme	How this is addressed in this ES
	in particular the western extent which creates a pinch point with Selsey Bill and effectively cuts off Littlehampton from the south.	PEIR Assessment Boundary, including at the western extent in proximity to Selsey Bill (see **Section 6.1** of **Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.13.1)).
UK Chamber of Shipping	Do not consider there to be any exceptional circumstance in this instance to bypass the Marine Planning Policies in relation to overlap of the red line boundary with the ITZ. Amendment of the red line boundary to avoid the ITZ would reduce the deviation required for vessels accessing Shoreham and the Dover Strait TSS.	The proposed DCO Order Limits represents a reduction in total area covered compared to the PEIR Assessment Boundary (see **Section 6.1** of **Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.4.13.1)) including no longer intersecting the ITZ.
UK Chamber of Shipping	Not supportive of the effective 'blocking off' of large areas of sea room as exhibited by the anticipated main routes post wind farm in the PEIR.	The proposed DCO Order Limits represents a reduction in total area covered compared to the PEIR Assessment Boundary (see **Section 6.1** of **Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.4.13.1)) and a structures exclusion zone (which serves as a navigation corridor) provides an additional option to/from Littlehampton Harbour (see **Section 17** of **Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.4.13.1)).
UK Chamber of Shipping	For the purposes of SAR and navigational safety request at least one line of orientation maintained between Rampion 1 and the proposed development. Furthermore, two lines of orientation as set out in MGN 654 are preferred within the proposed development unless a sufficient safety case can be presented to the MCA.	The final layout will be agreed with the MCA and Trinity House post consent as required under the draft DCO (see C-86, **Table 13-14**). The proposed DCO Order Limits incorporates HRAs to support access for SAR assets, including between Rampion 1 and Rampion 2.

Stakeholder	Theme	How this is addressed in this ES
UK Chamber of Shipping	Expect that the ES chapter and updated NRA will be fully compliant with MGN 654.	This chapter and the NRA are compliant with MGN 654, including the MGN 654 checklist (see **Annex A** of **Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.4.13.1)).
UK Chamber of Shipping	A single 10-year period is unnecessarily short for accident data and may not accurately reflect historic incidents and safety of navigation.	The most recent 20-year period of MAIB incident data available has been considered (2000 to 2019) (see **Table 13-9**), noting that the first 10-year period (2000 to 2009) is considered only qualitatively given the changes to safety standards/regulations and poorer levels of reporting of incidents in earlier years.
UK Chamber of Shipping	The future traffic baseline (10% increase) is conservative and a range of up to 30% should be considered particularly given the traffic volumes on the South Coast.	The future traffic baseline is considered in **Section 13.6**, noting that a 20% future case has now been incorporated in addition to a 10% future case. A 30% future case would be an extreme scenario and 10%/20% is considered conservative.

13.4 Scope of the assessment

Overview

13.4.1 This section sets out the scope of the ES assessment for shipping and navigation. This scope has been developed as Rampion 2 design has evolved and responds to feedback received to-date as set out in **Section 13.3**.

Spatial scope and study area

13.4.2 The spatial scope of the shipping and navigation assessment is defined as a minimum 10nm buffer of the proposed DCO Order Limits (cropped to the UK coastline) that has formed the basis of the study area described in this section and is presented in **Figure 13-1, Volume 3** of the ES (Document Reference: 6.3.13).

13.4.3 It is noted that the shipping and navigation study area has only been used to provide local context to the analysis of risks by capturing the vessel traffic movements and historical incidents within and in proximity to the proposed DCO Order Limits. Other data used to inform the baseline (including the navigational

features in the region) have not been restricted to the study area. For example, the Dover Strait TSS is only partially located within the study area but has been considered in full.

13.4.4 The study area's spatial scope and application is considered standard and has been used within the majority of shipping and navigation assessments for UK offshore wind farms including, for example, the Hornsea Project Three Offshore Wind Farm and Norfolk Vanguard Offshore Wind Farm, both of which were awarded consent in 2020.

Temporal scope

13.4.5 The temporal scope of the assessment of shipping and navigation is the entire lifetime of Rampion 2, which therefore covers the construction, operation and maintenance, and decommissioning phases. In particular, the construction and decommissioning phases have been assumed to last up to approximately four years and the operational phase up to approximately 30 years. The assessment of shipping and navigation considers all three phases in full, with the operational phase deemed to commence from a shipping and navigation perspective once operational lighting and marking is active and the construction buoyage area has been removed, in agreement with Trinity House.

Potential receptors

13.4.6 The spatial and temporal scope of the assessment enables the identification of receptors which may experience a change as a result of Rampion 2. The receptors identified that may experience likely significant effects for shipping and navigation are outlined in **Table 13-7**.

Table 13-7 Receptors requiring assessment for shipping and navigation

Receptor group	Receptors included within group
Commercial vessels	Cargo vessels, tankers, passenger vessels, marine aggregate dredgers, tugs and other offshore support vessels undertaking commercial operations.
Recreational vessels (2.4 to 24m length)	Racing vessels, dive charter vessels, recreational sea fishing vessels and other recreational craft.
Commercial fishing vessels	Commercial fishing vessels in transit.
Military vessels	Military vessels in transit.
UK emergency responders	RNLI lifeboats, SAR helicopters on behalf of the MCA and marine pollution responders.

Potential effects

13.4.7 Potential effects on shipping and navigation receptors that have been scoped in for assessment are summarised in **Table 13-8**.

Table 13-8 Potential effects on shipping and navigation receptors scoped in for further assessment

Receptor	Activity or impact	Potential effect
Construction		
All vessels	Displacement of vessels.	Construction activities associated with the installation of structures and cables may displace existing routes/activity, increase grounding risk, increase encounters and collision risk with other third-party vessels.
All vessels	Creation of vessel to vessel collision risk between a third-party vessel and a project vessel.	Vessels associated with construction activities may increase encounters and collision risk for other vessels already operating in the area.
All vessels	Reduced access to local ports.	Construction activities associated with the installation of structures and cables may displace existing routes/activity restricting access to ports.
Operation and maintenance		
All vessels	Displacement of vessels.	Presence of structures may displace existing routes/activity, increase grounding risk, increase encounters and collision risk with other third-party vessels.
All vessels	Creation of vessel to vessel collision risk between a third-party vessel and a project vessel.	Vessels associated with operation and maintenance activities may increase encounters and collision risk for other vessels already operating in the area.

Receptor	Activity or impact	Potential effect
All vessels	Creation of vessel to structure allision risk.	Presence of structures in the offshore environment may increase allision risk for vessels (both powered and drifting).
All vessels	Reduced access to local ports.	Presence of structures in the offshore environment may displace existing routes/activity restricting access to ports and prevent use of existing Aids to Navigation.
All vessels	Changes in under keel clearance.	Presence of export and inter array cable protection in the offshore environment may reduce charted water depths creating underwater allision risk.
Commercial vessels and commercial fishing vessels	Increased anchor interaction with sub-sea cables.	Presence of export cables, array cables and inter connector cables in the offshore environment may increase the potential for interaction with sub-sea cables.
UK emergency responders	Reduction of emergency response provision including SAR capability.	Presence of structures in the offshore environment including increased vessel activity and personnel numbers may reduce emergency response capability by increasing the number of incidents, increase consequences or reducing access for the responders.
Decommissioning		
All vessels	Displacement of vessels.	Decommissioning activities associated with the removal of structures and cables may displace existing routes/activity, increase grounding risk, increase encounters and collision risk with other third-party vessels.
All vessels	Creation of vessel to vessel collision risk between a third-party vessel and a project vessel.	Vessels associated with decommissioning activities may increase encounters and collision risk for other vessels already operating in the area.

Receptor	Activity or impact	Potential effect
All vessels	Reduced access to local ports.	Decommissioning activities associated with the removal of structures and cables may displace existing routes/activity restricting access to ports.

Activities or impacts scoped out of assessment

13.1.3 An impact relating to the interfering effect on equipment used on board all vessels (navigation, communications and position fixing equipment) due to the presence of structures, export and inter array cables within the offshore environment has been scoped out of the assessment based on the findings of the NRA.

13.1.4 No other potential effects have been scoped out of the assessment, noting that compliance with assessment parameters set out in MGN 654 (MCA, 2021) are mandatory for the NRA which is the technical assessment feeding into the ES.

13.5 Methodology for baseline data gathering

Overview

13.5.1 Baseline data collection has been undertaken to obtain information over the study areas described in **Section 13.4: Scope of the assessment**. The current baseline conditions presented in **Section 13.6: Baseline conditions** sets out data and information currently available from the study area.

Desk study

13.5.2 The data sources that have been collected and used to inform this shipping and navigation assessment are summarised in **Table 13-9**.

Table 13-9 Data sources used to inform the shipping and navigation ES assessment

Source	Date	Summary	Coverage of study area
Anatec	2012	*Navigation Risk Assessment – Rampion Offshore Wind Farm*.	Full coverage of the study area.
Anatec	2019	AIS data from onshore receivers covering 12 months.	Full coverage of study area.

Source	Date	Summary	Coverage of study area
Anatec	2022	ShipRoutes database.	Full coverage of the study area.
BMAPA[4]	2009 (downloaded 2020)	BMAPA transit routes, indicating marine aggregate dredger activity.	Full outdated coverage of study area.
Department for Transport (DfT)	2015 to 2022	Maritime incident data including locations and details of all UK civilian SAR helicopter taskings.	Full coverage of study area.
MAIB	2010 to 2019 (2000 to 2009 also considered qualitatively)	Maritime incident data including the locations and details of all MAIB reported incidents.	Full coverage of study area.
RNLI	2010 to 2019	Maritime incident data including locations and details of all RNLI reported incidents.	Full coverage of study area.
RYA	2019	UK Coastal Atlas of Recreational Boating 2.1	Full coverage of study area.
The Crown Estate (TCE)	2022	Marine aggregate dredging areas (licenced and active).	Full coverage of study area.
United Kingdom Hydrographic Office (UKHO)	2020	*Admiralty Sailing Directions Dover Strait Pilot NP28* (UKHO, 2020).	Full coverage of the study area.
UKHO	2021/22	Admiralty charts (1652, 1991, 2037, 2044, 2154, 2450 and 2675) and historical mapping.	Full coverage of study area.

[4] Given the age of this data source it was found to not be wholly reflective of marine aggregate dredger movements within the study area. It is noted that the AIS data (both the vessel traffic survey data and long-term vessel traffic data) together with consultation feedback from marine aggregate dredging representatives was considered comprehensive for marine aggregate dredgers.

Site surveys

13.1.5 The site surveys used to inform this shipping and navigation assessment are summarised in **Table 13-10**.

Table 13-10 Site surveys

Survey type	Scope of survey	Coverage of study area
Vessel traffic survey, summer 2020	AIS, Radar and visual observations data covering 14 full days between 8 and 22 August 2020 to validate vessel traffic movements within and in proximity to the proposed DCO Order Limits, in accordance with MGN 654 (MCA, 2021).	Full coverage of study area.
Vessel traffic survey, winter 2020	AIS, Radar and visual observations data covering 14 full days between 1 and 15 November 2020 to characterise vessel traffic movements within and in proximity to the proposed DCO Order Limits, in accordance with MGN 654 (MCA, 2021).	Full coverage of study area.
Vessel traffic survey, summer 2022	AIS, Radar and visual observations data covering 14 full days between 16 and 30 June 2022 to characterise vessel traffic movements within and in proximity to the proposed DCO Order Limits, in accordance with MGN 654 (MCA, 2021).	Full coverage of study area.
Vessel traffic survey, winter 2022	AIS, Radar and visual observations data covering 14 full days in December 2022 to characterise vessel traffic movements within and in proximity to the proposed DCO Order Limits, in accordance with MGN 654 (MCA, 2021).	Full coverage of study area.

Data limitations

Automatic Identification System data

13.1.6 The carriage of AIS is required on board all vessels of greater than 300 Gross Tonnage (GT) engaged on international voyages, cargo vessels of more than

500GT not engaged on international voyages, passenger vessels irrespective of size built on or after 1 July 2002, and fishing vessels over 15m Length Overall (LOA).

13.1.7 Therefore, for the vessel traffic surveys larger vessels were recorded on AIS, while smaller vessels without AIS installed (including fishing vessels under 15m LOA and recreational craft) were recorded, where possible, on the Automatic Radar Plotting Aid (ARPA) Radar on board the survey vessel. A proportion of smaller vessels also carry AIS voluntarily, typically utilising a Class B AIS device.

13.1.8 Throughout the summer survey 2022, approximately 99% of vessel tracks were recorded via AIS with the remaining 1% recorded via Radar. Throughout the winter survey 2022, approximately 98% of vessel tracks were recorded via AIS with the remaining 2% recorded via Radar.

13.1.9 The long-term vessel traffic data – an AIS only dataset – assumes that vessels under a legal obligation to broadcast via AIS will do so. Both the long-term vessel traffic data and the AIS component of the vessel traffic survey data assume that the details broadcast via AIS are accurate (such as vessel type and dimensions) unless there is clear evidence to the contrary.

COVID-19

13.1.10 It is acknowledged that COVID-19 has had a substantial effect on shipping movements globally. Therefore, the vessel traffic survey data collected in 2020 may be influenced by COVID-19. However, in line with *Advice Note Seven* (Planning Inspectorate, 2020), RED has agreed the approach to data collection and the results with relevant stakeholders including the MCA. Additionally, during consultation input has been sought from relevant stakeholders regarding the shifting pattern of vessel movements due to COVID-19, with the consensus that by the time of the 2020 vessel traffic surveys (undertaken in August and November) commercial vessel movements could be considered to have returned to normal in the region (see **Section 13.3**).

Historical incident data

13.1.11 Although all UK commercial vessels are required to report accidents to the MAIB, non-UK vessels do not have to report unless they are in a UK port or within 12nm territorial waters (noting that the study area is not located entirely within 12nm territorial waters) or carrying passengers to a UK port. There are also no requirements for non-commercial recreational craft to report accidents to the MAIB.

13.1.12 The RNLI incident data cannot be considered comprehensive of all incidents in the study area. Although, hoaxes and false alarms are excluded, any incident to which a RNLI resource was not mobilised has not been accounted for in this dataset.

United Kingdom Hydrographic Office admiralty charts

13.1.13 The UKHO admiralty charts are updated periodically and therefore the information shown may not reflect the real time features within the region with total accuracy. However, during consultation input has been sought from relevant stakeholders

regarding the navigational features baseline, with the consensus that the navigational features baseline established is comprehensive and accurate (see **Section 13.3**).

13.6 Baseline conditions

Current baseline

Navigational features

13.1.14 A plot of the navigational features within and in proximity to the proposed DCO Order Limits is presented in **Figure 13-2, Volume 3** of the ES (Document Reference 6.3.13).

13.1.15 The key navigational features identified within and in proximity to the proposed DCO Order Limits are summarised in **Table 13-11**. It should be noted that the baseline considers Rampion 1 as built (rather than the consented parameters).

Table 13-11 Summary of key navigational features

Navigational feature	Details
Other offshore wind farm developments	The existing Rampion 1 project lies immediately north of the array area and shares its eastern, southern and western boundaries with the proposed DCO Order Limits. Rampion 1 was fully commissioned in November 2018 and is currently the only UK offshore wind farm within the English Channel (including wind farms under construction or consented).
IMO routeing measures	The main IMO routeing measure present in the area is the Dover Strait routeing measure consisting of TSS lanes, separation zones and an ITZ. The Dover Strait TSS lies approximately 4.2nm from the proposed DCO Order Limits at the closest point, and 5.6nm from the outer edge of the westbound lane. An ITZ covers the sea area eastward of the line joining Shoreham and the CS1 light buoy and lies approximately 1.5nm from the proposed DCO Order Limits at the closest point. The ITZ is designed to protect local traffic including small craft and its use is subject to various restrictions.
Marine aggregate dredging areas	The closest extraction areas lie immediately east of the offshore export cable corridor, and are operated by Cemex, Tarmac Marine and Hanson Aggregates Marine. There are also groups of marine aggregate dredging areas to the west of the proposed DCO Order Limits (near the Isle of Wight) and to the south east of the proposed DCO Order Limits (within and south of the Dover Strait TSS).

Navigational feature	Details
Ports and pilot boarding areas	Several ports and harbours are located along the coast close to the proposed DCO Order Limits with the closest port being Shoreham Port, located approximately 9.5nm to the north. Littlehampton Harbour lies immediately east of the offshore export cable corridor and the Port of Newhaven and Brighton Marina are also located in the area. Further west there are various ports located in the Solent, with the NAB Deep Water Channel providing a suitable route for deep-laden inbound tankers, large containers and other vessels constrained by their draught.
Anchorage areas	There are anchorage areas associated with Shoreham Port, the Port of Newhaven and Littlehampton Harbour. There are no additional anchorage areas within or in proximity to the proposed DCO Order Limits, although an anchorage off Eastbourne and a recommended anchorage off St Helens Fort are noted.
Key aids to Navigation	There are aids to navigation located on Significant Peripheral Structures (SPS) and IPSs around the perimeter of Rampion 1, as well as at the exit/entrance to the Dover Strait TSS. The Owers Light Buoy, a south cardinal mark, is located approximately 2nm to the west of the array area and placed to protect vessels from the shallows of the Owers Bank.
Sub-sea cables	Sub-sea cables in proximity to the proposed DCO Order Limits include the export and inter array cables for Rampion 1 and the Interconnexion France-Angleterre 2 (IFA2) cable, which is located approximately 0.6nm to the south west.
Military Practice and Exercise Areas (PEXA)	A firing practice area (D037) is located in the area and lies less than 0.1nm from the western extent of the proposed DCO Order Limits. No restrictions are placed on the right to transit the firing practice area at any time, with operations conducted using a clear range procedure.
Charted wrecks	A high number of charted wrecks are present within the area surrounding the proposed DCO Order Limits with the shallowest located within the proposed DCO Order Limits at a depth of 12m below Chart Datum (CD).

Vessel traffic

13.6.1 A plot of vessel traffic recorded via AIS, Radar and visual observations over 14 full days between 16 and 30 June 2022 (summer) within the study area, colour-coded by vessel type, is presented in **Figure 13-3, Volume 3** of the ES (Document Reference: 6.3.13). Following this, a similar plot over 14 full days between 1 and 15 November 2020 (winter) is presented in **Figure 13-4, Volume 3** of the ES (Document Reference: 6.3.13).

13.6.2 Additionally, 12 months of AIS data (2019) is presented in **Annex E** of **Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.4.13.1) and a further 14 days of AIS, Radar and visual observations between 8 and 22 August 2020 is presented in **Annex G** of **Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.4.13.1). Finally, a further 14 days of AIS, Radar and visual observations between 2 and 16 December 2022 is presented in **Annex H** of **Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.4.13.1). These secondary datasets have been used to validate the vessel traffic survey data, with the last of these ensuring there is sufficient MGN 654 compliant survey data (in terms of timescale, i.e., recorded within 24 months of the DCO application).

13.6.3 A number of vessel tracks recorded during the two 14-day survey periods were classified as temporary (non-routine), such as the tracks of the survey vessel, vessels undertaking operations associated with Rampion 1, vessels surveying the IFA2 cable and a vessel undertaking an Unexploded Ordnance (UXO) survey at Brighton. These have therefore been excluded from the analysis.

13.6.4 Throughout the summer survey, approximately 94% of vessel tracks were recorded via AIS with the remaining 6% recorded via Radar. Throughout the winter survey, approximately 98% of vessel tracks were recorded via AIS with the remaining 2% recorded via Radar.

13.6.5 For the 14 days analysed in summer, there was an average of 210 unique vessels per day recorded within the study area. An average of 15 unique vessels per day was recorded intersecting the array area and 12 unique vessels per day intersecting the offshore export cable corridor.

13.6.6 The main vessel types recorded within the study area during the summer period were cargo vessels (37%), recreational vessels (26%), tankers (18%) and fishing vessels (8%).

13.6.7 For the 14 days analysed in winter, there was an average of 143 unique vessels per day recorded within the study area. An average of 11 unique vessels per day was recorded intersecting the array area and three to four unique vessels per day intersecting the offshore export cable corridor.

13.6.8 The main vessel types recorded within the study area during the winter period were cargo vessels (49%), tankers (22%) and fishing vessels (13%).

13.6.9 LOA was available for approximately 98% of vessels recorded throughout the two 14-day survey periods and ranged from 3m for a sailing vessel to 400m for several containerships. Excluding the proportion of vessels for which a length was not available the average length of vessels within the study area throughout the summer and winter survey periods was 110m and 135m, respectively.

13.6.10 Vessel draught was available for approximately 39% of vessels recorded throughout the two 14-day survey periods and ranged from 1.0m for a fishing vessel to 21.2m for a crude oil tanker. Excluding the proportion of vessels for which a draught was not available the average draught of vessels within the study area throughout the summer and winter survey periods was 7.1m and 7.0m, respectively.

13.6.11 Main commercial routes have been identified using the principles set out in MGN 654 (MCA, 2021). Vessel traffic data are assessed and vessels transiting at similar headings and locations are identified as a main route and can consist of multiple vessels or a single vessel making the same transit regularly. A total of 17 main commercial routes were identified within the study area from the vessel traffic survey data and consultation. A plot of the main commercial routes and corresponding 90th percentiles (the area within which 90% of the vessel traffic on a route is situated as per MGN 654) within the study area is presented in **Figure 13-5, Volume 3** of the ES (Document Reference: 6.3.13). It is noted that the main routes reflect key directions of vessel traffic routeing within the study area; there are additional commercial vessel movements operating outside of these routes.

13.6.12 Details of each of the main routes including the average number of vessels per day, main destination ports and main vessel types are provided in **Table 13-12**. It is noted that the main route destination ports reflect the most frequently broadcast destinations via AIS on each route and vessels on any particular route may not be transiting between the ports specified.

Table 13-12 Details of main commercial routes within study area

Route number	Average vessels per day	Description
1	74	Westbound lane of Dover Strait TSS to westbound lane of Off Casquets TSS. Generally used by cargo vessels (66%) and tankers (30%). Includes regular commercial ferry traffic operated by CLdN.
2	10	Westbound lane of Dover Strait TSS to Le Havre (France). Generally used by cargo vessels (59%) and tankers (37%).
3	5	Westbound lane of Dover Strait TSS to ports in the Solent (UK). Generally used by cargo vessels (62%), tankers (22%) and passenger vessels (12%).
4	4 to 5	Portsmouth Port (UK)–Le Havre. Generally used by passenger vessels (60%), cargo vessels (28%) and tankers (11%).
5	4 to 5	Westbound lane of Dover Strait TSS to Dublin (Republic of Ireland). Generally used by cargo vessels (85%) and tankers (10%).
6	4 to 5	Ports in the Solent (UK to eastbound lane of Dover Strait TSS. Generally used by cargo vessels (49%), tankers (31%) and passenger vessels (11%).
7	4	Port of Newhaven (UK)–Dieppe (France). Used by passenger vessels (100%).

Route number	Average vessels per day	Description
8	2	Shoreham Port (UK)–marine aggregate dredging areas near Isle of Wight. Generally used by marine aggregate dredgers (88%).
9	1 to 2	Westbound lane of Dover Strait TSS to ports in the Solent (UK). Generally used by cargo vessels (42%), tankers (35%) and marine aggregate dredgers (16%).
10	1	Westbound lane of Dover Strait TSS to Le Havre (France). Generally used by cargo vessels (58%), tankers (30%) and passenger vessels (11%).
11	1	Shoreham Port (UK)–Dover Strait TSS. Generally used by cargo vessels (80%) and marine aggregate dredgers (13%).
12	0 to 1	Shoreham Port (UK)–marine aggregate dredging areas near Owers Bank. Used by marine aggregate dredgers (100%).
13	0 to 1	Shoreham Port (UK)–North Sea ports. Generally used by cargo vessels (80%).
14	0 to 1	Port of Southampton (UK) to eastbound lane of Dover Strait TSS. Generally used by cargo vessels (63%), tankers (23%) and passenger vessels (12%).
15	0 to 1	Poole (UK) to eastbound lane of Dover Strait TSS. Generally used by cargo vessels (83%).
16	0 to 1	Westbound lane of Dover Strait TSS to ports in the Solent (UK). Generally used by cargo vessels (42%), tankers (39%) and tugs (10%).
17	Monthly*	Littlehampton Harbour (UK)–Dover Strait TSS. Generally used by cargo vessels. Includes small coaster traffic operated by Van Dam Shipping headed to/from Antwerp (Belgium) and Amsterdam (Netherlands).

(*) Vessel traffic on this route is not considered sufficient in volume to constitute a main commercial route but has been included given sensitivities raised during consultation (see Littlehampton Harbour Board entry in **Section 13.3**).

13.6.13 Three main commercial ferry operators were identified throughout the vessel traffic surveys – Brittany Ferries, DFDS Seaways and CLdN. Britannia Ferries primarily operated routes between Portsmouth Port (UK) and Ouistreham (Caen) (France)/Le Havre. DFDS Seaways primarily operate a route between the Port of Newhaven and Dieppe. CLdN primarily operate routes through the English Channel utilising the IMO routeing measures. Each of these routes is among the main commercial routes identified in **Figure 13-5, Volume 3** of the ES (Document Reference: 6.3.13) (Routes 4, 7 and 1, respectively).

13.6.14 For the purposes of the shipping and navigation assessment, recreational vessels are considered to be those between 2.4 and 24m LOA, including sailing and motor craft and those involving in racing, recreational diving and recreational sea fishing. Throughout the summer survey period an average of 53 unique recreational vessels per day were recorded within the study area. Throughout the winter survey period an average of five to six unique recreational vessels per day was recorded within the study area. Recreational vessels were predominantly observed transiting in nearshore areas including to/from Brighton Marina, ports in the Solent, Shoreham Port, the Port of Newhaven and Littlehampton Harbour. Across both vessel traffic surveys approximately 98% of recreational vessel tracks were recorded via AIS with the remaining 2% recorded via Radar.

13.6.15 Anchored vessels can be identified based on their navigational status which is programmed on the AIS transmitter on board a vessel. However, information is entered manually into the AIS, and therefore it is common for vessels not to update their navigational status if only at anchor for a short period of time. For this reason, those vessels which travelled at a speed of less than one knot (kt) for more than 30 minutes had their corresponding vessel tracks individually checked for patterns characteristic of anchoring activity. After applying these criteria, 55 vessels were identified within the study area, with 60% of such vessels broadcasting an AIS navigational status of “at anchor”. The majority of anchoring activity was associated with Shoreham Port, the Port of Newhaven and the Solent, with only one anchored vessel associated with Littlehampton Harbour. Anchored vessels during the summer survey period were predominately tankers (29%) and recreational vessels (25%). Anchored vessels during the winter survey period were predominantly marine aggregate dredgers (30%) and cargo vessels (26%). A plot of anchored vessels recorded within the study area throughout the survey periods is presented in **Section 13** of **Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.4.13.1).

Maritime incidents

13.1.16 All UK flagged vessels as well as non-UK flagged vessels in UK territorial waters (12nm), a UK port or carrying passengers to a UK port are required to report accidents to the MAIB. A plot of the locations of the incidents reported to the MAIB between 2010 and 2019 within the study area, colour-coded by incident type, is presented in **Figure 13-6, Volume 3** of the ES (Document Reference: 6.3.13).

13.1.17 A total of 145 incidents were reported to the MAIB within the study area between 2010 and 2019, which corresponds to an average of between 14 and 15 incidents per year. Throughout the 10-year period, six incidents were reported within the array area and five incidents within the offshore export cable corridor. The most frequently reported incident types were “*machinery failure*” (29% within the study area), “*accident to person*” (17%) and “*loss of control*” (11%). The most frequently reported vessel types were fishing vessels (30% within the study area), “*other commercial*” (17%) and dry cargo vessels (11%).

13.1.18 Incidents reported to the MAIB within the study area between 2000 and 2009 have also been reviewed. During this period, a total of 155 incidents were reported to the MAIB within the study area, corresponding to an average of between 15 and 16 incidents per year. This is slightly higher than the number of incidents between 2010 and 2019, which may be attributable to a trend of improvement in safety

standards/regulations. There were no particularly notable incidents recorded within the study area during the period between 2010 and 2019 from a shipping and navigation perspective.

Future baseline

Vessel traffic growth

13.1.19 During consultation, the Littlehampton Harbour Board noted that the upcoming construction of the A27 Arundel bypass resulting in increased aggregate arrivals, as well as the replacement of the harbour entrance breakwaters may lead to a significant increase in vessel traffic volumes associated with Littlehampton. Noting that such activities will be short-term in duration and that commercial vessel activity out of Littlehampton is very low currently, it is not anticipated that overall vessel traffic levels in the area will be affected substantially by the construction works.

13.1.20 Also, during consultation, the UK Chamber of Shipping suggested that up to 30% increases in vessel traffic should be considered given the high volumes of vessel movements associated with the South Coast. However, a 30% future case would be an extreme scenario and 20% is considered conservative and has been applied.

13.1.21 Given the uncertainty associated with long-term predictions of vessel traffic growth including the potential for any major new developments in UK or transboundary ports and the long-term effects of Brexit, a conservative potential growth in commercial vessel movements of 20% has been estimated throughout the lifetime of Rampion 2.

13.1.22 There is similar uncertainty associated with long-term predictions for commercial fishing vessel transits given the limited reliable information on future trends upon which any firm assumption could be made. Therefore, a conservative potential growth in commercial fishing vessel movements of 20% has been estimated throughout the lifetime of Rampion 2. Changes in fishing activity are considered further in **Chapter 10: Commercial fisheries, Volume 2** (Document Reference: 6.2.10).

13.1.23 There are no known major developments which will increase the activity of recreational vessels in the region. As with commercial fishing vessels, given the lack of reliable information on future activity levels or future trends, a conservative potential growth in recreational vessel movements of 20% has been estimated throughout the lifetime of Rampion 2.

Marine activities

13.1.24 As indicated in the current baseline, there are a number of marine aggregate dredging areas in proximity to the proposed DCO Order Limits. All such areas are active and the current baseline indicates a substantial number of vessel traffic movements directly associated with such areas. In the future these areas may be discontinued, thus reducing the number of associated vessel traffic movements. Likewise, new marine aggregate dredging areas may be designated (noting that

no exploration areas currently exist with the next TCE marine aggregate tender Round for England and Wales ongoing at the time of writing (TCE, 2021).

13.1.25 Given the lack of publicly available information on future changes to the marine aggregate dredging environment, no changes are considered in the future baseline, noting that marine aggregate dredgers are included in the 20% growth of commercial vessel movements described above.

Climate Change

13.1.26 It is possible that climate change and measures taken to slow the effects of climate change could have an effect on shipping and navigation receptors. However, given the temporal nature of climate change, any effects are expected to develop in the long-term (post operational life of the Proposed Development) rather than the short- or medium-term. Therefore, it is not possible to suitably consider the future baseline for shipping and navigation accounting fully for climate change.

13.7 Basis for ES assessment

Maximum design scenario

13.7.1 Assessing using a parameter-based design envelope approach means that the assessment considers a maximum design scenario whilst allowing the flexibility to make improvements in the future in ways that cannot be predicted at the time of submission of the DCO Application. The assessment of the maximum adverse scenario for each receptor establishes the maximum potential adverse impact and as a result impacts of greater adverse significance would not arise should any other development scenario (as described in **Chapter 4: The Proposed Development, Volume 2** of the ES (Document Reference: 6.2.4)) to that assessed within this chapter be taken forward in the final scheme design.

13.7.2 The maximum parameters and assessment assumptions that have been identified to be relevant to shipping and navigation are outlined in **Table 13-13** and are in line with the Project Design Envelope (**Chapter 4: The Proposed Development, Volume 2** of the ES (Document Reference: 6.2.4)).

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Table 13-13 Maximum parameters and assessment assumptions for impacts on shipping and navigation

Project phase and activity/impact	Maximum parameters	Maximum assessment assumptions	Justification
Construction			
Construction activities associated with the installation of structures and cables may displace existing routes / activity, increase grounding risk, increase encounters and collision risk with other third-party vessels.	**Array cable installation** Maximum length of 135nm (250km). **Offshore interconnector cable installation** Maximum length of approximately 22nm (40km). **Export cable installation** Maximum length of approximately 92nm (170km).	**Array area** Buoyed construction area deployed around the maximum extent of the array area. All third-party vessels will not choose to navigate within the buoyed construction area. Deviation required for five of the 17 main routes identified within the study area, ranging from less than 0.1nm increase for to a 12.5nm increase (see **Table 13-17**). **Application for safety zones** 500m radius construction safety zones. 50m radius pre-	The parameters represent the largest extent and the longest construction period, and therefore the greatest effect on displacement of vessels leading to a potential increase in encounters, grounding risk, collision risk and commercial risk for other third-party vessels.

Project phase and activity/impact	Maximum parameters	Maximum assessment assumptions	Justification
		commissioning safety zones.	
Vessels associated with construction activities may increase encounters and collision risk for third-party vessels already operating in the area.		**Project vessel movements** Construction vessels will be on-site throughout the construction phase. Third-party vessels may experience restrictions on visually identifying project vessels entering and exiting the array during reduced visibility. **WTG foundation installation** A maximum of 25 vessels making up to 680 return trips. **WTG installation** A maximum of 22 vessels making up to 1,033 return trips. **Offshore substation installation** A maximum of 37 vessels	The parameters represent the maximum number of project vessel movements and therefore the greatest increase in potential encounters and collision risk for other vessels.

Project phase and activity/impact	Maximum parameters	Maximum assessment assumptions	Justification
		making up to 288 return trips. **Export cable installation** A maximum of 24 vessels making up to 154 return trips. **Array cable installation** A maximum of 21 vessels making up to 318 return trips.	
Construction activities associated with the installation of structures and cables may displace existing routes/activity restricting access to ports.	**Application for safety zones** 500m radius construction safety zones. 50m radius pre-commissioning safety zones. **Export cable installation** Maximum length of approximately 92nm (170km) and four cables.	**Buoyed construction area** Deployed around the maximum extent of the array area. **Export cables** Installation activities may result in the displacement of vessels.	The parameters represent the largest extent and the longest construction period and therefore the greatest effect on vessel access to ports due to displacement effects.

Project phase and activity/impact	Maximum parameters	Maximum assessment assumptions	Justification
Operation and Maintenance			
Presence of structures may displace existing routes/activity, increase grounding risk, increase encounters and collision risk with third-party vessels.		**Array area** Commercial vessels will not choose to navigate internally within the array. Deviation required for five of the 17 main routes identified within the study area, ranging from less than 0.1nm increase for to a 12.5nm increase. **Array layout** Structure deployment across the maximum extent of the array area. **Application for safety zones** 500m radius major maintenance safety zones.	The parameters represent the largest extent and the longest operational period, and therefore the greatest effect on displacement of vessels leading to a potential increase in encounters, grounding risk, collision risk and commercial risk for other third-party vessels.
Vessels associated with operation and maintenance activities may increase encounters and collision risk for		**Project vessel movements** Third-party vessels may experience restrictions on visually identifying project	The parameters represent the maximum number of project vessel movements and therefore the greatest increase in potential encounters and collision risk for other vessels.

Project phase and activity/impact	Maximum parameters	Maximum assessment assumptions	Justification
other vessels already operating in the area.		vessels entering and exiting the array during reduced visibility. A maximum of 21 vessels at any one time making up to 869 return trips per year. **Application for safety zones** 500m radius major maintenance safety zones.	
Presence of structures in the offshore environment may increase allision risk for vessels (both powered and drifting).	**WTGs** Up to 90 WTGs. Minimum air gap above MHWS of 22m. **Offshore substations** Three offshore substations with topside dimensions of 80×50m located at internal locations (i.e., not on the perimeter). **Array layout** Minimum spacing	**Array area** Commercial vessels will choose not to navigate internally within the array. Fishing vessels may choose to navigate internally within the array, particularly in summer months. Recreational vessels are unlikely to choose to navigate internally within the array area. **WTG foundations** Four-legged jackets with suction buckets with sea	The parameters represent the maximum number and size (at the sea surface) of structures, the largest extent and the longest operational period and therefore the greatest increase in allision risk for both powered and drifting vessels.

Project phase and activity/impact	Maximum parameters	Maximum assessment assumptions	Justification
	between structures of 830m.	surface dimensions of 20×20m. **Array layout** Indicative array layout as per **Figure 13-7, Volume 3** of the ES (Document Reference 6.3.13).	
Presence of structures in the offshore environment may displace existing routes/activity restricting access to ports and prevent use of existing Aids to Navigation.		**Array layout** Structure deployment across the maximum extent of the array area. **Application for safety zones** 500m radius major maintenance safety zones.	The parameters represent the largest extent and the longest operational period and therefore the greatest effect on vessel access to ports and aids to navigation use due to displacement effects.
Presence of export cable and array cable protection in the offshore environment may reduce charted water depths creating underwater allision risk.	**Array cables** Maximum array cable length of 135nm (250km). **Offshore interconnector cables** Maximum length of	**Array cables** Target burial depth of 1m. **Offshore interconnector cables** Target burial depth of 1m.	The parameters represent the largest extent and the longest operational period and therefore the greatest increase in underwater allision risk.

Project phase and activity/impact	Maximum parameters	Maximum assessment assumptions	Justification
	approximately 22nm (40km). **Export cables** Maximum length of approximately 92nm (170km) and four cables.	**Export cables** Target burial depth of 1 to 1.5m.	
Presence of export and inter array cables in the offshore environment may increase the potential for interaction with sub-sea cables.	**Array cables** Maximum array cable length of 135nm (250km). **Offshore interconnector cables** Maximum length of approximately 22nm (40km). **Export cables** Maximum length of approximately 92nm (170km) and four cables.	**Array cables** Target burial depth of 1m. **Offshore interconnector cables** Target burial depth of 1m. **Export cables** Target burial depth of 1 to 1.5m.	The parameters represent the largest extent and the longest operational period and therefore the greatest increase in potential interaction with sub-sea cables.
Presence of structures in the offshore environment including		**Array area** HRAs located west of	The parameters represent the maximum number of project vessel movements and

Project phase and activity/impact	Maximum parameters	Maximum assessment assumptions	Justification
increased vessel activity and personnel numbers may reduce emergency response capability by increasing the number of incidents, increase consequences or reducing access for the responders.		Rampion 1 (minimum width 1.3nm) and south of Rampion 1 (minimum width of 1.0nm). **Project vessel movements** A maximum of 21 vessels at any one time making up to 869 return trips per year.	the longest operational period and therefore the greatest potential reduction in emergency response capability and increased consequences.
Decommissioning			
Decommissioning activities associated with the removal of structures and cables may displace existing routes/activity, increase grounding risk, increase encounters and collision risk with third-party vessels.	**Array cable removal** Maximum length of 135nm (250km). **Offshore interconnector cable removal** Maximum length of approximately 22nm (40km). **Export cable removal** Maximum length of approximately 92nm (170km).	**Sub-sea cables** All cables will be removed during decommissioning. Commercial vessels will not choose to navigate within the buoyed decommissioning area. Deviation required for six of the 17 main routes identified within the study area, ranging from less than 0.1nm increase for to a 12.5nm increase.	The parameters represent the largest extent and the longest decommissioning period, and therefore the greatest effect on displacement of vessels leading to a potential increase in encounters, grounding risk, collision risk and commercial risk for other third-party vessels.

Project phase and activity/impact	Maximum parameters	Maximum assessment assumptions	Justification
		Application for safety zones 500m radius decommissioning safety zones. 50m radius decommissioning safety zones.	
Vessels associated with decommissioning activities may increase encounters and collision risk for other vessels already operating in the area.		**Project vessel movements** Decommissioning vessels will be on-site throughout the decommissioning phase. Third-party vessels may experience restrictions on visually identifying project vessels entering and exiting the array during reduced visibility. **WTG foundation decommissioning** A maximum of 25 vessels making up to 680 return trips.	The parameters represent the largest extent and the longest decommissioning period, and therefore the greatest effect on displacement of vessels leading to a potential increase in encounters, grounding risk, collision risk and commercial risk for other third-party vessels.

Project phase and activity/impact	Maximum parameters	Maximum assessment assumptions	Justification
		WTG decommissioning A maximum of 22 vessels making up to 1,033 return trips. **Offshore substation decommissioning** A maximum of 37 vessels making up to 288 return trips. **Export cable removal** A maximum of 24 vessels making up to 154 return trips. **Array cable removal** A maximum of 21 vessels making up to 318 return trips.	
Decommissioning activities associated with the removal of structures and cables may displace existing routes/activity restricting access to ports.		**Buoyed decommissioning area** Deployed around the maximum extent of the array area. **Export cables** Export cable removal	The parameters present the largest extent and the longest decommissioning period and therefore the greatest effect on vessel access to ports due to displacement effects.

Project phase and activity/impact	Maximum parameters	Maximum assessment assumptions	Justification
		activities may result in the displacement of vessels. **Application for safety zones** 500m radius decommissioning safety zones.	

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13.1.27 Additionally, for all impacts it is assumed as a worst case for shipping and navigation that offshore construction will be undertaken over approximately four years within the array area and up to four months within the export cable corridor as described in **Chapter 4: The Proposed Development, Volume 2** of the ES (Document Reference: 6.2.4). Similarly, the operational life of the wind farm is assumed to be 30 years).

Embedded environmental measures

13.7.3 As part of the Rampion 2 design process, a number of embedded environmental measures have been adopted to reduce the potential for impacts on shipping and navigation. These embedded environmental measures have evolved over the development process as the EIA has progressed and in response to consultation.

13.7.4 These measures also include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements. As there is a commitment to implementing these embedded environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of Rampion 2 and are set out in this ES.

13.7.5 **Table 13-14** sets out the relevant embedded environmental measures within the design and how these affect the shipping and navigation assessment.

Table 13-14 Relevant shipping and navigation embedded environmental measures

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to shipping and navigation assessment
C-41	The subsea interarray cables will typically be buried at a target burial depth of 1m below the seabed surface. The final depth of the cables will be dependent on the seabed geological conditions and the risks to the cable (e.g. from anchor drag damage).	Scoping	Cable Specification and Installation Plan	Will minimise risk of interaction with sub-sea cable.
C-45	Where possible, subsea cable burial will be the preferred option for cable	Scoping	DCO requirements or dML conditions.	Will minimise the risk of an underwater allision

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to shipping and navigation assessment
	protection. Cable burial will be informed by the cable burial risk assessment and detailed within the Cable Specification and Installation Plan[5].			in proximity to sub-sea cables.
C-46	Advance warning and accurate location details of construction, maintenance and decommissioning operations, associated Safety Zones and advisory passing distances will be given via Notices to Mariners and Kingfisher Bulletins. The undertaker must ensure that a local Notice to Mariners (NtM) is issued at least 14 days prior to the commencement of the authorised Proposed Development or any part thereof advising of the start date of each activity and the expected vessel routes from the construction ports to the relevant location.	Scoping	DCO requirements or dML conditions.	Will assist in raising awareness of the Proposed Development, allowing vessels to passage plan in advance of encountering the array area or activities associated with the Proposed Development.

[5] Littlehampton Harbour Board have requested to be a consultee for the preparation of these documents.

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to shipping and navigation assessment
C-47	Ongoing liaison with fishing fleets will be maintained during pre-construction, construction, maintenance and decommissioning operations via an appointed Fisheries Liaison Officer and Fishing Industry Representative to ensure that the fishing community are fully informed of any offshore activities and works. Also see C-91, C-92 and C-93.	Scoping	DCO requirements or dML conditions.	Will assist fishing vessels in raising their awareness of the Proposed Development, minimising disruption on passage and minimising allision and collision risk.
C-48	Monitoring of vessel traffic will be undertaken for the duration of the construction period.	Scoping	DCO requirements or dML conditions.	Will allow characterisation of vessel displacement during the construction phase so that the effectiveness of embedded environmental measures may determined.
C-53	An Outline Marine Pollution Contingency Plan (MPCP) has been submitted with this Application as Appendix A of the Outline Project Environmental Management Plan (Document Reference 7.11). This Outline MPCP provides details of procedures to protect	Scoping, updated at ES.	DCO requirements or dML conditions.	Will minimise the environmental effect in the event of worst-case consequences from collision, allision and grounding incidents.

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to shipping and navigation assessment
	personnel working and to safeguard the marine environment and mitigation measures in the event of an accidental pollution event arising from offshore operations relating to Rampion 2. The Final MPCP will include relevant key emergency contact details.			
C-56	RED will apply for safety zones post consent. Safety zones of up to 500m will be sought during construction, maintenance and decommissioning phases. Where appropriate, guard vessels will also be used to ensure adherence with Safety Zones or advisory passing distances, as defined by risk assessment, to mitigate any impact which poses a risk to surface navigation during construction, maintenance and decommissioning phases. Such impacts may include partially installed structures or cables, extinguished navigation lights or	Scoping	Electricity application procedures (Section 95 of Energy Act 2004).	Will minimise the risk to project vessels engaged in construction, operations and maintenance, and decommissioning activities. Will assist in safe internal navigation within the array by guiding third-party vessels on a safe passing distance.

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to shipping and navigation assessment
	other unmarked hazards.			
C-83	Where scour protection is required for sub-sea cables, MGN 654 (or latest relevant available guidance) will be adhered to with respect to changes greater than 5% to the under-keel clearance in consultation with the MCA and Trinity House.	Scoping	dML conditions.	Minimises the risk of an underwater allision in proximity to sub-sea cables.
C-84	RED will exhibit lights, marks, sounds, signals and other aids to navigation as required by Trinity House, MCA and Civil Aviation Authority (CAA). This will include a buoyed construction area around the Rampion 2 array.	Scoping	dML conditions.	Will reduce the collision risk by maximising awareness of the Proposed Development Will reduce internal allision risk within the array by minimising the risk of disorientation using unique identification marking.
C-85	RED will ensure that local notification to mariners are updated and reissued at weekly intervals during construction activities and at least five days before any planned operations and maintenance works and supplemented with	Scoping	dML conditions.	Will assist in raising awareness of activity at the Proposed Development, allowing vessels to passage plan in advance of encountering the array area or activities associated

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to shipping and navigation assessment
	VHF radio broadcasts agreed with the MCA in accordance with the construction and monitoring programme approved under deemed marine licence condition.			with the Proposed Development.
C-86	A layout plan (including cables) will be agreed with the MMO following appropriate consultation with Trinity House and the MCA setting out proposed details of the authorised Proposed Development.	Scoping	dML conditions.	Will ensure minimum turbine spacing and lines of orientation are sufficient such that safe internal navigation within the array is possible as well as facilitating SAR access to the array area.
C-87	No part of the authorised Proposed Development may commence until the MMO, in consultation with the MCA, has confirmed in writing that the undertaker has taken into account and, so far as is applicable to that stage of the Proposed Development, adequately addressed all MCA recommendations as appropriate to the authorised Proposed Development contained within MGN 654 (MCA,	Scoping, updated at ES	dML conditions.	Will ensure that the corridor is compliant with MGN 654 requirements and therefore mitigate potential increased allision and collision risk due to the presence of the corridor. Additionally, an Emergency Response Cooperation Plan (ERCoP) will be submitted to the MCA in line with MGN 654 requirements.

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to shipping and navigation assessment
	2021) and its annexes.			
C-88	Marine coordination will be implemented to manage project vessels throughout construction and maintenance periods.	Scoping	N/A	Will minimise port access issues due to the Proposed Development. Additionally, marine coordination will reduce the risk of collisions with third-party vessels involving project vessels.
C-89	There will be a minimum blade tip clearance of at least 22m above MHWS	Scoping	Secured in the DCO requirements	Aligns with the minimum blade clearance recommended by the RYA.
C-96	Subsea array and export cables will be installed via either ploughing, jetting, trenching, or post-lay burial techniques, to a target burial depth of 1m.	Scoping	DCO/ dML conditions	Will minimise risk of interaction with sub-sea cable.
C-284	There shall be no offshore substation located within 500 metres of the array periphery (as defined in the draft DCO).	ES	DCO/ dML conditions	Will reduce the exposure of the substations.

13.7.6 Further detail on the environmental measures in **Table 13-14** is provided in the **Commitments Register** (Document Reference: 7.22) which sets out how and where particular environmental measures will be implemented and secured.

13.8 Methodology for ES assessment

Introduction

13.8.1 The project-wide generic approach to assessment is set out in **Chapter 5: Approach to the EIA, Volume 2** of the ES (Document Reference: 6.2.5). The assessment methodology for shipping and navigation for the ES is consistent with that provided in the Scoping Report (RED, 2020) and no changes have been made since the scoping phase and PEIR provided alongside Statutory Consultation.

Application of guidance

13.1.1 The guidance documents outlined in **Section 13.2** have been considered in defining the assessment methodology for shipping and navigation.

13.1.2 The IMO FSA methodology (IMO, 2018) is the internationally recognised approach for assessing effects on shipping and navigation receptors, and is the approach required under the MCA methodology (MCA, 2021). This methodology is centred on risk control and assesses each effect in terms of its frequency and consequence in order that its significance can be determined as "Broadly Acceptable", "Tolerable" or "Unacceptable". Any effect assessed as unacceptable requires additional environmental measures implemented beyond those considered embedded in order that the effect is reduced to within tolerable or broadly acceptable parameters (application of the ALARP principle).

Significance of effect ranking

13.1.3 The significance of the effects is determined via an impact ranking matrix assessing frequency and consequence of the impacts. The frequency and consequence, as part of the NRA process, is related to the parameters required by the IMO FSA with further detail provided in **Section 3** of **Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.4.13.1).

13.1.4 The frequency and consequence rankings per effect are determined using a number of inputs, notably:

- output of the baseline assessment including the vessel traffic surveys;
- consideration of embedded environmental measures in place;
- lessons learnt from other offshore wind farm developments;
- level of stakeholder concern; and
- consultation output.

13.1.5 The impact ranking matrix is presented in **Table 13-15**.

Table 13-15 Impact ranking matrix for shipping and navigation

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				

13.1.6 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.

13.1.7 Additionally, differences in terminology between this chapter (which uses EIA terminology) and the NRA (which uses FSA terminology) are summarised in **Table 13-16**.

Table 13-16 Summary of terminology differences between ES and NRA

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).

13.1.8 Although EIA terminology has been adopted throughout the assessment of effects, the assessment is undertaken within the framework of FSA methodology as described above.

13.9 Assessment of effects: Construction phase

Displacement of vessels

13.1.9 Construction activities associated with the installation of structures and cables may displace existing routes / activity, increase grounding risk, increase encounters and collision risk with other third-party vessels.

13.1.10 The subject of vessel displacement and its potential consequences were raised by multiple stakeholders during consultation including CLdN, UECC, Britannia Aggregates, DEME, VDL, Cemex, and Hanson Marine.

13.1.11 Each element of this impact is considered in turn in terms of frequency of occurrence and severity of consequence. The resulting significance of the residual effect across the various elements is summarised at the end of the assessment. The elements considered include:

- vessel displacement;
- adverse weather routeing;
- third-party vessel to vessel collision risk;
- grounding risk; and
- commercial risk (which is distinct from the other elements which consider navigational safety risk).

Vessel displacement

Qualification of the effect

13.1.12 The volume of vessel traffic passing within or in proximity to the array area has been established using vessel traffic data collected during dedicated surveys (28 days over winter 2020 and summer 2022) and from coastal receivers (12 months, 2019), as well as Anatec's ShipRoutes database and a previous dedicated survey (14 days over summer 2020). These datasets were interrogated to identify main routes using the principles set out in MGN 654 (MCA, 2021).

13.1.13 There will be no restrictions on entry into the buoyed construction area, other than active construction or pre-commissioning safety zones. However, based on experience at previously under construction offshore wind farms (including at Rampion 1), it is anticipated that commercial vessels will choose not to navigate internally within the buoyed construction area. Therefore, some main route deviations will be required.

13.1.14 The full methodology for main route deviations is provided in **Section 15.5.1** of **Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.4.13.1). A deviation will be required for five of the 17 main routes identified within the study area, with the level of deviation ranging from less than 0.1nm decrease for Route 9 (westbound lane of the Dover Strait TSS to ports in the Solent) to a 12.5nm increase for Route 17 (westbound lane of the Dover Strait TSS to Littlehampton Harbour), noting that vessel traffic levels on Route 17 are

very low (around once a month). **Table 13-17** presents the increase in distance from the pre wind farm scenario for the displaced routes (see **Figure 13-8, Volume 3** of the ES (Document Reference 6.3.13) for an illustration of the anticipated worst-case shift in the mean positions of the main routes).

Table 13-17 Summary of post wind farm main commercial route deviations within study area

Route number	Average vessels per day	Change in route length (nm)
3	5	0.2
8	2	0.1
9	1 to 2	< 0.1
16	0 to 1	2.0
17	Monthly	12.5

13.1.15 In the case of Route 17, the large deviation around the west of the array area represents a worst case for vessel displacement. An alternative routeing option is proposed which minimises the deviation, namely utilising the structures exclusion zone to the west of Rampion 1, which serves as a navigation corridor. This alternative deviation would be result in a route length increase of approximately 2.0nm. A safety case has been undertaken for this MGN 654 compliant corridor and concluded that it is suitable for safe navigation (see **Section 17** of **Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.4.13.1)).

13.1.16 Route 3 (westbound lane of the Dover Strait TSS to ports in the Solent) is the busiest main route identified within the study area for which a deviation will be required, with an average of five vessels per day. During consultation, ABP Southampton indicated that traffic in/out of the Solent will be compressed into a tighter space close to the Isle of Wight. However, the increase in route length (0.2nm) is minor and there is sufficient distance between the point where the route passes the array area and the NAB Deep Water Channel (approximately 13nm) to ensure that vessels are able to avoid any substantial changes to their approach.

13.1.17 Based on experience at previously under construction offshore wind farms (including at Rampion 1), it is anticipated that fishing vessels and recreational vessels will also choose not to routinely navigate internally within the buoyed construction area, with the RYA indicating that recreational users make early course corrections to minimise the distance travelled on passage along the east coast. There is sufficient sea room available (including at the eastern extent of the array in proximity to the Dover Strait TSS and at the western extent of the array area in proximity to the Owers Bank) for such vessels to be accommodated. However, marine aggregate dredging stakeholders did note during consultation that there may be a risk of displaced fishing vessels passing in proximity to current active extraction areas. Displacement of active commercial fishing is assessed

separately in **Chapter 10: Commercial fisheries, Volume 2** of the ES (Document Reference: 6.2.10), with separate consultation with marine aggregate dredging stakeholders undertaken as part of **Chapter 7: Other marine users, Volume 2** of the ES (Document Reference: 6.2.7).

13.1.18 A concern was raised by the RYA in relation to larger recreational craft being displaced into inshore waters resulting in increased interaction with smaller craft. The increase in recreational traffic inshore of the array area is likely to be low given that the majority of recreational traffic is already located inshore of the array area (refer to paragraph 13.6.14). However, east-west recreational routeing currently passing offshore of Rampion 1 may be deviated inshore of Rampion 1, resulting in a slight increase in journey times and distances.

13.1.19 During consultation, the Ministry of Defence (MOD) raised a concern that any installation in Danger Area D037 will impact on freedom of movement for military exercises. From the vessel traffic survey data, on average less than one unique military vessel per day was recorded within the entire study area, a volume validated by the long-term AIS data[6]. Additionally, Danger Area D037 is adjacent to the proposed DCO Order Limits, and a substantially smaller portion of the total area covered by military PEXAs in the region as a whole. Therefore, the disruption to military exercises is likely to be very limited, generally relating only to where safety zones are present and overlap Danger Area D037 (noting that these are temporary in nature).

13.1.20 The main consequence of vessel displacement will be increased journey times and distances for affected third-party vessels, over a large spatial extent, particularly as it is assumed that the buoyed construction area will be deployed around the maximum extent of the array area. Vessels are expected to comply with international and flag state regulations (including the COLREGs and SOLAS) and will be able to passage plan in advance given the promulgation of information relating to the Proposed Development and relevant nautical charts (C-46 and C-85, **Table 13-14**).

Frequency of occurrence

13.1.21 The frequency of occurrence in relation to displacement of vessel traffic is considered **reasonably probable**.

Severity of consequence

13.1.22 The severity of consequence in relation to displacement of vessel traffic is considered **negligible**.

Adverse weather routeing

13.1.23 The need to consider routeing in adverse weather conditions was highlighted by the MCA during consultation. However, since no substantial alternative routeing was observed (based on the 12-months of AIS data as well as the 42 days of

[6] During sensitive operations, military vessels are allowed to switch off their AIS transmitter.

vessel traffic survey data) nor any transit cancellations which could be traced to adverse weather, no impact relating to adverse weather routeing has been identified and, hence, assessed.

Increased third-party vessel to vessel collision risk

Qualification and quantification of the effect

13.1.24 It is anticipated that five of the 17 main routes identified will deviate as a result of the construction of the Proposed Development. This could lead to increased vessel densities within the area, which could in turn lead to an increase in vessel-to-vessel encounters and therefore increased collision risk.

13.1.25 Based on the pre wind farm modelling, the baseline collision risk levels within the study area are high, with an estimated vessel to vessel collision frequency of one every 9.7 years, as summarised in **Section 16** of **Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.4.13.1). The baseline assessment of MAIB incident data (see **Section 9** of **Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.4.13.1)) indicated six collisions were recorded in the 10-year period between 2010 and 2019, all of which resulted in either no or minor damage. The high level of collision risk is due to the high volume of vessel traffic in the area, particularly within and out of the Dover Strait TSS and out of the Solent. However, for the post wind farm scenario, the collision frequency (one in 9.6 years) represents a 1% increase compared to the pre wind farm base case scenario indicating that the influence of the Proposed Development on the overall collision risk for commercial traffic is low.

13.1.26 During consultation, the MCA noted that the squeeze of small craft into the routes of larger commercial vessels should be considered. Given that recreational traffic is primarily based nearshore, the effect of the main commercial route deviations outlined on such traffic is expected to be low. In particular, the area where commercial vessel density is most likely to increase (at the south-western extent of the proposed DCO Order Limits in proximity to the Owers Bank) is not a prominent location for recreational vessel transits, with small craft primarily navigating through the shallows of the Looe closer to shore. During consultation, the RYA indicated that the reduction in the PEIR Assessment Boundary (which has been further reduced for the DCO Application) addresses issues relating to navigational squeeze in this area.

13.1.27 Additionally, the eastern extent of the array area is closely aligned with the eastern boundary of Rampion 1. This ensures that there is no spatial overlap with the ITZ, an area designed to protect local traffic including small craft. Subsequently, larger commercial vessels routeing in and out of Shoreham Port will be able to continue routeing as present, minimising interaction with the ITZ to the close approaches to the port, and thus minimising the likelihood of encounters with small craft navigating within the ITZ. During the second Hazard Workshop, various stakeholders indicated that the reduction to the proposed DCO Order Limits at the eastern extent were a positive change, including Shoreham Port Authority.

13.1.28 East-west recreational routeing currently passing offshore of Rampion 1 and which may be deviated inshore of Rampion 1 may be subject to increased collision risk.

However, large commercial vessels are not prominent in this area, with the only routine commercial traffic movements being those of marine aggregate dredgers in/out of Shoreham Port. Therefore, a notable increase in interaction between small craft and larger vessels is not anticipated. There is also potential for interaction between small craft but with the application of good seamanship including compliance with the fundamental principles of safe navigation such as COLREGs and SOLAS, the likelihood of an encounter between small craft developing into a collision situation is low.

13.1.29 There is potential for collision risk to be introduced where vessels utilising the structures exclusion zone located west of Rampion 1 meet with crossing traffic. However, as discussed in the navigation corridor safety case (see **Section 17** of **Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.4.13.1)), with application of the COLREGs and the large minimum spacing between structures, the collision risk will be minimised.

13.1.30 With respect to all vessels, the effect will be present throughout the construction phase, but the promulgation of information (C-46 and C-85, **Table 13-4**) relating to construction activities – including the deployment of the buoyed construction area – and charting of infrastructure will allow vessel Masters to passage plan in advance, minimising disruption from late changes to routeing. Additionally, information for fishing vessels will be promulgated through ongoing liaison with fishing fleets via an appointed FLO (C-47, **Table 13-4**). Experience from previous under construction offshore wind farms indicated that the extensive promulgation of information is an effective mitigation, with evidence suggesting that Masters regularly choose to transit farther than 1nm from construction works.

13.1.31 As an extension to this, RED will exhibit lights, marks, sounds, signals and other aids to navigation as required by Trinity House, MCA and CAA, including the buoyed construction area (C-84, **Table 13-4**). These navigational aids will further maximise mariner awareness when in proximity, both in day and night conditions including in poor visibility.

13.1.32 The minimum spacing between any installed structures (830m) is sufficient to ensure the view of other vessels will not be blocked or hindered, again reducing the likelihood of an encounter occurring in proximity to the Proposed Development. As a high-level computation, a vessel in transit at 6kt would take approximately 26 seconds to travel 80m[7], the greatest foundation width considered in the maximum design scenario (for offshore substations, see **Section 13.7**). Using the conservative example of a small 10m recreational vessel travelling at 6kt, the view of the vessel may be entirely blocked by an offshore wind structure for a duration of approximately 3 seconds[8] for a WTG foundation (width 20m) or 23 seconds for an offshore substation foundation (width 80m), noting that the offshore substation will share the same foundation dimensions. This duration converges to zero as the vessel length increases to 20m in the WTG case or 80m in the offshore substation case, after which point no total blocking of the view would occur.

[7] 6kt ≈ 3.1 metres per second ⇒ over 80m a time of 25.8 seconds.

[8] Where $x = foundation\ width$ and $l = vessel\ length$, $t = \frac{x-l}{v}$

13.1.33 In the event that an encounter does occur, it is likely to be very localised and occur for only a short duration, with collision avoidance action implemented by the vessels involved, in line with the COLREGs, thus ensuring that the situation does not develop into a collision incident. This is supported by experience at previous under construction wind farms, where no collision incidents involving two third-party vessels have been reported.

13.1.34 Historical collision incident data also indicates that the most likely consequences will be low should a collision occur, with minor contact between the vessels resulting in minor damage and no injuries to persons, with both vessels able to resume their respective passages and undertake a full inspection at the next port. As an unlikely worst case, one of the vessels could be foundered resulting in a Potential Loss of Life (PLL) and pollution.

13.1.35 It is noted that monitoring of vessel traffic will be undertaken for the duration of the construction phase (C-48, **Table 13-4**) to characterise vessel displacement relative to that predicted by the routeing deviations predicted in **Section 15** of **Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.4.13.1)), with the embedded mitigation measures adjusted accordingly. If pollution were to occur in proximity to the Proposed Development, then the Marine Pollution Contingency Plan (MPCP) will be implemented (C-53, **Table 13-4**) to minimise the environmental effect.

Frequency of occurrence

13.1.36 The frequency of occurrence in relation to encounters and collision risk is considered **extremely unlikely**.

Severity of consequence

13.1.37 The severity of consequence in relation to encounters and collision risk is considered **moderate**.

Increased vessel grounding risk

Qualification of the effect

13.1.38 Water depths within and in proximity to the array area are generally suitably deep (greater than 20m) to prevent any risk of grounding. In particular, the displacement associated with Routes 3, 9 and 16 does not result in vessels on these routes navigating in reduced water depths. The displacement associated with Routes 8 and 17 involves passing west of the proposed DCO Order Limits, with Shoreham Port raising during consultation that such deviations may result in vessels being at greater risk of grounding inshore of the site. Therefore, these two routes are assessed in further detail.

13.1.39 Route 8 (Shoreham Port-marine aggregate dredging areas near the Isle of Wight) is anticipated to pass closer to the Outer Owers where water depths drop considerably to less than 5m. However, the presence of the Owers Light Buoy, a south cardinal mark located approximately 2nm to the west of the array area, should serve its purpose of protecting vessels from the shallows of the Owers Bank by directing vessels to the south. There remains sufficient sea room for

Route 8 to safely pass between the array area and the Owers Light Buoy (approximately 2.1nm), and thus the increase in grounding risk for vessels on Route 8 is not considered substantial.

13.1.40 Route 17 (Littlehampton Harbour – Dover Strait TSS) is also anticipated to pass close to the Outer Owers although did not do so in the pre wind farm scenario. Noting the water depths along the pre wind farm approach of the route to Littlehampton (as low as 12m) it is not considered that there will be any substantial reduction in water depth for vessels navigating on Route 17, particularly noting again the presence of the Owers Light Buoy to protect vessels from the shallows of the Owers Bank. Additionally, the vessels observed on Route 17 are small coasters which from the long-term vessel traffic data operate in this area with draughts of less than 5m. As with Route 8, there remains sufficient sea room for Route 17 to safely pass between the array area and the Owers Light Buoy (approximately 2nm), outside of areas where the water depth drops considerably (less than 5m inshore of the buoy), and thus the increase in grounding risk for vessels on Route 17 is not considered substantial. Additionally, it is also acknowledged that vessels on Route 17 may choose to utilise the structures exclusion zone located west of Rampion 1 as a navigation corridor.

13.1.41 In the case of both Routes 8 and 17, the proposed DCO Order Limits represents a reduction in the total area covered compared to the Scoping Boundary including the western extent of the array area, and in the case of Route 17 also represents a reduction compared to the PEIR Assessment Boundary. This reduction assists in ensuring vessels on these routes have sufficient sea room to avoid the shallows of the Owers Bank.

13.1.42 For small craft operating in nearshore waters – particularly in proximity to the export cables – the likelihood of a grounding incident is greater. Although the effect will be present throughout the construction phase, in line with good seamanship it is also anticipated that any vessel navigating in the area will check relevant nautical charts, and thus ensure the vessel does not navigate into a location where there is a substantial likelihood of grounding.

13.1.43 Based on historical data for grounding incidents, the most likely consequences will be low should a grounding incident occur, with minor damage incurred and no injuries to persons with the vessel able to resume passage and undertake a full inspection at the next port. As an unlikely worst case, the vessel could founder resulting in a PLL and pollution. Again, if pollution were to occur in proximity to the Proposed Development, then the MPCP will be implemented (C-53, **Table 13-14**) to minimise the environmental effect.

Frequency of occurrence

13.1.44 The frequency of occurrence in relation to grounding risk is considered **remote**.

Severity of consequence

13.1.45 The severity of consequence in relation to grounding risk is considered **moderate**.

Commercial risk

13.1.46 Based on consultation with local vessel operators, there is a commercial risk posed by the presence of the Proposed Development, specifically with regard to marine aggregate dredging transits. This subsection considers this element of the impact, separate from the effect relating to navigational safety.

13.1.47 During consultation, Britannia Aggregates and VDL each raised a concern that established routes between Shoreham, Newhaven or ports in the Solent (Portsmouth and Southampton) and marine aggregate dredging areas close to the Isle of Wight, in the central English Channel or the Outer Thames/east coast could be impacted by the presence of Rampion 2. Britannia Aggregates raised a particular concern over the route between Shoreham and the East Channel licence areas since a detour of 8 to 10nm could have a commercial effect due to time increases.

13.1.48 It is noted that the proposed DCO Order Limits represents a reduction in the total area covered compared to the PEIR Assessment Boundary (which in turn represents a reduction in total area compared to the Scoping Boundary) including at both the eastern and western extents of the array area. These reductions reduce the size of the deviation required for some of the routes outlined above.

13.1.49 The main routes identified within the study area include a number of routes with a proportion of marine aggregate dredgers (Routes 8, 9, 11 and 12) which characterise most of the routeing raised by marine aggregate dredging representatives and constitute up to six vessels per day. As discussed in the vessel displacement component of this impact, there is either no deviation required for these routes due to the presence of Rampion 2 (Routes 11 and 12); or the level of deviation is considered to be low (maximum 0.1nm for Routes 8 and 9). Therefore, the commercial effect on these routes including additional transit time is considered to be minimal with no substantial disruption caused.

13.1.50 One of the routes highlighted by Britannia Aggregates – between Newhaven and the central English Channel to the east of the proposed DCO Order Limits – was observed in the vessel traffic survey data but not in sufficient numbers to constitute a main route. However, such traffic passes well clear of the proposed DCO Order Limits and so the effect associated with such traffic is negligible.

Frequency of impact

13.1.51 The frequency of occurrence in relation to commercial risk is considered **remote**.

Severity of impact

13.1.52 The severity of consequence in relation to commercial risk is considered **minor**.

Significance of the residual effect

13.1.53 **Table 13-18** summarises the resulting significance of the residual effect for each component of this impact in relation to navigational safety.

Table 13-18 Summary of shipping and navigation impact rankings for vessel displacement during construction phase (navigational safety)

Component of impact	Frequency of occurrence	Severity of consequence	Significance of the residual effect
Vessel displacement	Reasonably Probable	Negligible	Broadly Acceptable
Increased third-party vessel to vessel collision risk	Extremely Unlikely	Moderate	Broadly Acceptable
Grounding risk	Remote	Moderate	Tolerable

13.1.54 **Table 13-19** summarises the resulting significance of the residual effect for this impact in relation to commercial risk.

Table 13-19 Summary of shipping and navigation impact rankings for vessel displacement during construction phase (commercial risk)

Component of impact	Frequency of occurrence	Severity of consequence	Significance of the effect
Vessel displacement	Remote	Minor	Broadly Acceptable

13.1.55 Overall, it is predicted that the effect is of **Tolerable** significance (given that the worst case result is Tolerable for the grounding risk component of the impact), which is **Not Significant** in EIA terms.

Third-party to project vessel collision risk

13.1.56 Vessels associated with construction activities may increase encounters and collision risk for other vessels already operating in the area.

Qualification of risk

13.1.57 Up to 2,415 return trips by construction vessels may be made throughout the construction phase, including Restricted in Ability to Manoeuvre (RAM) vessels. It is assumed that construction vessels will be on-site throughout the construction phase.

13.1.58 Encounter and collision risk involving a project vessel will be managed by marine coordination (C-88, **Table 13-14**) including the application of traffic management procedures such as the designation of entry and exit points to and from the array and routes to and from construction ports. Such procedures will take account of those areas where collision risk is assessed as greatest (where third-party vessels pass or undertake operational activities in proximity to the array area frequently

such as marine aggregate dredgers). Additionally, experience from and procedures established for Rampion 1 will be taken into account, project vessels will carry AIS and be compliant with Flag State regulations including IMO conventions such as the COLREGs, and information for fishing vessels will also be promulgated through ongoing liaison with fishing fleets via an appointed FLO (C-47, **Table 13-4**).

13.1.59 Furthermore, an application for safety zones of 500m will be sought during the construction phase (C-56, **Table 13-4**). These will serve to protect project vessels engaged in construction activities. Minimum advisory passing distances, as defined by risk assessment, may also be applied, with advanced warning and accurate locations of both safety zones and any minimum advisory safe passing distances provided by Notifications to Mariners and Kingfisher Bulletins (C-46 and C-85, **Table 13-4**).

13.1.60 Also, RED will exhibit lights, marks, sounds, signals and other aids to navigation as required by Trinity House and MCA, including the buoyed construction area (C-84, **Table 13-4**). These navigational aids will further maximise mariner awareness when in proximity, both in day and night conditions including in poor visibility.

13.1.61 Third-party vessels may experience restrictions on visually identifying project vessels entering and exiting the array during reduced visibility; however, this impact will be mitigated by the application of the COLREGs (reduced speeds) in adverse weather conditions and project vessels mandatorily will carry AIS regardless of size.

13.1.62 The likelihood of a collision is likely to be greater in reduced visibility when the identification of project vessels entering and exiting the array may be encumbered. However, the COLREGs regulate vessel movements in adverse weather conditions and require all vessels operating in reduced visibility to reduce speed to allow more time for reacting to encounters, thus minimising the collision risk.

13.1.63 Based on historical incident data, there have been two instances of a third-party vessel colliding with a project vessel in the UK. In both incidents moderate vessel damage was reported with no harm to persons. It is noted that the two incidents occurred in 2011 and 2012, respectively, and awareness of offshore wind developments and application of the measures outlined above has improved and been refined considerably in the interim, with no further collision incidents reported since.

13.1.64 Should an encounter occur between a third-party vessel and a project vessel, it is likely to be very localised and occur for only a short duration. With collision avoidance action implemented in line with the COLREGs, the vessels involved will likely be able to resume their respective passages and/or activities with no long-term consequences.

13.1.65 Should a collision occur, the most likely consequences will be similar to that outlined for the case of a collision between two third-party vessels, namely minor contact between the vessels resulting in minor damage and no injuries to persons with both vessels able safely make their next port to undertake a full inspection. As an unlikely worst case, one of the vessels could be foundered resulting in a PLL and pollution. If pollution were to occur in proximity to the Proposed Development

or involving a project vessel, then the MPCP will be implemented (C-53, **Table 13-4**) to minimise the environmental effect.

Frequency of occurrence

13.1.66 The frequency of occurrence in relation to third-party to project vessel collision risk is considered to be **extremely unlikely.**

Severity of consequence

13.1.67 The severity of consequence in relation to third-party to project vessel collision risk is considered to be **moderate**.

Significance of the effect

13.1.68 Overall, it is predicted that the significance of the effect due to increased third-party to project vessel collision risk is of **Broadly Acceptable** significance, which is **Not Significant** in EIA terms.

Reduced access to local ports and harbours

13.1.69 Construction activities associated with the installation of structures and cables may displace existing routes / activity restricting access to ports/harbours.

13.1.70 To ensure the impact is assessed in as much detail as possible overall, a number of ports and harbours in the area are considered individually, taking account of the vessel traffic movements associated with these ports, based on vessel traffic data and consultation feedback.

13.1.71 Concerns were raised by some port operators in relation to commercial risk to local ports, and therefore a separate assessment for this element has been undertaken as the last subsection for this impact.

13.1.72 The ports and elements considered include:

- Shoreham Port;
- Port of Newhaven;
- Brighton Marina;
- Littlehampton Harbour;
- ports within the Solent; and
- commercial risk for Shoreham Port and Littlehampton Harbour.

Shoreham Port

13.1.73 As described in **Section 10** of **Appendix 13.1, Volume 4** of the ES (Document Reference: 6.4.13.1), fishing vessel traffic is prominent out of Shoreham Port, with fishing vessels both in transit to fishing grounds located south of the array area and actively engaged in fishing within the eastern half of the array area. Therefore, access to Shoreham Port for fishing vessels may be compromised during the

construction phase, assuming that fishing vessels choose not to pass through the buoyed construction area irrespective of the presence of construction safety zones. There is available sea room to the east of the array area for fishing vessels to alter their passage such that navigation will not be required in proximity to the end of the Dover Strait TSS. Moreover, these vessels have good familiarity with operating in proximity to the end of the Dover Strait TSS anyway, have good manoeuvrability and are expected to display good seamanship and comply with the COLREGs.

13.1.74 Recreational vessel activity was also observed, although was mostly confined to the nearshore area and the summer period, and so disruption to recreational vessel movements out of Shoreham Port are not expected to be notable given the majority of vessel activity is a sufficient distance from the array area and the marine coordination for project vessels. For recreational traffic transiting east-west out of Shoreham Port and passing north of the array area, crossing of the offshore export cable corridor could be disrupted whilst export cable installation is ongoing. However, it is anticipated that given the nature of the export cable installation, only a section of the offshore export cable corridor will have a cable laying vessel (alongside other construction vessels) present at any one time and so recreational vessels will still be able to safely navigate to/from Shoreham Port with minimal disruption. Additionally, export cable installation is expected to last up to four months only.

13.1.75 Marine aggregate dredgers were principally observed on two main routes out of Shoreham Port (Routes 8 and 12), headed for marine aggregate dredging areas near the Isle of Wight and the Owers Bank, constituting up to three vessels per day. Marine aggregate dredgers were also observed on Route 13 alongside cargo vessels, between Shoreham Port and North Sea ports, constituting less than one vessel per day. Vessels on these routes are unlikely to be disrupted, noting there is either no deviation or a low level of deviation anticipated (see the vessel displacement assessment of effects).

13.1.76 The other main route out of Shoreham Port (Route 13), which is generally used by cargo vessels, is not anticipated to require any deviation due to the under construction array area.

13.1.77 The pilot boarding station for Shoreham Port is located approximately 7.7nm north of the array area and 11nm west of the offshore export cable corridor. Therefore, the presence of the Proposed Development is not anticipated to have an impact on access to pilotage services, noting that no impact has been reported due to the presence of Rampion 1 (which is substantially closer). Additionally, given that the array area will be well clear of the ITZ, there will be limited accessibility risk for active pilot vessels, a concern raised by the MCA during consultation prior to the eastern extent of the array area being reduced. This is supported by the vessel traffic data collected during dedicated surveys (28 days, winter 2020 and summer 2022) and from coastal receivers (12 months, 2019) which indicates that pilot vessels operating in the ITZ are largely located within 2nm of Shoreham Port (also applicable to the Port of Newhaven) and therefore the effect on pilotage operations of vessel displacement is anticipated to be minimal.

Frequency of occurrence

13.1.78 The frequency of occurrence for Shoreham Port in relation to navigational safety is considered to be **reasonably probable**.

Severity of consequence

13.1.79 The severity of consequence for Shoreham Port in relation to navigational safety is considered to be **minor**.

Port of Newhaven

13.1.80 Two passenger ferries operated by DFDS Seaways are prominent out of the Port of Newhaven, each making a cross-channel passage to Dieppe twice per day. Given the distance of this route from the array area (approximately 11nm at the closest point), the Proposed Development is not anticipated to have any impact on routeing with respect to vessel displacement.

13.1.81 Other non-wind farm related commercial vessel activity at the Port of Newhaven is limited, mostly consisting of occasional single transits by cargo vessels and marine aggregate dredgers.

13.1.82 As with Shoreham Port, recreational vessels were observed but mostly confined to the nearshore area and the summer period; however, some recreational traffic was observed headed directly to/from ports in the Solent. Fishing vessel activity was also observed mostly within 3nm of the port. The effect on port access for fishing and recreational users operating nearshore is not anticipated to be substantial when considering the distance from the array area and the marine coordination that will be implemented for project vessels. Recreational traffic which transits east-west out of the Port of Newhaven passes north of the array area but crosses the offshore export cable corridor and therefore could be disrupted whilst export cable installation is ongoing. However, as noted in the assessment for Shoreham Port, it is anticipated that given the nature of the export cable installation, only a section of the offshore export cable corridor will have a cable laying vessel (alongside other construction vessels) present at any one time and so recreational vessels will still be able to safely navigate to/from the Port of Newhaven with minimal disruption. Additionally, export cable installation is expected to last up to four months only.

13.1.83 The pilot boarding station for the Port of Newhaven is located approximately 9nm north-east of the array area. Newhaven Port & Properties confirmed during consultation that there is not expected to be any effect on pilot operations given the distance from the proposed DCO Order Limits. Also, as with Shoreham Port, the Port of Newhaven was a key base for the construction of Rampion 1 and no notable effects from this have been reported (including during consultation for the Proposed Development).

Frequency of occurrence

13.1.84 The frequency of occurrence for the Port of Newhaven in in relation to navigational safety is considered to be **reasonably probable**.

Severity of consequence

13.1.85 The severity of consequence for the Port of Newhaven in relation to navigational safety is considered to be **negligible**.

Brighton Marina

13.1.86 As analysed in **Section 10** of **Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.4.13.1), recreational vessel traffic is the predominant activity associated with Brighton Marina. The majority of such traffic is located nearshore or headed directly to/from ports in the Solent, although some visits to Rampion 1 do occur (wind farm trips) as well as recreational dive charter visits to numerous wrecks in the area.

13.1.87 As with fishing and recreational users operating nearshore at the Port of Newhaven, the effect on port access for those vessels is not anticipated to be substantial when considering the marine coordination that will be implemented for project vessels (C-88, **Table 13-14**). Recreational traffic which transits east-west out of Brighton Marina passes north of the array area but crosses the offshore export cable corridor and therefore could be disrupted during export cable installation. However, as noted for Shoreham Port and the Port of Newhaven, it is anticipated that given the nature of the export cable installation, only a section of the offshore export cable corridor will have a cable laying vessel (alongside other construction vessels) present at any one time and so recreational vessels will still be able to safely navigate to/from Brighton Marina with minimal disruption. Additionally, export cable installation is expected to last up to four months only.

13.1.88 Recreational vessels undertaking visits to Rampion 1 are unlikely to face any additional challenges to port access, noting again the marine coordination that will be implemented for project vessels.

13.1.89 Activity featuring other vessel types related to Brighton including fishing vessels was sparse (noting that Radar data coverage in close proximity to Brighton may not be comprehensive given its location relative to the proposed DCO Order Limits) and therefore minimal disruption is expected for these other vessel types.

Frequency of occurrence

13.1.90 The frequency of occurrence for Brighton Marina in relation to navigational safety is considered to be **remote**.

Severity of consequence

13.1.91 The severity of consequence for Brighton Marina in relation to navigational safety is considered to be **negligible**.

Littlehampton Harbour

13.1.92 As analysed in **Section 10** of **Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.4.13.1), recreational vessel traffic is prominent out of Littlehampton Harbour, including angling charter vessels.

However, traffic levels for recreational vessels are generally lower than that observed at Shoreham Port, the Port of Newhaven and Brighton Marina.

13.1.93 Additionally, three small coasters operate a route into Littlehampton Harbour from the Dover Strait TSS which, following consultation, has been designated as a main route (Route 17). This route is not used as frequently as other main routes, with transits occurring on a more monthly basis than daily basis on average across the year (on the spring tide).

13.1.94 Consultation also identified a limited volume of fishing vessel and resident workboat activity.

13.1.95 The worst case deviation for vessels accessing Littlehampton Harbour from the Dover Strait TSS (as per Route 17) is large in terms of additional distance required, and could have implications for accessing the harbour given the need to make berth on the spring tide. However, an alternative routeing option is available – use of the structures exclusion zone located west of Rampion 1 as a navigation corridor. This option was welcome by Littlehampton Harbour Board during consultation and would minimise the additional distance and time requirements when re-routeing for the low volume of commercial activity and fishing and recreational vessels out of Littlehampton Harbour.

13.1.96 Access to the port itself should be mitigated by the implementation of marine coordination for project vessels (C-88, **Table 13-14**) including the application of traffic management procedures such as the designation of routes to and from port.

13.1.97 Activities relating to the installation of the export cables could cause disruption given the proximity of the offshore export cable corridor to the port and the pilot boarding station (located approximately 120m to the east). As noted in relation to the Port of Newhaven and Brighton Marina, it is anticipated that given the nature of the export cable installation, only a section of the offshore export cable corridor will have a cable laying vessel (alongside other construction vessels) present at any one time and so the restrictions imposed on access will be much less severe than that associated with the buoyed construction area at the array area. Additionally, export cable installation is expected to be completed in up to four months only. Particular care will be required by project vessels in relation to the pilot boarding area but with marine coordination in place the impact is considered suitably mitigated.

13.1.98 There are several racing marks used by the Arun Yacht Club located in proximity to Littlehampton Harbour, two of which are located within the offshore export cable corridor. Depending on the final location and timing of the export cable installation these seasonal racing marks may need to be temporarily moved in consultation with Arun Yacht Club, although it is anticipated that there would be sufficient sea room available to place these marks so as to retain their purpose of marking for recreational events.

13.1.99 It is noted that during consultation, Littlehampton Harbour Board indicated that upcoming construction works associated with the A27 Arundel bypass (scheduled to start in 2024/25 and be completed by 2030) may lead to a significant increase in vessel traffic volumes associated with Littlehampton Harbour. Should the construction phase of the Proposed Development coincide with these works then constraints on port access may be heightened but not to a level at which additional

mitigation is required. Additional operations associated with replacement of the harbour entrance breakwaters at Littlehampton Harbour by 2025 are expected to have minimal temporal overlap with the offshore construction of the Proposed Development.

Frequency of occurrence

13.1.100 The frequency of occurrence for Littlehampton Harbour in relation to navigational safety is considered to be **extremely unlikely**.

Severity of consequence

13.1.101 The severity of consequence for Littlehampton Harbour in relation to navigational safety is considered to be **minor**.

Ports in the Solent

13.1.102 The characterisation of the main routes (see **Section 11** of **Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.13.1)) indicated that a substantial volume of commercial traffic in and out of ports in the Solent pass in proximity to the Proposed Development. Specifically, Routes 3, 4, 6, 9, 14 and 16 all consist of transits to and from ports in the Solent, constituting up to 16 vessels per day. These routes either enter / exit the Dover Strait TSS or link up with ports in France and feature a passenger ferry route operated by Brittany Ferries between Portsmouth Port and Ouistreham (Caen).

13.1.103 In terms of non-commercial traffic, some fishing vessel activity was observed out of the Solent although was lower than that associated with Shoreham Port and the Port of Newhaven. Recreational vessel activity was observed out of the Solent, mostly passing through the shallow waters of the Looe to and from Brighton Marina and ports / harbours further along the UK south coast.

13.1.104 Given the distance from the proposed DCO Order Limits and the minor level of deviation required, it is not anticipated that on-site construction activities and the displacement of routeing (further considered in the assessment of effects on vessel displacement) will have a substantial effect on port access. Similarly, numerous navigational features associated with access to the Solent (including pilot boarding stations, designated anchorage areas and the NAB Deep Water Channel) are located a great enough distance from the proposed DCO Order Limits that any substantial effect on their use is not anticipated. This includes the St Helen's Road Anchorage located off the Isle of Wight which was raised as a possible concern by the UK Chamber of Shipping during consultation.

Frequency of occurrence

13.1.105 The frequency of occurrence for ports in the Solent in relation to navigational safety is considered to be **frequent**.

Severity of consequence

13.1.106 The severity of consequence for ports in the Solent in relation to navigational safety is considered to be **negligible**.

Commercial Risk

13.1.107 Based on consultation with local port operators, there is a commercial risk posed by the presence of the Proposed Development, specifically with regard to Shoreham Port and Littlehampton Harbour. This subsection considers this element of the impact, separate from elements relating to navigational safety.

Shoreham Port

13.1.108 Shoreham Port confirmed that any deviation of vessels much further west out of Shoreham Port to access the Dover Strait TSS could have implications on the attractiveness of the port for commercial use. There is an average of one vessel per day using such a route (Route 11).

13.1.109 As shown in **Figure 13-8, Volume 3** of the ES (Document Reference: 6.3.13), it is anticipated that vessels routeing between the Dover Strait TSS and Shoreham will be able to safely pass east of Rampion 2, thus ensuring no increase in route length. This is a result of a reduction in the proposed DCO Order Limits compared to that under consideration at both the Scoping and PEIR phases, with the eastern extent of the array area further reduced giving enough space between the end of the TSS and the array area to safely allow vessels to navigate around. Subsequently, the attractiveness of Shoreham as a commercial port is not likely to be affected.

13.1.110 Additionally, the inclusion of the navigation corridor between Rampion 1 and Rampion 2 may offer vessels routeing between the Dover Strait TSS and Shoreham Port an alternative option to passing east of the proposed DCO Order Limits, particularly for fishing vessels and cross-channel recreational vessels. This will be dependent upon factors such as the placement of construction buoyage (to be determined in consultation with Trinity House post consent), passage planning and conditions on the day of the transit. Although the size of the deviation resulting from use of the corridor may be greater compared to passing east of the proposed DCO Order Limits, this does represent an additional routeing option which will be of particular relevance during the winter months when it is known that fishing vessels prefer to avoid navigating internally within Rampion 1. Therefore, with the inclusion of the corridor, it is very unlikely that any resulting deviations will diminish the attractiveness of Shoreham Port for fishing and recreational receptors.

13.1.111 It is noted that no timetabled ferries were observed out of Shoreham Port and so the sensitivity of the relevant receptors is relatively lower than would be the case if timetabled ferries were present.

Frequency of impact

13.1.112 The frequency of the impact for Shoreham Port in relation to commercial risk is considered to be **reasonably probable**.

Consequence of impact

13.1.113 The consequences of the impact for Shoreham Port in relation to commercial risk are considered to be **negligible**.

Littlehampton Harbour

Overview

13.1.114 Littlehampton Harbour Board confirmed that any deviation of vessels out of Littlehampton to access the Dover Strait TSS could have implications on the attractiveness of the port for commercial use. Such a route (Route 17) is used on a near monthly basis.

13.1.115 As shown in **Figure 13-8, Volume 3** of the ES (Document Reference: 6.3.13), it is anticipated that, as a worst case, vessels routeing between the Dover Strait TSS and Littlehampton will pass west of the proposed DCO Order Limits. This involves a much greater increase in route length than that associated with the aforementioned route to Shoreham, of approximately 12.5nm. However, an alternative routeing option is proposed – use of the structures exclusion zone located west of Rampion 1 as a navigation corridor – which is anticipated to reduce the increase in route length to approximately 2.0nm. This option was welcomed by Littlehampton Harbour Board during consultation, noting that benefitting vessels on the route are typically smaller commercial cargo vessels. There is potential that these vessels may use the navigation corridor, dependent upon the placement of construction buoyage, which is to be determined in consultation with Trinity House post consent.

13.1.116 It is noted that no timetabled ferries were observed out of Littlehampton Harbour and so the sensitivity of the relevant receptors is relatively lower than would be the case if timetabled ferries were present.

Frequency of impact

13.1.117 The frequency of the impact for Littlehampton Harbour in relation to commercial risk is considered to be **extremely unlikely**.

Consequence of impact

13.1.118 The consequences of the impact for Littlehampton Harbour in relation to commercial risk are considered to be **minor** given the potential for inaccessibility of the corridor depending on construction buoyage deployment.

Significance of the effect

13.1.119 **Table 13-20** summarises the resulting significance of the effect for each receptor.

Table 13-20 Summary of shipping and navigation impact rankings for reduced access to local ports and harbours during construction phase (navigational safety)

Receptor	Frequency	Consequence	Significance of the effect
Shoreham Port	Reasonably Probable	Minor	**Tolerable**
Port of Newhaven	Reasonably Probable	Negligible	**Broadly Acceptable**
Brighton Marina	Remote	Negligible	**Broadly Acceptable**
Littlehampton Harbour	Extremely Unlikely	Minor	**Broadly Acceptable**
Ports in the Solent	Frequent	Negligible	**Tolerable**

13.1.120 **Table 13-21** summarises the resulting significance of the residual effect for each receptor in relation to commercial risk.

Table 13-21 Summary of shipping and navigation impact rankings for reduced access to local ports and harbours during construction phase (commercial risk)

Receptor	Frequency	Consequence	Significance of the residual effect
Shoreham Port	Reasonably Probable	Negligible	Broadly Acceptable
Littlehampton Harbour	Extremely Unlikely	Minor	Broadly Acceptable

13.1.121 Overall, it is predicted that the effect is of **Tolerable** significance (given that the worst case result is Tolerable for the Shoreham Port and ports in the Solent components of the navigational safety impact), which is **Not Significant** in EIA terms.

13.10 Assessment of effects: Operation and maintenance phase

Displacement of vessels

13.1.122 The presence of structures may displace existing routes/activity, increase grounding risk, increase encounters and collision risk with other third-party vessels.

13.1.123 The subject of vessel displacement and its potential consequences were raised by multiple stakeholders during consultation including CLdN, UECC, Britannia Aggregates, DEME, VDL, Cemex, and Hanson Marine.

13.1.124 Each element of this impact is considered in turn in terms of frequency of occurrence and severity of consequence, with the resulting significance of the residual effect across the various elements summarised at the end of the assessment. The elements considered include:

- vessel displacement;
- adverse weather routeing;
- increased third-party to third-party vessel collision risk;
- grounding risk; and
- commercial risk (which is distinct from the other elements which consider navigational safety risk).

Vessel displacement

Qualification of effect

13.1.125 Based on experience at existing operational offshore wind farms (including at Rampion 1) it is anticipated that commercial vessels will choose not to navigate internally within the array and therefore the main route deviations established for the equivalent construction phase impact in line with MGN 654 (MCA, 2021) are again considered (see **Figure 13-8, Volume 3** of the ES (Document Reference: 6.3.13) and **Table 13-17**).

13.1.126 The busiest main route identified within the study area for which a deviation will be required is Route 3 (westbound lane of the Dover Strait TSS to ports in the Solent), with an average of five vessels per day. However, the deviation associated with this route is relatively small (0.2nm) and the distance to the NAB Deep Water Channel (13nm) is sufficient to ensure that vessels are able to avoid any substantial changes to their approach.

13.1.127 The largest main route deviation identified within the study area is Route 17 (Littlehampton Harbour–Dover Strait TSS), with a deviation of 12.5nm. However, the volume of vessel traffic associated with this route is very low (monthly). This large deviation around the west of the array area represents a worst case for vessel displacement. An alternative routeing option is proposed which minimises the deviation, namely utilising the structure exclusion zone to the west of Rampion

1, which serves as a navigation corridor. A safety case has been undertaken for this MGN 654 compliant corridor and concluded that it is suitable for safe navigation (see **Section 17 of Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.4.13.1)).

13.1.128 Noting that there will be no restrictions on entry into the array area, other than active operation and maintenance safety zones, and based on experience at Rampion 1, it is anticipated that fishing vessels will navigate internally within the array during the summer months. Subsequently the displacement of such vessels in transit is not anticipated to be substantial in the summer months, although may be analogous with the level of displacement anticipated for the construction phase during the winter months, depending on the spacing between structures in the final array layout and usage of the MGN 654 compliant corridor (C-87, **Table 13-14**). This includes the potential for displacement of fishing vessels into current active extraction areas. Displacement of active commercial fishing is assessed separately in **Chapter 10: Commercial fisheries, Volume 2** of the ES (Document Reference: 6.2.10)., with separate consultation with marine aggregate dredging stakeholders undertaken as part of **Chapter 7: Other marine users, Volume 2** of the ES (Document Reference: 6.2.7).

13.1.129 Additionally, from consultation with the RYA, and based on the baseline characterisation of recreational vessel movements (including the RYA Coastal Atlas – see **Section 10** of **Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.4.13.1)), recreational vessels are unlikely to choose to navigate internally within the array; however, the minimum spacing between structures at the Proposed Development (830m) is greater than that at Rampion 1 (750m) which may increase the likelihood of recreational vessels choosing to navigate internally within the array and this minimum spacing is considered sufficient for safe internal navigation. Additionally, for north-south transits, the navigation corridor offers an alternative routeing option for recreational vessels.

13.1.130 Military vessels are less likely to choose to navigate internally within the array, and therefore the discussion relating to Danger Area D037 for the equivalent construction phase hazard is again applicable. In particular, given the low frequency of military traffic and the lack of any overlap between the military PEXA and the proposed DCO Order Limits, the disruption to military activities is likely to be minimal.

13.1.131 With the main route deviations matching those established for the equivalent construction phase hazard, the main consequences of vessel displacement are considered to be the same, namely increased journey times and distances for affected third-party vessels, covering a large spatial extent.

13.1.132 As for the construction phase, promulgation of information relating to the Proposed Development and relevant nautical charts will allow vessels to effectively passage plan in advance (C-46 and C-85, **Table 13-14**).

Frequency of occurrence

13.1.133 The frequency of in relation to displacement of vessel traffic is considered **reasonably probable**.

Severity of consequence

13.1.134 The severity of consequence in relation to displacement of vessel traffic is considered **negligible**.

Adverse weather routeing

13.1.135 As per the construction phase, since no substantial alternative routeing was observed (based on the 12 months of AIS data as well as the 42 days vessel traffic survey data) nor any transit cancellations which could be traced to adverse weather, no impact on adverse weather routeing has been identified or assessed.

Increased third-party vessel to vessel collision risk

Qualification of effect

13.1.136 Since the main route deviations mirror those established for the equivalent construction phase impact, the likelihood of an encounter occurring is the same. In particular, the annual collision frequency for the post wind farm scenario (one in 9.6 years) represent a 1% increase compared to the pre wind farm base scenario indicating that the influence of the Proposed Development on the overall collision risk for commercial traffic is low. Additionally, the change in collision risk to small craft due to the main route deviations is expected to be low, noting the sea room available at the western extent (prior to reaching the Owers Bank) and the eastern extent (prior to reaching the Dover Strait TSS including the ITZ).

13.1.137 During post PEIR consultation, the portion of the PEIR Assessment Boundary overlapping the ITZ was pulled back from the east to create sea room between the proposed DCO Order Limits and the ITZ, thus reducing the collision risk relating to traffic to/from Shoreham Port; it was noted in consultation with Shoreham Port Authority that the main issue from Rampion 1 was the lack of sea room in the ITZ. Furthermore, the MGN 654 compliant navigation corridor located west of Rampion 1 (C-87, **Table 13-14**) offers an additional routeing option for vessels in/out of Shoreham Port, particularly in the event of adverse weather when fishing vessels may wish to avoid navigating internally within the Rampion 1 and Rampion 2 arrays. During consultation, the MCA have acknowledged that the corridor will be beneficial and further reduce collision risk associated with traffic transiting around the eastern and southern boundaries of the array areas.

13.1.138 Concern was also raised as part of the first Hazard Workshop in relation to the western extent of the array area, although most felt that the increased sea room available (post scoping) was sufficient and additional mitigation such as buoyage may be required to fully reduce the effect to acceptable levels. Further refinement to the proposed DCO Order Limits (post PEIR) has further increased sea room available.

13.1.139 Increased collision risk due to wind farm structures visually obstructing vessels may be created in the following scenarios:

- a fishing vessel or recreational vessel navigating within the array area including crossing the navigation corridor or utilising the structures exclusion zone located south of Rampion 1;

- a third-party vessel approaching a corner of the array area; and
- a third-party vessel entering/exiting the navigation corridor.

13.1.140 As per the vessel obstruction calculation included for the equivalent construction phase impact, total blocking of a vessel in transit behind a structure will, as a worst case, last for three seconds behind a WTG and 23 seconds behind an offshore substation. Additionally, taking into account the expectation of good seamanship, the effect is not anticipated to be substantial, including where a vessel passes east-west at the southern entry/exit of the navigation corridor, i.e., the east-west recreational routeing highlighted during consultation by the RYA.

13.1.141 In the event that an encounter or collision does occur, the consequences are expected to be the same as for the equivalent construction phase impact, with the most likely consequences being minor damage incurred and no injuries to persons. The worst case consequences could include the foundering of one of the vessels resulting in a PLL and pollution, with the environmental effect of the latter minimised by the implementation of the MPCP (C-53, **Table 13-14**).

13.1.142 As with the equivalent construction phase impact, for all vessels the effect will be present throughout the operation and maintenance phase, but the promulgation of information (C-46 and C-85, **Table 13-14**) relating to maintenance activities and charting of infrastructure will allow vessel Masters to passage plan in advance, minimising disruption resulting from late changes to routeing. Additionally, as with the construction phase, mariner awareness will be further maximised by promulgation of information to fishing vessels via an FLO (C-47, **Table 13-14**) and deployment of lighting and marking (C-84, **Table 13-14**).

13.1.143 With regard to the navigation corridor, the UK Chamber of Shipping noted that the exit from the corridor could be a pinch point for vessel traffic in the English Channel, potentially increasing collision risk (see **Section 17** of **Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.4.13.1)). Taking into account the low visual blocking risk, expected good seamanship in line with the COLREGs and the 4.7nm distance between the corridor and traffic out of the Dover Strait TSS, the collision risk associated with exiting the corridor is low. This is in line with the MCA's support of the corridor which highlighted that the 4.7nm distance provided sea room to minimise rights of way issues.

Frequency of occurrence

13.1.144 The frequency of occurrence in relation to displacement of vessel traffic is considered **reasonably probable**.

Severity of consequence

13.1.145 The severity of consequence in relation to displacement of vessel traffic is considered **moderate**.

Increased vessel grounding risk

Qualification of the effect

13.1.146 Since the main route deviations mirror those established for the equivalent construction phase impact, the likelihood of a grounding incident for a commercial vessel occurring is the same. In particular, for Routes 8 and 17 there is an increased likelihood due to the proximity of these routes to the Outer Owers where water depths drop considerably (less than 5m), but the presence of the Owers Light Buoy will assist in protecting vessels from the shallows of the Owers Bank and there is sufficient sea room available for vessels to pass safely between the array area and Owers Light Buoy, particularly given the reduction in the area covered by the proposed DCO Order Limits compared to the Scoping and PEIR Assessment Boundaries.

13.1.147 In the event that a grounding incident does occur, the consequences are expected to be the same as for the equivalent construction phase impact, with minor damage incurred and no injuries to persons the most likely consequence and the foundering of the vessel resulting in a PLL and pollution the unlikely worst case consequences, with the environmental effect of the latter minimised by the implementation of the MPCP (C-53, **Table 13-14**).

Frequency of occurrence

13.1.148 The frequency of occurrence in relation to increased grounding risk is considered to be **extremely unlikely**.

Severity of consequence

13.1.149 The severity of consequence in relation to increased grounding risk is considered to be **moderate**.

Commercial risk

13.1.150 As previously noted, based on consultation with local vessel operators, there is a commercial risk posed by the presence of the Proposed Development specifically with regard to local port users and marine aggregate dredging transits.

13.1.151 Given that the main route deviations established for the construction phase also apply to the operation and maintenance phase, the impact is considered broadly similar for commercial vessels, including marine aggregate dredgers.

13.1.152 Amendments to passage planning will be well established by the operation and maintenance phase, and so there is no further element of this effect which requires consideration for this phase.

Frequency of Impact

13.1.153 The frequency of occurrence in relation to commercial risk is considered **remote**.

Consequence of Impact

13.1.154 The severity of consequence in relation to commercial risk is considered **minor**.

Significance of the effect

13.1.155 **Table 13-22** summarises the resulting significance of the effect for each component of this impact in relation to navigational safety.

Table 13-22 Summary of shipping and navigation impact rankings for vessel displacement during operations and maintenance phase (navigational safety)

Component of impact	Frequency	Consequence	Significance of the effect
Vessel displacement	Reasonably Probable	Negligible	Broadly Acceptable
Increased third-party vessel to vessel collision risk	Reasonably Probable	Moderate	Tolerable
Grounding risk	Extremely Unlikely	Moderate	Broadly Acceptable

13.1.156 **Table 13-23** summarises the resulting significance of the effect for this impact in relation to commercial risk.

Table 13-23 Summary of shipping and navigation impact rankings for vessel displacement during operations and maintenance phase (commercial risk)

Component of impact	Frequency of occurrence	Severity of consequence	Significance of the effect
Grounding risk	Remote	Minor	Broadly Acceptable

13.1.157 Overall, it is predicted that the effect is of **Tolerable** significance (given that the worst case result is Tolerable for the increased third-party vessel to vessel collision risk component of the impact), which is **Not Significant** in EIA terms.

Third-party to project vessel collision risk

Qualification of the effect

13.1.158 Vessels associated with operation and maintenance activities may increase encounters and collision risk for other vessels already operating in the area.

13.1.159 Up to 869 return trips per year by operation and maintenance vessels may be made throughout the operation and maintenance phase, including RAM vessels. It is assumed that operation and maintenance vessels will be on-site throughout the operation and maintenance phase. It is noted that the movement of project vessels during the operation and maintenance phase represents a decrease in movements in comparison to the construction phase.

13.1.160 As with the equivalent construction phase impact, encounter and collision risk involving a project vessel will be well mitigated, including through marine coordination (C-88, **Table 13-14)** carriage of AIS and compliance with Flag State regulations by project vessels, and promulgation of information to fishing fleets via an appointed FLO (C-47, **Table 13-14**).

13.1.161 Furthermore, an application for safety zones of 500m radius will be sought during the operation and maintenance phase (C-56, **Table 13-14**). These will serve to protect project vessels engaged in major maintenance activities. Minimum advisory passing distances, as defined by risk assessment, may also be applied, with advanced warning and accurate locations of both safety zones and any minimum advisory safe passing distances provided by Notifications to Mariners and Kingfisher Bulletins (C-46 and C-85, **Table 13-14**).

13.1.162 As with the equivalent construction phase impact, third party vessels may experience restrictions on visually identifying project vessels entering and exiting the array area during reduced visibility, including within the structures exclusion zone located west of Rampion 1; however, this impact will be mitigated by the application of the COLREGs (reduced speeds) in adverse weather conditions and project vessels mandatorily will carry AIS regardless of size (C-88, **Table 13-14**). In the case of the structures exclusion zone located west of Rampion 1, designated entry and exit points to/from the array area for project vessels will be selected to ensure collision risk within the corridor is minimised.

13.1.163 As stated for the equivalent construction phase impact, based on historical incident data, there have been two instances of a third-party vessel colliding with a wind farm vessel in the UK. In both incidents moderate vessel damage was reported with no harm to persons. It is noted that the two incidents occurred in 2011 and 2012, respectively, and awareness of offshore wind developments and application of the measures outlined above has improved and been refined considerably in the interim, with no further collision incidents reported since.

13.1.164 As for the equivalent construction impact, RED will exhibit lights, marks, sounds, signals and other aids to navigation as required by Trinity House and MCA (C-84, **Table 13-14**), maximising mariner awareness when in proximity, both in day and night conditions including in poor visibility.

13.1.165 Should an encounter or collision occur between a third-party vessel and a project vessel, the consequences are expected to be the same as for the equivalent construction phase impact, with the most likely consequences being minor damage incurred and no injuries to persons. The worst-case consequences could include the foundering of one of the vessels resulting in a PLL and pollution, with the environmental effect of the latter minimised by the implementation of the MPCP (C-53, **Table 13-14**).

Frequency of occurrence

13.1.166 The frequency of occurrence in relation to increased third-party to project vessel collision risk is considered **extremely unlikely**.

Severity of consequence

13.1.167 The severity of consequence in relation to increased third-party to project vessel collision risk is considered **moderate**.

Significance of the effect

13.1.168 Overall, it is predicted that the effect is of **Broadly Acceptable** significance, which is **Not Significant** in EIA terms.

Creation of vessel to structure allision risk

13.1.169 The presence of structures in the offshore environment may increase the powered, drifting and internal allision risk for vessels.

13.1.170 The spatial extent of the impact is small given that a vessel must be in close proximity to a wind farm structure for an allision incident to occur. The forms of allision considered include:

- Powered allision risk;
- Drifting allision risk; and
- Internal allision risk.

13.1.171 Familiarity with offshore wind farms and navigating in their proximity will be high for vessels operating in proximity to the Proposed Development, primarily due to the existing presence of Rampion 1, but – in the case of the large volume of vessel traffic out of the Dover Strait TSS coming from North Sea ports – also due to the increasing number of offshore wind farms present in the North Sea across multiple states.

Powered allision risk

Qualification and quantification of the effect

13.1.172 With the main commercial route deviations associated with the presence of the Proposed Development in place, the base case annual powered vessel to structure allision frequency is estimated to be 2.17×10^{-3}, corresponding to a return period of approximately one in 460 years, as detailed in **Section 16** of **Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.4.13.1). This is a moderate to high return period compared to that estimated for other UK offshore wind farm developments and is reflective of the high volume of vessel traffic in the area, particularly within and out of the Dover Strait TSS and out of the Solent. The greatest powered vessel to structure allision risk was associated with structures at the western extent of the array area where multiple main commercial routes pass at the minimum mean distance from the array area (1nm) headed into the Solent. The greatest individual allision risk was

associated with the structure on the south-western edge of the array area (approximately 4.03×10^{-4} or one in 2,484 years). This aligns with UK Chamber of Shipping expectations during consultation.

13.1.173 Based on historical incident data, there have been two reported instances of a third-party vessel alliding with an operational wind farm structure in the UK (in the Irish Sea and Southern North Sea). Both of these incidents involved a fishing vessel, with an RNLI lifeboat attending on both occasions and a helicopter deployed in one case (further details are provided in **Section 9** of **Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.4.13.1). Given the navigational measures which exist in proximity to the Proposed Development (such as the Dover Strait TSS and approaches to the Solent) and subsequent heightened alertness, it is unlikely that such an incident will occur in relation to the Proposed Development.

13.1.174 Should an allision occur, the consequences will depend on multiple factors including the energy of the impact, structural integrity of the vessel and sea state at the time of the impact. Fishing vessels and recreational vessels are considered most vulnerable to the impact given the potential for a non-steel construction and possible internal navigation within the array by such vessels. In such cases, the most likely consequences will be minor damage with the vessel able to resume passage and undertake a full inspection at the next port. As an unlikely worst case, the vessel could be foundered resulting in a PLL and pollution. If pollution were to occur, then the MPCP will be implemented (C-53, **Table 13-14**) to minimise the environmental effect.

13.1.175 Additionally, commercial vessels are expected to comply with international and flag state regulations (including the COLREGs and SOLAS) and will be able to passage plan in advance given the promulgation of information relating to the Proposed Development (C-46 and C-85, **Table 13-14**).

13.1.176 The offshore substations carry increased powered allision risk and consequences due to their greater size and resistant force. However, the increase is not considered substantial and may be mitigated by the effective use of operational lighting and marking in accordance with requirements from Trinity House and MCA (C-84, **Table 13-14**). Moreover, the offshore substations will not be located on the perimeter of the array area (C-284) greatly reducing their exposure, including in relation to marine aggregate dredgers operating in the region.

13.1.177 With regard to the structures exclusion zone located west of Rampion 1 (serving as a navigation corridor), the MCA stated during consultation that under COLREGs traffic exiting the Dover Strait TSS to the Solent would give way to traffic exiting the navigation corridor, forcing a starboard turn towards the wind farm. However, it was noted by the MCA that the 4.7nm separation between the mean route position and the navigation corridor provides sufficient sea room such that there is no significant additional allision risk as a result of such a manoeuvre (see **Section 17** of **Appendix 13.1: Navigational Risk Assessment, Volume 4** (Document Reference: 6.4.13.1)). Specific lighting and marking requirements to minimise allision risk associated with routeing through the navigation corridor will be agreed post-consent with Trinity House, MCA and CAA as part of the lighting and marking sign-off process and the Proposed Development will ensure ongoing liaison with an FLO (C-47, **Table 13-14**).

Frequency of occurrence

13.1.178 The frequency of occurrence in relation to increased powered allision risk is considered **extremely unlikely**.

Severity of consequence

13.1.179 The severity of consequence in relation to increased powered allision risk is considered **moderate**.

Drifting allision risk

Qualification and quantification of the effect

13.1.180 With the main commercial route deviations associated with the presence of the Proposed Development in place, the base case annual drifting vessel to structure allision frequency is estimated to be 8.64×10^{-4}, corresponding to a return period of approximately one in 1,157 years, as detailed in **Section 16** of **Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.4.13.1). This is a moderate return period compared to that estimated for other UK offshore wind farm developments and is reflective of the high volume of vessel traffic in the area, particularly within and out of the Dover Strait TSS and out of the Solent. The greatest drifting vessel to structure allision risk is associated with structures at the western extent of the array area, where multiple main commercial routes pass at the minimum mean distance from the array area (1nm) headed into the Solent and on the flood tide may drift towards these structures. The greatest individual allision risk is associated with the structure on the south-western edge of the array area (approximately 1.79×10^{-4} or one in 5,580 years).

13.1.181 Based on historical incident data, there have been no instances of a third-party vessel alliding with an operational wind farm structure whilst Not Under Command (NUC). However, there is higher potential for a vessel to be adrift; this is reflected in the MAIB incident data reviewed in proximity to the Proposed Development which indicates that machinery failure is the most common incident type (approximately 29%).

13.1.182 A vessel adrift may only develop into an allision situation if in proximity to a wind farm structure. This is only the case where the adrift vessel is located internally within or in close proximity to the array (including within the structures exclusion zones) and the direction of the wind and/or tide directs the vessel towards a structure.

13.1.183 Given the high volume of traffic, the westbound lane of the Dover Strait TSS may be considered the most likely source for a drifting incident to originate. However, taking into account the distance to the array area (approximately 4.3nm from the end of the westbound lane of the TSS), it is very unlikely that the drifting incident (for a powered vessel) will develop into an allision situation since the vessel could potentially regain power prior to reaching the array or initiate its emergency response procedures to avoid an allision occurring should one develop. This may include an emergency anchoring event which would involve checking relevant nautical charts to ensure that deployment of the anchor will not lead to other effects (such as anchor snagging on a sub-sea cable) in line with emergency

procedures. It is noted that there are limited seabed features between routeing out of the westbound lane of the Dover Strait TSS and the array area.

13.1.184 During consultation, the RYA raised concerns regarding the likelihood of a recreational craft's ability to anchor during a drifting incident. However, while it is recognised that it may be unlikely for recreational craft to prevent a drifting allision by anchoring, the proposed structures exclusion zones will assist with facilitating SAR access in the event of such an incident. Furthermore, project vessels may be able to swiftly render assistance including under SOLAS obligations (IMO, 1974) and will be managed via marine coordination (C-88, **Table 13-14**).

13.1.185 Meteorological data suggest that prevailing north and north-westerly winds (which would be required to direct a vessel out of the Dover Strait TSS towards a structure) constitute only a minor proportion of winds in the area. CLdN – a regular operator in the Dover Strait TSS – noted the drifting risk from the Dover Strait TSS during consultation but acknowledged that the issue was no different from that at any existing offshore wind farm.

13.1.186 Another possible source for a drifting incident is a recreational vessel under sail in unfavourable weather conditions, particularly at the western extent of the proposed DCO Order Limits if sailing westwards into a prevailing south-westerly wind, a scenario highlighted by the RYA during consultation. The recreational vessel would have limited options in terms of emergency action if an allision situation were to develop. However, one option would be to lower the sails, hove to or deploying a drogue depending on the design of the vessel. Additionally, given the high level of emergency response resources in the region (including RNLI, SAR helicopter services, project vessels and third-party vessels), it is anticipated that the response time to assist the adrift vessel would be reasonable. This response time is also relevant to recreational vessels unable to anchor in the case of an emergency, including when navigating within the structures exclusion zone located south of Rampion 1.

13.1.187 Should an allision occur, the consequences will be similar to those noted for the case of a powered allision including the unlikely worst-case of foundering and pollution; in the highly unlikely scenario of a drifting allision incident resulting in pollution, the implementation of the MPCP (C-53, **Table 13-14**) will minimise the environmental effects. Additionally, a drifting vessel is likely to transit at a reduced speed compared to a powered vessel, thus reducing the energy of the impact, including in the case of a recreational vessel under sail.

13.1.188 The offshore substations again carry increased allision risk and consequences due to their greater size and resistant force, although this may again be mitigated by effective use of operational lighting and marking in accordance with requirements from Trinity House and MCA. During consultation, Tarmac Marine indicated that the offshore substations posed a particular concern in relation to drifting allision risk when sited on the perimeter of the array (at PEIR); however, the worst-case layout for the DCO Application places the offshore substations at internal locations, mitigating this concern.

Frequency of occurrence

13.1.189 The frequency of occurrence in relation to increased drifting allision risk is considered **extremely unlikely**.

Severity of consequence

13.1.190 The severity of consequence in relation to increased drifting allision risk is considered **moderate**.

Internal allision risk

Qualification and quantification of the effect

13.1.191 As noted previously, based on experience at existing operational offshore wind farms (including at Rampion 1), it is anticipated that:

- Commercial vessels will choose not to navigate internally within the array;
- Fishing vessels may choose to navigate internally within the array, particularly in summer months;
- Recreational vessels are unlikely to choose to navigate internally within the array area.

13.1.192 Therefore, the likelihood of an internal allision involving a commercial vessel is anticipated to be negligible.

13.1.193 The base case annual fishing vessel to structure allision frequency is estimated to be 5.01×10^{-1}, corresponding to a return period of approximately one in 2.0 years, as detailed in **Section 16** of **Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.4.13.1). This is a high return period compared to that estimated for other UK offshore wind farm developments and is reflective of the high volume of fishing vessel traffic in the area, both in transit and engaged in fishing activities. The greatest fishing vessel to structure allision risk was associated with structures at the eastern extent of the array area where active fishing activity was observed and west of Rampion 1 where fishing vessels regularly transit north-east to south-west out of Shoreham. The greatest individual allision risk was associated with one of the structures on the eastern edge of the array area (approximately 3.37×10^{-2} or one in 30 years).

13.1.194 The minimum spacing between structures of 830m is considered sufficient for safe internal navigation, keeping clear of the wind farm structures. It is noted that this spacing is greater than that associated with many other offshore wind farms in the UK located near the coast and is slightly greater than the minimum spacing at Rampion 1 where evidence suggests that fishing vessels are comfortable operating internally in favourable conditions. A layout plan will be agreed with the MMO following appropriate consultation with Trinity House and the MCA (C-86, **Table 13-14**).

13.1.195 As with any passage, any vessel navigating within the array is expected to passage plan in accordance with SOLAS Chapter V (IMO, 1974) and promulgation of information (C-46 and C-85, **Table 13-14**) including through ongoing liaison with fishing fleets via an appointed FLO (C-47, **Table 13-14**) will ensure that such

vessels have good awareness of any maintenance works being undertaken. This includes the placement of safety zones of 500m radius which will be applied for around major maintenance activities (C-56, **Table 13-14**) which itself will assist safe navigation internally within the array by guiding vessels on a safe passing distance.

13.1.196 RED will exhibit lights, marks, sounds, signals and other aids to navigation as required by Trinity House, MCA and CAA (C-84, **Table 13-14**). This will include unique identification marking of each wind farm structure in an easily understandable pattern to minimise the likelihood of a mariner navigating internally within the array becoming disoriented.

13.1.197 Should a recreational vessel under sail enter the proximity of a WTG, there is also potential for effects such as wind shear, masking and turbulence to occur. From previous studies of offshore wind developments, it has been concluded that WTGs do reduce wind velocity downwind of a WTG (MCA, 2008) but that no negative effects on recreational craft have been reported on the basis of the limited spatial extent of the effect and its similarity to that experienced when passing a large vessel or close to other large structures (such as bridges) or the coastline. In addition, no practical issues have been raised by recreational users to date when operating in proximity to existing offshore wind developments including at Rampion 1.

13.1.198 For recreational vessels with a mast there is an additional allision risk when navigating internally within the array associated with the WTG blades. However, the minimum blade tip clearance is 22m above MHWS (C-89, **Table 13-14**) which is aligned with the minimum clearance the RYA recommend for minimising allision risk (RYA, 2019) and which is also noted in MGN 654 (C-87, **Table 13-14**).

Frequency of occurrence

13.1.199 The frequency of occurrence in relation to increased internal allision risk is considered to be **remote**.

Severity of consequence

13.1.200 The severity of consequence in relation to internal allision risk is considered to be **moderate**.

Significance of the effect

13.1.201 **Table 13-24** summarises the resulting significance of the residual effect for each component of this impact.

Table 13-24 Summary of shipping and navigation impact rankings for allision risk during operation and maintenance phase (navigational safety)

Component of impact	Frequency	Consequence	Significance of the residual effect
Powered allision risk	Extremely Unlikely	Moderate	Broadly Acceptable
Drifting allision risk	Extremely Unlikely	Moderate	Broadly Acceptable
Internal allision risk	Remote	Moderate	Tolerable

13.1.202 Overall, it is predicted that the effect is of **Tolerable** significance (given that the worst case result is Tolerable for the internal allision risk component of the impact), which is **Not Significant** in EIA terms.

Reduced access to local ports and harbours

13.1.203 The presence of structures in the offshore environment may displace existing routes / activity restricting access to ports/harbours and prevent use of existing aids to navigation.

13.1.204 To ensure the impact is assessed in as much detail as possible overall, a number of ports and harbours in the area are considered individually, taking account of the vessel traffic movements associated with these ports, based on vessel traffic data and consultation feedback.

13.1.205 As per the equivalent impact for the construction phase, the ports / harbours and elements considered include:

- Shoreham Port;
- Port of Newhaven;
- Brighton Marina;
- Littlehampton Harbour;
- ports within the Solent;
- prevention of use of aids to navigation not associated with the above ports/harbours; and
- commercial risk for Shoreham Port and Littlehampton Harbour.

Shoreham Port

13.1.206 Since the main route deviations established for the construction phase also apply to the operation and maintenance phase, the impact is considered broadly similar for commercial vessels. In particular, routes used by marine aggregate dredgers

are unlikely to be disrupted, noting that the level of deviation for such routes is low (see the vessel displacement impact).

13.1.207 Unlike during the construction phase, fishing vessels are anticipated to transit internally within the array, particularly during the summer months, based on experience at Rampion 1. Therefore, access to Shoreham Port for fishing vessels is unlikely to be compromised for the operation and maintenance phase during the summer months, although may be analogous with the level of displacement anticipated for the construction phase during the winter months, depending on the spacing between structures in the final array layout. Active commercial fishing is assessed separately in **Chapter 10: Commercial fisheries, Volume 2** of the ES (Document Reference: 6.2.10) where consultation on spacing between structures is considered post PEIR.

13.1.208 Additionally, the structures exclusion zone located west of Rampion 1 (serving as a navigation corridor) provides an alternative option for access to/from Shoreham Port for commercial vessels and fishing vessels (particularly in the winter months). During consultation, Shoreham Port Authority indicated that should the navigation corridor be of suitable width, traffic to/from Shoreham Port may use the navigation corridor, noting that vessels will take the safest option in adverse weather conditions.

13.1.209 Recreational vessel activity is mostly confined to the nearshore area and the summer period, and so disruption to recreational vessel movements out of Shoreham Port are not expected to be notable.

13.1.210 As per the equivalent construction phase impact, the pilot boarding station for Shoreham Port is located far enough away from the array area that the presence of the Proposed Development is not anticipated to have any impact on access to pilotage services, noting that no effect has been reported due to the presence of Rampion 1.

13.1.211 Similarly, the leading line for Shoreham Port ends approximately 7.0nm north of the array area and so the presence of the Proposed Development is not anticipated to encumber use of the leading lights (with 10nm nominal range) for the port for aiding approaches. Again, no issue has been raised regarding this matter due to the presence of Rampion 1.

Frequency of occurrence

13.10.1 The frequency of occurrence for Shoreham Port in relation to navigational safety is considered to be **remote**.

Severity of consequence

13.10.2 The severity of consequence for Shoreham Port in relation to navigational safety is considered to be **minor**.

Port of Newhaven

13.1.212 As discussed for the equivalent construction phase impact, the passenger ferry service operated by DFDS Seaways out of the Port of Newhaven is not anticipated to be disrupted given that the route heads south-east out of the Port of Newhaven

and crosses the Dover Strait TSS, staying well clear of the array area. Other commercial activity at Newhaven is limited.

13.1.213 Disruption to fishing and recreational users operating nearshore at the Port of Newhaven is again not anticipated to be substantial when considering the distance to the array area and the marine coordination that will be implemented for project vessels. Additionally, since the volume of project vessel movements will be lower during the operation and maintenance phase, the impact is less frequent than that considered in the equivalent impact for the construction phase.

13.1.214 Likewise, disruption to recreational traffic which transits east-west out of the Port of Newhaven and crosses the offshore export cable corridor will be lower given that maintenance activities will be limited to surveys and remedial burial and repairs where required. This activity will be present throughout the operation and maintenance phase although the interval between surveys may increase over time as cables are proven to be stable.

13.1.215 As per the equivalent construction phase impact, the pilot boarding station for the Port of Newhaven is located far enough away from the array area that the presence of the Proposed Development is not anticipated to affect access to pilotage services.

13.1.216 There are no existing aids to navigation relating to the Port of Newhaven which may be encumbered by the presence of the Proposed Development.

Frequency of occurrence

13.10.3 The frequency of occurrence for Port of Newhaven in relation to navigational safety is considered **remote**.

Severity of consequence

13.10.4 The severity of consequence for Port of Newhaven in relation to navigational safety is considered to be **negligible**.

Brighton Marina

13.1.217 Disruption to recreational users operating nearshore at Brighton Marina is again not anticipated to be substantial when considering the distance to the array area and the marine coordination that will be implemented for project vessels. Additionally, since the volume of project vessel movements will be lower during the operation and maintenance phase, the impact is less frequent than that considered in the equivalent impact for the construction phase.

13.1.218 Likewise, disruption to recreational traffic which transits east-west out of the Port of Newhaven and crosses the offshore export cable corridor will be lower given that maintenance activities will be limited to surveys and remedial burial and repairs where required. This activity will be present throughout the operation and maintenance phase although the interval between surveys may increase over time as cables are proven to be stable.

13.1.219 Recreational vessels undertaking visits to Rampion 1 are again unlikely to face any additional challenges to port access, noting again the marine coordination that will be implemented for project vessels.

13.1.220 There are no existing aids to navigation relating to Brighton Marina which may be encumbered by the presence of the Proposed Development.

Frequency of occurrence

13.1.221 The frequency of occurrence for Brighton Marina in relation to navigational safety is considered to be **extremely unlikely**.

Severity of consequence

13.1.222 The severity of consequence for Brighton Marina in relation to navigational safety is considered to be **negligible**.

Littlehampton Harbour

13.1.223 Since the main route deviations established for the construction phase also apply to the operation and maintenance phase, the impact is considered broadly similar for commercial vessels. In particular, the route used by three small coasters into Littlehampton from the Dover Strait TSS may be compromised, as assessed as part of vessel displacement. However, the navigation corridor provides an alternative option for access to/from Littlehampton and during consultation Littlehampton Harbour Board stated that it would benefit fishing and recreational vessels out of Littlehampton Harbour as well as the low volume commercial activity.

13.1.224 Access to the harbour itself should be mitigated by the implementation of marine coordination for project vessels (C-88, **Table 13-14**) including the application of traffic management procedures such as the designation of routes to and from port.

13.1.225 Disruption to the port and pilotage services due to maintenance activities relating to the offshore export cable corridor will be lower given that maintenance activities will be limited to surveys and remedial burial and repairs where required. This activity will be present throughout the operation and maintenance phase although the interval between surveys may increase over time as cables are proven to be stable.

13.1.226 The leading line for Littlehampton Harbour ends approximately 4.0nm north of the array area and so the presence of the Proposed Development is not anticipated to encumber use of the leading lights (with 10nm nominal range) for the port for aiding approaches. It is noted that, as an unlikely worst case for vessel displacement, the post wind farm deviation for the small coaster route discussed above (Route 17) still aligns with the leading line on approach to Littlehampton Harbour despite this incurring a greater transit distance. Leading line alignment would also be maintained should these vessels utilise the navigation corridor.

13.1.227 There are several racing marks used by the Arun Yacht Club located in proximity to Littlehampton Harbour, two of which are located within the offshore export cable corridor. However, noting the distance of the array area from such aids to navigation and the limited maintenance activities which will be undertaken within

the offshore export cable corridor as outlined above, this is not anticipated to affect the use of these aids to navigation.

Frequency of occurrence

13.1.228 The frequency of occurrence for Littlehampton Harbour in relation to navigational safety is considered to be **extremely unlikely**.

Severity of consequence

13.1.229 The severity of consequence for Littlehampton Harbour in relation to navigational safety are considered to be **moderate**.

Ports in the Solent

13.1.230 As per the equivalent construction phase impact, given the distance from the proposed DCO Order Limits, it is not anticipated that on-site maintenance activities will have any substantial effect on port access and likewise use of numerous navigational features associated with access to the Solent (including pilot boarding stations, designated anchorage areas and the NAB Deep Water Channel) will not be encumbered by the presence of the Proposed Development. This includes the St Helen's Road Anchorage located off the Isle of Wight which was raised as a possible concern by the UK Chamber of Shipping during consultation.

13.1.231 Additionally, the NAB Tower (located adjacent to some of the pilot boarding stations and the NAB Deep Water Channel approximately 12nm west of the array area) with a nominal range of 12nm is located a sufficient distance from the array area that the presence of structures will not encumber use of this navigational aid by vessels approaching the Solent.

Frequency of occurrence

13.1.232 The frequency of occurrence for ports in the Solent in relation to navigational safety is considered to be **frequent**.

Severity of consequence

13.1.233 The severity of consequence for ports in the Solent in relation to navigational safety is considered to be **negligible**.

Prevention of use of other aids to navigation

13.1.234 Although many aids to navigation in the area are directly linked to local ports (as discussed for the relevant ports above), there are other aids to navigation in the area which are not directly linked to local ports.

13.1.235 These include at Rampion 1 where SPS are equipped with flashing yellow lights with a nominal range of 5nm. There are also two special marks where the Rampion 1 site has a concave shape. The presence of the Proposed Development will prevent the use of those Rampion 1 aids to navigation which are on the southern periphery. However, RED will also exhibit lights, marks, sounds, signals and other aids to navigation as required by Trinity House, MCA and CAA (C-84,

Table 13-14), thus ensuring that the purpose of the aids to navigation at Rampion 1 – to assist vessels with safe navigation in proximity to an offshore wind farm – is maintained. It is noted that the aids to navigation associated with Rampion 1 may be reviewed in consultation with Trinity House following the installation of the Proposed Development, including the potential removal of the southern special mark.

13.1.236 The previously mentioned Owers Light Buoy may be partially obscured to vessels approaching from the Dover Strait TSS with the intention of navigating around the array area. However, with suitable passage planning mariners should be aware of the shallows of the Owers Bank that it highlights and have a high level of awareness navigating in an area with shallow waters. The presence of the SPSs will also guide mariners around the array until they visually acquire the Owers Light Buoy, noting that the structures exclusion zone located west of Rampion 1 (serving as a navigation corridor) may limit the likelihood of vessels taking this course.

13.1.237 Another buoy in proximity to the array area is the CS1 light buoy, a special mark indicating the end of the Dover Strait TSS. However, noting the direction from which vessels making passage in proximity to this buoy transit and its distance from the array area (approximately 4.9nm), no effect on its use is anticipated.

Frequency of occurrence

13.1.238 The frequency of occurrence for all vessels in relation to use of existing aids to navigation is considered to be **negligible**.

Severity of consequence

13.1.239 The severity of consequence for all vessels in relation to use of existing aids to navigation are considered to be **minor**.

Commercial risk

13.1.240 The commercial risk posed during the operation and maintenance phase by the presence of the Proposed Development is largely aligned with the equivalent construction phase impact, noting that during the operation and maintenance phase, the navigation corridor located west of Rampion 1 will not be affected by potential construction buoyage deployment.

Shoreham Port

13.1.241 As outlined for the equivalent construction phase impact, no increase in route length is anticipated for vessels routeing between the Dover Strait TSS and Shoreham Port. Subsequently, the attractiveness of Shoreham as a commercial port is not likely to be affected.

13.1.242 Additionally, the inclusion of the navigation corridor between Rampion 1 and Rampion 2 may offer vessels routeing between the Dover Strait TSS and Shoreham Port an alternative option to passing east of the proposed DCO Order Limits, particularly for fishing vessels and cross-channel recreational vessels.

Frequency of impact

13.1.243 The frequency of the impact for Shoreham Port in relation to commercial risk is considered to be **extremely unlikely**.

Consequence of impact

13.1.244 The consequences of the impact for Shoreham Port in relation to commercial risk are considered to be **negligible**.

Littlehampton Harbour

13.1.245 It is anticipated that vessels routeing between the Dover Strait TSS and Littlehampton may pass west of the proposed DCO Order Limits, with an increased route length of approximately 12.5nm as a worst case. However, vessels using this route are typically smaller commercial cargo vessels and there is potential that, depending upon the final array layout, these vessels may choose to navigate through the array area including use of the navigation corridor between Rampion 1 and Rampion 2. Littlehampton Harbour Board indicated during consultation that the corridor would offer benefits to local users.

Frequency of impact

13.1.246 The frequency of the impact for Littlehampton Harbour in relation to commercial risk is considered to be **extremely unlikely**.

Consequence of impact

13.1.247 The consequences of the impact for Littlehampton Harbour in relation to commercial risk are considered to be **negligible**.

Significance of the residual effect

13.1.248 **Table 13-25** summarises the resulting significance of the residual effect for each receptor in relation to navigational safety.

Table 13-25 Summary of shipping and navigation impact rankings for reduced access to local ports and harbours during operations and maintenance phase (navigational safety)

Receptor	Frequency	Consequence	Significance of the residual effect
Shoreham Port	Remote	Minor	Broadly Acceptable
Port of Newhaven	Remote	Negligible	Broadly Acceptable
Brighton Marina	Extremely Unlikely	Negligible	Broadly Acceptable
Littlehampton Harbour	Extremely Unlikely	Moderate	Broadly Acceptable
Ports in the Solent	Frequent	Negligible	Tolerable

Receptor	Frequency	Consequence	Significance of the residual effect
All vessels (use of existing aids to navigation)	Negligible	Minor	Broadly Acceptable

13.1.249 **Table 13-26** summarises the resulting significance of the residual effect for each receptor in relation to commercial risk.

Table 13-26 Summary of shipping and navigation impact rankings for reduced access to local ports and harbours during operations and maintenance phase (commercial risk)

Receptor	Frequency	Consequence	Significance of the residual effect
Shoreham Port	Extremely Unlikely	Negligible	Broadly Acceptable
Littlehampton Harbour	Extremely Unlikely	Negligible	Broadly Acceptable

13.1.250 Overall, it is predicted that the effect is of **Tolerable** significance (given that the worst case result is Tolerable for the ports in the Solent component of the navigational safety impact), which is **Not Significant** in EIA terms.

Changes in under keel clearance

13.1.251 The presence of sub-sea cable protection in the offshore environment may reduce charted water depths leading to increased risk of under keel interaction for passing vessels.

13.1.252 This impact was highlighted by the RYA during consultation, noting that disruption to the seabed from construction methods could create coastal navigation problems.

13.1.253 For the array and offshore interconnector cables the target burial depth is 1.0m and for the export cables the target burial depth is between 1.0 and 1.5m (C-41, C-96 **Table 13-14**). Seabed burial will be the primary means of cable protection and the burial depth of any external cable protection will be determined by the cable burial risk assessment (C-45, **Table 13-14**).

13.1.254 It is acknowledged that array cables may be located within the structures exclusion zones; however, these will be subject to the same determination of cable protection type and burial depth as detailed above.

13.1.255 Where cable burial is not possible, alternative cable protection methods may be deployed which will again be determined within the cable burial risk assessment. It is noted that there are no cable crossings anticipated for the export cables and up

to four cable crossings anticipated for the array cables. RED intend to follow the guidance contained in MGN 654 in relation to cable protection (C-83, **Table 13-14**), namely cable protection will not change the charted water depth by more than 5%, including where cable crossings occur. This aligns with the RYA's recommendation that the "*minimum safe under keel clearance over submerged structures and associated infrastructure should be determined in accordance with the methodology set out in MGN 543 [since superseded by MGN 654]*" (RYA, 2019). With this guidance adhered to, the likelihood of an underwater allision is considered very low.

13.1.256 Should this percentage be exceeded, further assessment including consultation with the MCA and Trinity House may be required to determine whether any additional mitigation measures are necessary to ensure the safety of navigation.

13.1.257 Should an underwater allision occur, the consequences are akin to those identified for a grounding incident, with grounding considered one such possible outcome. Minor damage incurred is the most likely consequence, and foundering of the vessel resulting in a PLL and pollution the unlikely worst-case consequences, with the environmental effect of the latter minimised by the implementation of the MPCP (C-53, **Table 13-14**).

Frequency of occurrence

13.1.258 The frequency of occurrence in relation to changes in under keel clearance is considered **negligible**.

Severity of consequence

13.1.259 The severity of consequence in relation to changes in under keel clearance is considered **moderate**.

Significance of the residual effect

13.10.5 Overall, it is predicted that the effect is of **Broadly Acceptable** significance, which is **Not Significant** in EIA terms.

Increased interaction with sub-sea cables

Qualification of the effect

13.1.260 The presence of export cables, array cables and interconnector cables in the offshore environment may increase the potential for interaction with sub-sea cables.

13.1.261 The spatial extent of the impact is small given that a vessel must be in close proximity to an export cable, array cable or interconnector cable for an interaction to occur, although a vessel could be present for a reasonable duration, with Littlehampton Harbour Board noting during consultation that vessels may spend anywhere between six hours and two days at anchor in the approaches to their harbour.

13.1.262 Additionally, marine aggregate dredging representatives noted during consultation that marine aggregate dredgers will likely operate in proximity to the offshore export cable corridor for extended periods, and should a marine aggregate dredger drift on the ebb tide this could lead to the vessel being directly over the export cables. Moreover, should a marine aggregate dredger anchor over the export cables then it is likely that the anchor will penetrate through 1.5m of seabed.

13.1.263 There are three anchoring scenarios which are considered for this impact:

- planned anchoring – most likely as a vessel awaits a berth to enter port but may also result from adverse weather conditions, machinery failure or sub-sea operations;
- unplanned anchoring – generally resulting from an emergency situation where the vessel has experienced steering failure; and
- anchor dragging – caused by anchor failure.

13.1.264 Although the second of these scenarios may involve limited decision-making time if drifting towards a hazard, in all three scenarios it is anticipated that the charting of infrastructure including the sub-sea cables will inform the decision to anchor, as per Regulation 34 of SOLAS (IMO, 1974).

13.1.265 From the vessel traffic survey data, an average of two anchored vessels were identified per day. The closest anchoring activity to the proposed DCO Order Limits was a cargo vessel approximately 0.25nm west of the offshore export cable corridor. Generally, the majority of anchoring activity was associated with designated anchorages at nearby ports and harbours including Shoreham Port, the Port of Newhaven, and within the Solent, with the closest such designated anchorage area located approximately 7.4nm from the array area. Only one anchored vessel was recorded in proximity to Littlehampton Harbour where the export cables make landfall.

13.1.266 The primary concern noted by Littlehampton Harbour Board during consultation was that of cable burial and anchoring vessels in proximity to the export cables potentially requiring anchorage relocation. This concern will be investigated further within the cable burial risk assessment undertaken post consent (C-45, **Table 13-14**).

13.1.267 The likelihood of anchor interaction with a sub-sea cable is further minimised by the burial of the cables and use of external cable protection where required, which will be informed by the cable burial risk assessment and detailed within the Cable Specification and Installation Plan (C-41, C-96 and C-45, **Table 13-14**). The target burial depth of between 1.0 and 1.5m for the export cables may be insufficient based on consultation feedback from marine aggregate dredgers and this will be further considered in the cable burial risk assessment.

13.1.268 It is acknowledged that array cables may be located within the structures exclusion zones. As per the description of anchoring activity above, no anchoring activity was observed within the structures exclusion zones; therefore, it is assumed that anchoring would occur only in the unlikely event of an emergency (see **Section 17** of **Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.4.13)).

13.1.269 Should an anchor interaction incident occur, the most likely consequences will be low based on historical anchor interaction incidents, with no damage incurred to the cable or the vessel. As an unlikely worst case, a snagging incident could occur and the vessel's anchor and/or the cable could be damaged; however, with the mitigation measures above in place, this risk will be minimised. For commercial fishing vessels the consequences may also include compromised stability of the vessel.

Frequency of occurrence

13.1.270 The frequency of occurrence in relation to increased interaction with sub-sea cables is considered **negligible**.

Severity of consequence

13.1.271 The severity of consequence in relation to increased interaction with sub-sea cables is considered **minor**.

Significance of the residual effect

13.1.272 Overall, it is predicted that the effect is of **Broadly Acceptable** significance, which is **Not Significant** in EIA terms.

Reduction of emergency response provision including SAR capability

13.1.273 The presence of structures in the offshore environment including increased vessel activity and personnel numbers may reduce emergency response capability by increasing the number of incidents, increasing consequences or reducing access for the responders.

13.1.274 Given the distances that may be covered by air-based SAR support (the SAR helicopter base at Lee-on-Solent is located approximately 24nm from the proposed DCO Order Limits), the spatial extent of this impact is considered reasonably large. Additionally, the array area covers approximately 47 square nautical miles (nm^2) which represents a moderate area to search compared to other offshore wind farms. However, it is unlikely that a SAR operation will require the entire array area to be searched; it is much more likely that a search could be restricted to a smaller area within which a casualty is known to be located (inclusive of any assumptions on the drift of the casualty).

13.1.275 Up to 869 return trips per year by operation and maintenance vessels may be made throughout the operation and maintenance phase. It is assumed that operation and maintenance vessels will be on-site throughout the operation and maintenance phase. The presence of such vessels will increase the likelihood of an incident and subsequently increase the likelihood of multiple incidents occurring simultaneously, diminishing emergency response capability. As an unlikely worst case, the consequences of such a situation could include a failure of emergency response to an incident, resulting in a PLL and pollution.

13.1.276 However, with project vessels to be managed through marine coordination (C-88, **Table 13-14**) and compliant with Flag State regulations, the likelihood of an incident is minimised. Additionally, should an incident occur, project vessels will be

well equipped to assist, either through self-help capability or – for an incident involving a nearby third-party vessel – through SOLAS obligations (IMO, 1974), all in liaison with the MCA. This is reflected in past experience, with 12 known instances of a vessel (or persons on a vessel) being assisted by an industry vessel from a nearby UK offshore wind farm. The MPCP (C-53, **Table 13-14**) will also be implemented to minimise the environmental effect of any incident involving pollution.

13.1.277 From recent SAR helicopter taskings data, the frequency of SAR operations in proximity to the Proposed Development is moderate to high, reflecting the MCA's stance during consultation that in this general area SAR access is particularly important. However, only a small proportion of SAR helicopter incidents occurred within the proposed DCO Order Limits and the majority occurred inshore of the array area, and therefore any emergency response will not be directly obstructed by the presence of the Proposed Development. This pattern is replicated by MAIB and RNLI incident data. The frequency of SAR operations in proximity to the Proposed Development is not anticipated to change markedly from the current level given the measures noted above which will be in place.

13.1.278 As noted previously, the number of reported collision or allision incidents associated with UK offshore wind farms is low, with only 13 reported to date, corresponding to an average of one incident per 1,570 operational WTG years (as of September 2022). Although this data covers only collisions and allisions, it is nevertheless not anticipated that the presence of the Proposed Development will result in any substantial increase in the need for SAR operations.

13.1.279 In terms of SAR access, the minimum spacing between structures at the Proposed Development (830m) is greater than that at Rampion 1 (750m), noting that the MCA stated during consultation that the Rampion 1 array layout is considered a good layout for SAR access. Moreover, no SAR access issues have been reported at Rampion 1 (noting that Rampion 1 was fully commissioned in April 2018). Therefore, SAR assets (both marine and air based) will have the ability to access the array for SAR purposes in the event of an incident occurring within the array and have a high probability of detection when searching for a casualty.

13.1.280 Additionally, the two structures exclusion zones serve as HRAs, providing a break between the differing spacing (and potentially orientation) of structures across Rampion 1 and Rampion 2. This will facilitate the transition between Rampion 1 and Rampion 2 for SAR assets, noting that both HRAs are compliant with MGN 654 (minimum 1nm width measured tip-to-tip). It is noted that the final array layout (which will include the HRAs) will be agreed with the MCA and Trinity House post consent as required under the draft DCO with discussions to include SAR (C-86, **Table 13-14**).

13.1.281 Additionally, an ERCoP will be submitted to the MCA in line with the requirements of MGN 654 (MCA, 2021) (C-87, **Table 13-14**).

Frequency of occurrence

13.1.282 The frequency of occurrence in relation to reduction of emergency response provision is considered **extremely unlikely**.

Severity of consequence

13.1.283 The severity of consequence in relation to reduction of emergency response provision is considered **minor**.

Significance of the residual effect

13.1.284 Overall, it is predicted that the effect is of **Broadly Acceptable** significance, which is **Not Significant** in EIA terms.

13.11 Assessment of effects: Decommissioning phase

Displacement of vessels

13.11.1 Decommissioning activities associated with the removal of structures and cables may displace existing routes / activity, increase grounding risk and increase encounters and collision risk with other third-party vessels.

13.1.285 Since the methods used to remove structures and sub-sea cables are expected to be similar to those used to install them, this impact is expected to be similar in nature to the equivalent construction phase impact. It is noted that in the case of sub-sea cables it is expected that they will be left in situ, but for the purposes of this assessment (as an unlikely worst-case) it has been assumed that all sub-sea cables will be removed during decommissioning.

13.1.286 The use of a buoyed decommissioning area analogous to the buoyed construction area is assumed and will result in similar main route deviations to those established for the equivalent construction phase impact.

Significance of the residual effect

13.1.287 Therefore, the frequency of occurrence and severity of consequence of the impact in relation to all navigational safety elements (vessel displacement, adverse weather routeing, encounters and collision risk and grounding risk) are considered to be equivalent to that determined for the equivalent construction phase impact, as summarised in **Table 13-18**.

13.1.288 Likewise, the frequency of occurrence and severity of consequence of the impact in relation to commercial risk is considered equivalent to that determined for the equivalent construction phase impact, as summarised in **Table 13-19**.

13.1.289 Overall, it is predicted that the effect is of **Tolerable** significance, which is **Not Significant** in EIA terms.

Third-party to project vessel collision risk

Qualification or the effect

13.1.290 Vessels associated with decommissioning activities may increase encounters and collision risk for other vessels already operating in the area.

13.1.291 Since the methods used to remove structures and sub-sea cables are expected to be similar to those used to install them, including the vessels involved, this impact is expected to be similar in nature to the equivalent construction phase impact, including the number of return trips by decommissioning vessels. It is noted that in the case of sub-sea cables it is expected that they will be left in situ but for the purposes of this assessment (as an unlikely worst-case) it has been assumed that all cables will be removed during decommissioning.

13.1.292 The use of a buoyed decommissioning area analogous to the buoyed construction area is assumed and will result in similar main route deviations to those established for the equivalent construction phase impact.

Frequency of occurrence

13.1.293 The frequency of occurrence in relation to third-party to project vessel collision risk is considered **extremely unlikely**.

Severity of consequence

13.1.294 The severity of consequence is considered **moderate**.

Significance of the residual effect

13.1.295 Overall, it is predicted that the effect is of **Broadly Acceptable** significance, which is **Not Significant** in EIA terms.

Reduced access to local ports and harbours

13.1.296 Decommissioning activities associated with the removal of structures and cables may displace existing routes/activity restricting access to ports/harbours.

13.1.297 Since the methods used to remove structures and sub-sea cables are expected to be similar to those used to install them, this impact is expected to be similar in nature to the equivalent construction phase impact, including the number of return trips by decommissioning vessels. It is noted that in the case of sub-sea cables it is expected that they will be left in situ but for the purposes of this assessment (as a worst-case) it has been assumed that all cables will be removed during decommissioning.

13.1.298 As with the construction phase, it is not yet known from which port(s) decommissioning activity will be based for the Proposed Development.

Significance of the residual effect

13.1.299 Therefore, the frequency of occurrence and severity of consequence of the impact in relation to all navigational safety elements (Shoreham Port, Port of Newhaven, Brighton Marina, Littlehampton Harbour and ports within the Solent) are considered to be equivalent to that determined for the equivalent construction phase impact, as summarised in **Table 13-22**.

13.1.300 Likewise, the frequency of occurrence and severity of consequence of the impact in relation to commercial risk is considered equivalent to that determined for the equivalent construction phase impact, as summarised in **Table 13-23**.

13.1.301 Overall, it is predicted that the effect is of **Tolerable** significance, which is **Not Significant** in EIA terms.

13.12 Assessment of cumulative effects

Approach

13.1.302 A CEA examines the combined impacts of Rampion 2 in combination with other developments on the same single receptor or resource and the contribution of Rampion 2 to those impacts. The overall method followed in identifying and assessing potential cumulative effects in relation to the offshore environment is set out in **Chapter 5: Approach to the EIA, Volume 2** of the ES (Document Reference: 6.2.5).

13.12.1 The offshore screening approach is based on Planning Inspectorate's Advice Note Nine (Planning Inspectorate, 2018) and Advice Note Seventeen (Planning Inspectorate, 2019), with relevant components of the RenewableUK (RenewableUK, 2014) accepted guidance, which includes aspects specific to the marine elements of an offshore wind farm, addressing the need to consider mobile wide-ranging species (foraging species, migratory routes etc).

13.12.2 For shipping and navigation, no Zone of Influence (ZOI) of the proposed DCO Order Limits has been applied for the CEA to ensure direct and indirect cumulative effects can be appropriately identified and assessed. Instead, other developments are considered on a case-by-case basis, with other developments up to 60nm from the proposed DCO Order Limits considered (but their inclusion in the CEA determined based on a number of criteria as outlined in **Section 14** of **Appendix 13.1: Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.4.13.1).

Cumulative effects assessment

13.12.3 A short list of 'other developments' that may interact with the Rampion 2 ZOIs during their construction, operation or decommissioning is presented in **Appendix 5.4: Cumulative effects assessment shortlisted developments, Volume 4** of the ES (Document Reference: 6.4.5.4) and on **Figure 5.4.1, Volume 3** of the ES (Document Reference: 6.4.5.4). This list has been generated applying criteria set out in **Chapter 5: Approach to the EIA, Volume 2** of the ES (Document Reference: 6.2.5) and has been collated up to the finalisation of the ES through desk study, consultation and engagement.

13.12.4 Only those 'other developments' in the short list that fall within particular distances of the proposed DCO Order Limits have the potential to result in cumulative effects with the Proposed Development on shipping and navigation. All 'other developments' greater than 60nm from the proposed DCO Order Limits are

excluded from this assessment. The types of 'other development' and distance within which considered[9] are:

- Offshore wind farms and tidal energy – up to 60nm;
- Oil and gas infrastructure – up to 10nm; and
- Marine aggregate dredging areas – up to 30nm.

13.12.5 On the basis of the above, no 'other developments' contained within the short list in **Appendix 5.4: Cumulative effects assessment shortlisted developments, Volume 4,** of the ES (Document Reference: 6.4.5.4) are scoped into this CEA. This is either due to the distance from the proposed DCO Order Limits or limited interaction with traffic which may be displaced by the array area. For those 'other developments' located within 60nm of the proposed DCO Order Limits, a justification for the scoping out of the CEA is provided in **Table 13-27**.

Table 13-27 Justification for scoping out 'other developments' within 60nm of proposed DCO Order Limits from CEA

'Other development'	Description of development	Distance to proposed DCO Order Limits (nm)	Justification for scoping out of CEA
Rampion 1	Offshore wind farm	0	Operational and therefore part of the baseline assessment.
Contentin-Centre Manche	Offshore wind farm	35	Area of search with low data confidence and routeing impacted by the array area does not pass in proximity.
Dieppe – Le Tréport	Offshore wind farm	<50	Consented but routeing impacted by the array area does not pass in proximity. Additionally, the main commercial route between the Port of Newhaven and Dieppe (located at the eastern extent of the study area) does not pass in proximity.
Fécamp	Offshore wind farm	<50	Under construction and therefore part of the baseline assessment.

[9] Proposed sub-sea cable developments such as the AQUIND Interconnector – which passes through the western extent of the proposed DCO Order Limits – are not considered since there are limited impact pathways for shipping and navigation receptors (since it is assumed that sub-sea cables will be subject to a cable burial risk assessment) and no specific concerns have been raised by shipping and navigation stakeholders during consultation.

'Other development'	Description of development	Distance to proposed DCO Order Limits (nm)	Justification for scoping out of CEA
Perpetuus Tidal Energy Centre (PTEC)	Tidal energy	43.3	Consented but located in nearshore waters off south coast of Isle of Wight where vessel traffic volumes are low and routeing impacted by the array area does not pass in proximity.
Area 340 South East Isle of Wight	Marine aggregate dredging area	23.7	Active and therefore part of the baseline assessment.
Area 351 South East Isle of Wight	Marine aggregate dredging area	15.8	Active and therefore part of the baseline assessment.
Area 395/1 Off Selsey Bill	Marine aggregate dredging area	15	Active and therefore part of the baseline assessment.
Area 395/2 Off Selsey Bill	Marine aggregate dredging area	16.9	Active and therefore part of the baseline assessment.
Area 396/1 Inner Owers	Marine aggregate dredging area	0	Active and therefore part of the baseline assessment.
Area 396/2 Inner Owers	Marine aggregate dredging area	2	Active and therefore part of the baseline assessment.
Area 407 St Catherine's	Marine aggregate dredging area	28.4	Active and therefore part of the baseline assessment.
Area 435/1 Inner Owers	Marine aggregate dredging area	0.7	Active and therefore part of the baseline assessment.
Area 435/2 Inner Owers	Marine aggregate dredging area	1.5	Active and therefore part of the baseline assessment.
Area 451 St Catherine's	Marine aggregate dredging area	16.5	Active and therefore part of the baseline assessment.

'Other development'	Description of development	Distance to proposed DCO Order Limits (nm)	Justification for scoping out of CEA
Area 453 Owers Extension	Marine aggregate dredging area	0.4	Active and therefore part of the baseline assessment.
Area 458 West Bassurelle	Marine aggregate dredging area	36.4	Active and therefore part of the baseline assessment.
Area 460 South Hastings	Marine aggregate dredging area	34.8	Active and therefore part of the baseline assessment.
Area 461 Median Deep	Marine aggregate dredging area	36.8	Active and therefore part of the baseline assessment.
Area 464 West Bassurelle	Marine aggregate dredging area	33.6	Active and therefore part of the baseline assessment.
Area 473/1 Greenwich Light East	Marine aggregate dredging area	25.7	Active and therefore part of the baseline assessment.
Area 473/2 Greenwich Light East	Marine aggregate dredging area	28.5	Active and therefore part of the baseline assessment.
Area 478 Area 1 South	Marine aggregate dredging area	29.6	Active and therefore part of the baseline assessment.
Area 488 Inner Owers North	Marine aggregate dredging area	0.5	Active and therefore part of the baseline assessment.
Area 1803 West Bassurelle Extension	Marine aggregate dredging area	22	Exploration area but is located within the separation zone of the Dover Strait TSS and therefore has limited interaction with routeing including those commercial routes impacted by the array area.

13.12.6 Since no other developments are scoped into this CEA, no main commercial route deviations are anticipated at the cumulative level. In essence, the future case movement of commercial traffic for the cumulative scenario can be considered

equivalent to that determined for the assessment of the Proposed Development in isolation, i.e., no cumulative effects are anticipated.

13.13 Transboundary effects

13.13.1 Transboundary effects arise when impacts from a development within one European Economic Area (EEA) state affects the environment of another EEA state(s). A screening of transboundary effects has been carried out and is presented in Appendix B of the Scoping Report (RED, 2020).

13.1.303 Vessel traffic movements are transboundary in nature. In the English Channel this includes cross channel navigation between the UK and France as well as through navigation, with the latter being highly international in nature. There is potential for vessel routeing to be displaced by the presence of the Proposed Development and therefore this is considered as a potential effect.

13.1.304 However, given the international use of AIS transceivers on commercial vessels, the baseline characterisation of vessel traffic movements suitably captures both the receptors and the nature of this transboundary effect. Therefore, transboundary effects are considered to be suitably accounted for as part of the baseline assessment and no further assessment has been undertaken.

13.14 Inter-related effects

13.14.1 The inter-related effects assessment considers likely significant effects from multiple impacts and activities from the construction, operation and maintenance and decommissioning phases of Rampion 2 on the same receptor, or group of receptors.

13.14.2 Inter-related effects could potentially arise in one of two ways. The first type of inter-related effect is a Proposed Development lifetime effect, where multiple phases of the Proposed Development interact to create a potentially more significant effect on a receptor than in one phase alone. The phases for Rampion 2 are construction, operation and maintenance, and decommissioning. All Proposed Development lifetime effects are assessed in **Chapter 30: Inter-related effects, Volume 2** of the ES (Document Reference: 6.2.30).

13.14.3 The second type of inter-related effect is receptor-led effects. Receptor-led effects are where effects from different environmental aspects combine spatially and temporally on a receptor. These effects may be short-term, temporary, transient, or longer-term.

13.14.4 Receptor-led effects have been considered, where relevant, in this chapter for potential interactions between shipping and navigation and the following environmental aspects:

- **Chapter 7: Other marine users, Volume 2** of the ES (Document Reference: 6.2.7); and
- **Chapter 10: Commercial fisheries, Volume 2** of the ES (Document Reference: 6.2.10).

13.14.5 Full results of the receptor-led effects assessment can be found in **Chapter 29: Inter-related effects, Volume 2** of the ES (Document Reference: 6.2.30).

13.15 Summary of residual effects

13.15.1 **Table 13-28** presents a summary of the assessment of significant impacts, any relevant embedded environmental measures and residual effects on shipping and navigation receptors.

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Table 13-28 Summary of assessment of residual effects

Activity and impact	Frequency of impact	Receptor and consequence of impact	Embedded environmental measures	Assessment of residual effect (significance)
Construction				
Displacement of vessels (worst-case element is grounding risk).	Remote	All vessels – Moderate	C-46 C-47 C-48 C-53 C-84 C-85	**Tolerable**
Third-party to project vessel collision risk.	Extremely Unlikely	All vessels – Moderate	C-46 C-47 C-53 C-56 C-84 C-85 C-88	**Broadly Acceptable**
Reduced access to local ports (worst-case element is Shoreham Port).	Reasonably Probable	All vessels – Minor	C-88	**Tolerable**
Operation and maintenance				
Displacement of vessels (worst-case element is third-	Reasonably Probable	All vessels – Moderate	C-46 C-47	**Tolerable**

Activity and impact	Frequency of impact	Receptor and consequence of impact	Embedded environmental measures	Assessment of residual effect (significance)
party to third-party collision risk/ grounding risk).			C-53 C-84 C-85	
Third-party to project vessel collision risk.	Extremely Unlikely	Moderate	C-46 C-47 C-53 C-56 C-85 C-88	**Broadly Acceptable**
Vessel to structure allision risk (worst-case element is internal allision risk).	Remote	Recreational vessels and commercial fishing vessels – Moderate	C-46 C-47 C-53 C-56 C-84 C-85 C-86 C-87 C-88 C-89 C-284	**Tolerable**
Reduced access to local ports (worst case element is ports in the Solent – navigational safety risk).	Frequent	All vessels – Negligible	C-84 C-88	**Tolerable**

Activity and impact	Frequency of impact	Receptor and consequence of impact	Embedded environmental measures	Assessment of residual effect (significance)
Changes in under keel clearance.	Negligible	All vessels – Moderate	C-41 C-45 C-53 C-83 C-96	**Broadly Acceptable**
Increased anchor interaction with sub-sea cables.	Negligible	Commercial vessels and commercial fishing vessels – Minor	C-41 C-45 C-96	**Broadly Acceptable**
Reduction of emergency response provision including SAR capability.	Extremely Unlikely	Emergency responders – Minor	C-53 C-88	**Broadly Acceptable**
Decommissioning				
Displacement of vessels (worst-case element is grounding risk).	Remote	All vessels – Moderate	C-46 C-47 C-53 C-84 C-85	**Tolerable**
Third-party to project vessel collision risk.	Extremely Unlikely	All vessels – Moderate	C-46 C-47 C-53 C-56 C-84	**Broadly Acceptable**

Activity and impact	Frequency of impact	Receptor and consequence of impact	Embedded environmental measures	Assessment of residual effect (significance)
			C-85 C-88	
Reduced access to local ports (worst-case element is Shoreham Port).	Reasonably Probable	All vessels – Minor	C-88	**Tolerable**

13.16 Glossary of terms and abbreviations

Table 13-29 Glossary of terms and abbreviations – shipping and navigation

Term (acronym)	Definition
ABP	Associated British Ports
AIS	Automatic Identification System
ALARP	As Low As Reasonably Practicable
Allision	The act or process of a moving object striking a stationary object.
Aspect	An individual environmental topic. Shipping and navigation is one of a number of offshore aspects.
Baseline	Refers to existing conditions as represented by latest available survey and other data which is used as a benchmark for making comparisons to assess the impact of development.
Baseline conditions	The environment as it appears (or would appear) immediately prior to the implementation of the Proposed Development together with any known or foreseeable future changes that will take place before completion of the Proposed Development.
BMAPA	British Marine Aggregate Producers Association
CA	Cruising Association
CAA	Civil Aviation Authority
Cable Burial Risk Assessment (CBRA)	Risk assessment to determine suitable burial depths for cables, based on hazards such as anchor strike, fishing gear interaction and seabed mobility.
CD	Chart Datum
CEA	Cumulative Effect Assessment. Assessment of impacts as a result of the incremental changes caused by other past, present and reasonably foreseeable human activities and natural processes together with the Proposed Development.
Collision	The act or process of one moving object striking another moving object.

Term (acronym)	Definition
COLREGs	Convention on International Regulations for Preventing Collisions at Sea
Cumulative effects	Additional changes caused by a Proposed Development in conjunction with other similar developments or as a combined effect of a set of developments.
Development Consent Order (DCO)	The means of obtaining permission to construct and maintain developments characterised as Nationally Significant Infrastructure Projects in England and Wales.
DECC	Department of Energy & Climate Change
Decommissioning	The period during which a development and its associated processes are removed from active operation.
DEFRA	Department for Environment, Food & Rural Affairs
Design envelope	A description of the range of possible elements that make up the design options under consideration for a development. This envelope is used to define a development for Environmental Impact Assessment (EIA) purposes when the exact engineering parameters are not yet known. This is also often referred to as the 'Rochdale Envelope' approach.
Development Consent Order (DCO) Application	An application for consent to undertake a Nationally Significant Infrastructure Project made to the Planning Inspectorate who will consider the application and make a recommendation to the Secretary of State, who will decide on whether development consent should be granted for the Proposed Development.
DfT	Department for Transport
dML	Deemed Marine Licence
EEA	European Economic Area
EIA	Environmental Impact Assessment. The process of evaluating the likely significant environmental effects of a proposed project or development over and above the existing circumstances (or 'baseline').
Embedded environmental measures	They are measures to avoid or reduce and where possible offset any significant adverse environmental effects that are directly incorporated into the design for the Proposed Development.
ERCoP	Emergency Response Cooperation Plan

Term (acronym)	Definition
ES	Environmental Statement. The written output presenting the full findings of the Environmental Impact Assessment.
FLO	Fisheries Liaison Officer
FSA	Formal Safety Assessment. A structured and systematic process for assessing the risks and costs (if applicable) associated with shipping activity.
Future baseline	Refers to the situation in future years without the Proposed Development.
GLA	General Lighthouse Authority
GT	Gross Tonnage
HM Government	Her Majesty's Government
HRA	Helicopter Refuge Area
IALA	International Association of Marine Aids to Navigation and Lighthouse Authority
IFA2	Interconnexion France-Angleterre 2
IMO	International Maritime Organization
Impact	The changes resulting from an action
International Maritime Organization (IMO) routeing measure	Predetermined shipping routes and areas established by the IMO to improve the safety of shipping at sea.
IPS	Intermediate Peripheral Structure
ITZ	Inshore Traffic Zone
KHM	King's Harbour Master
km	Kilometre
kt	Knot
Likely significant effects	It is a requirement of Environmental Impact Assessment Regulations to determine the likely significant effects of the Proposed Development on the environment which should relate to the level of an effect and the type of effect.
LOA	Length Overall

Term (acronym)	Definition
m	Metre
MAIB	Marine Accident Investigation Branch
Main commercial route	Defined transit route (mean position) of commercial vessels identified within a specified study area.
Marine aggregate	Marine dredged sand and/or gravel.
MCA	Maritime and Coastguard Agency
MGN	Marine Guidance Note. A system of guidance notes issued by the Maritime and Coastguard Agency (MCA) which provide significant advice relating to the improvement of the safety of shipping at sea, and to prevent or minimise pollution from shipping.
MHWS	Mean High Water Springs
MMO	Marine Management Organisation
MOD	Ministry of Defence
MPCP	Marine Pollution Contingency Plan
MW	Megawatt
Nationally Significant Infrastructure Project (NSIP)	Nationally Significant Infrastructure Projects are major infrastructure developments in England and Wales which are consented by DCO. These include proposals for renewable energy projects with an installed capacity greater than 100MW.
Navigation corridor	An MGN 654 compliant gap between the offshore surface infrastructure of Rampion 1 and Rampion 2 which may be used for transit by third-party vessels.
nm	Nautical Mile
nm^2	Square Nautical Mile
NPS	National Policy Statement
NRA	Navigational Risk Assessment. A document which assesses the overall impact to shipping and navigation of a proposed Offshore Renewable Energy Installation (OREI) based on Formal Safety Assessment (FSA).
NRW	Natural Resources Wales
NUC	Not Under Command

Term (acronym)	Definition
OREI	Offshore Renewable Energy Installation. In the context of offshore wind development, offshore Wind Turbine Generators (WTG) and the associated electrical infrastructure such as offshore substations.
PEIR	Preliminary Environmental Information Report. The written output of the Environmental Impact Assessment (EIA) undertaken to date for the Proposed Development. It is developed to support statutory consultation and presents the preliminary findings of the assessment to allow an informed view to be developed of the Proposed Development, the assessment approach that has been undertaken, and the preliminary conclusions on the likely significant effects of the Proposed Development and environmental measures proposed.
PEIR Assessment Boundary	The PEIR Assessment Boundary combines the search areas for the offshore and onshore infrastructure associated with the Proposed Development at the PEIR stage and has been superseded by the proposed DCO Order Limits.
PEXA	Practice and Exercise Area
Planning Inspectorate	The Planning Inspectorate deals with planning appeals, national infrastructure planning applications, examinations of local plans and other planning-related and specialist casework in England and Wales.
Proposed DCO Order Limits	The proposed DCO Order Limits combines the search areas for the offshore and onshore infrastructure associated with the Proposed Development at the submission of the ES. It is defined as the area within which the Proposed Development and associated infrastructure will be located, including the temporary and permanent construction and operational work areas.
Proposed Development	The development that is subject to the application for development consent, as described in **Chapter 4: The Proposed Development, Volume 2** of the ES (Document Reference: 6.2.4).
PLL	Potential Loss of Life
PTEC	Perpetuus Tidal Energy Centre
Radar	Radio Detection and Ranging. An object-detection system which uses radio waves to determine the range, altitude, direction or speed of objects.

Term (acronym)	Definition
RAM	Restricted in Ability to Manoeuvre
Receptor	These are as defined in Regulation 5(2) of The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 and include population and human health, biodiversity, land, soil, water, air, climate, material assets, cultural heritage and landscape that may be at risk from exposure to pollutants which could potentially arise as a result of the Proposed Development.
RED	Rampion Extension Development
Regular Operator	A commercial operator whose vessel(s) are observed to transit through a particular region on a regular basis.
RNLI	Royal National Lifeboat Institution
RYA	Royal Yachting Association
Safety zone	A statutory marine zone demarcated for the purposes of safety around a possibly hazardous installation or works/construction area.
SAR	Search and Rescue
Scoping Boundary	Area that encompasses all planned infrastructure at the submission of the Scoping Report.
Scoping Opinion	A report presenting the written opinion of the Secretary of State as to the scope and level of detail of information to be provided in the Environmental Statement (ES) for a development.
Scoping Report	A report that presents the findings of an initial stage in the Environmental Impact Assessment process.
Secretary of State	The Minister for Department for Energy Security and Net Zero (DESNZ).
Significance	A measure of the importance of the environmental effect, defined by criteria specific to the environmental aspect.
SOLAS	Safety of Life at Sea
SPS	Significant Peripheral Structure
TCE	The Crown Estate

Term (acronym)	Definition
Temporal Scope	The temporal scope covers the time period over which changes to the environment and the resultant effects are predicted to occur and are typically defined as either being temporary or permanent.
TSS	Traffic Separation Scheme. A traffic management route system ruled by the International Maritime Organization (IMO). The traffic lanes (or clearways) indicate the general direction of transit which apply to the vessels in that zone; vessels navigating within a TSS all sail in the same direction or they cross the lanes at an angle as close to 90 degrees (°) as possible.
UECC	United European Car Carriers
UK	United Kingdom
UKHO	United Kingdom Hydrographic Office
UN	United Nations
UNCLOS	United Nations Conventions on the Law of the Sea
UXO	Unexploded Ordnance
VDL	Volker Dredging Limited
VHF	Very High Frequency
WTG	Wind Turbine Generator
ZOI	Zone of Influence

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Rampion 2
WIND FARM