Vattenfall Wind Power Ltd

Thanet Extension Offshore Wind Farm

Appendix 2 to Deadline 7 Submission: Applicant's Response to Deadline 6 Interested Parties Submissions - Shipping and Navigation

Relevant Examination Deadline: 7

Submitted by Vattenfall Wind Power Ltd

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Revision A

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Annex A to Appendix 2 to Deadline 7 Submission	Detailed response regarding navigational simulation
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1 Introduction

1 As requested in the Rule 8 letter (PINS Ref PD-009) the Applicant has reviewed submissions by Interested Parties (IPs) made at Deadline 6 and has provided responses to all submissions relating to Shipping and Navigation interests within this document.

2 Submissions relating to shipping and navigation were received from the following IPs at Deadline 6:

- Port of Tilbury London Limited and London Gateway Port Limited (POTLL and LGPL);
- Maritime Coastguard Agency (MCA);
- Trinity House (TH);
- Port of Sheerness Ltd.;
- Thanet Fishermen's Association;
- NATS;
- Port of London Authority (PLA); and
- Estuary Services Limited (dual response with PLA).

3 The structure of the comments in this document are as follows:

- Section 2: Applicant's comments on IP's responses to Third Written Questions (ExQ3); and
- Section 3: Applicant's comments on IP's responses to Deadline 5 Submissions.
- Section 4: Applicants responses to ExQ3. This section provides, for completeness, the Applicant's responses to ExQ3 to which no other parties have provided a response. This section is provided for ease of reference and completeness and does not provide new responses.

2 Applicant's comments on IP's responses to Third Written Questions (ExQ3)

4 The Applicant provided their response to the Examining Authorities (ExA) Third Written Questions (ExQ3) as Appendix 22 of the Applicant's Deadline 6 Submission. Table 1 provides the Applicant's comments on the IP's responses to ExQ3.

5 For ease of reference the Applicant has included their responses to the ExQ3 questions which were to be addressed exclusively by the Applicant in Section 0, as such the Applicant has provided no additional commentary to these questions as part of their Deadline 7 Submission

Table 1: Applicant's comments on IP's responses to Third Written Questions

ExQ3 PINS Question number:	Question is addressed to:	Question:	Applicant's Response:	IP Response:	Applicant's comments on IP response:
3.12.5.	Maritime and Coastguard Agency (MCA); Trinity House (THLS)	**Status of the "inshore route" and route to the north of the existing Thanet Offshore Wind Farm (TOWF)** The Applicant has argued strongly that the current route between the TOWF and the Kent coast is not designated as a 'sea lane' in the meaning attributed by NPS EN-3. Further in [REP5-18] at point 43, the Applicant makes the case that being outside harbour limits, the area of routes surrounding the TOWF *"is better described as an area of open sea."* In its D5 submission, MCA [REP5-063] argues that the *"…area of sea to the west of the existing Thanet windfarm…is not an IMO designated routing measure" but goes on to state "…in an operational sense, the area of sea should be treated as a recognized sea lane" and that " there is no formally designated or charted inshore route or route immediately to the north of the project. There is nothing in the Pilot Books to indicate that (either) is an important route to be followed when route planning…"* In the [REP4-034] PLA D4 submission Appendix 1: Anatec Review of Evidence Figures 8.3 and 8.4, this inshore route is clearly shown as one of the 3 primary approaches to the Thames Estuary prior to and after any WF construction in the estuary. Would the IPs please clarify for the avoidance of doubt: a) whether MCA intends "the area of sea" in its [REP5-063] submission referred above in both instances to mean the space used for general navigation, transit by commercial	The Applicant notes that this ExQ is for IPs but has the following observations to make. During oral representations and at project specific meetings Capt Roger Barker in particular of THLS has noted the area of sea to be an area of general navigation. The Applicant concurs with this view and does not consider the routes to be formal sea lanes, nor understands there to be any existing proposals in place to designate the area as a sea lane or implement any formal routeing measures. The Applicant notes that the jurisdiction of the PLA harbour limits are as recorded within charts and previous submission, and that the PLA jurisdiction does not extend to the inshore route area. In this context by being outside of the harbour limits (PLA statutory and competent harbour authority area boundaries) this is outside of the PLA jurisdiction and lies within an area of open sea that is under MCA responsibility (and THLS as relates to aids to navigation).	**MCA response:** The Applicant has argued strongly that the current route between the TOWF and the Kent coast is not designated as a 'sea lane' in the meaning attributed by NPS EN-3. Further in [REP5-18] at point 43, the Applicant makes the case that being outside harbour limits, the area of routes surrounding the TOWF "is better described as an area of open sea." In its D5 submission, MCA [REP5-063] argues that the "…area of sea to the west of the existing Thanet windfarm…is not an IMO designated routeing measure" but goes on to state "…in an operational sense, the area of sea should be treated as a recognized sea lane" and that " there is no formally designated or charted inshore route or route immediately to the north of the project". There is nothing in the Pilot Books to indicate that (either) is an important route to be followed when route planning…" In the [REP4-034] PLA D4 submission Appendix 1: Anatec Review of Evidence Figures 8.3 and 8.4, this inshore route is clearly shown as one of the 3 primary approaches to the Thames Estuary prior to and after any WF construction in the estuary. a) The MCA would like to make it clear that it intends "the area of sea" to be the area to the west and south west of the proposed boundary used for navigation including pilotage and for vessels transiting to and from the ports in the Medway and Thames Estuaries.	The Applicant notes the MCA's response on this and comments a) The Applicant agrees with the MCA's statement with regards to the extent and activities that are undertaken in the Area of Sea with the exception of pilotage. The Applicant notes, for clarification, that whilst pilot landing and boarding is undertaken in the area to the west and south of the wind farm the act of pilotage does not commence until the vessel is inside PLA London Pilotage District which is to the north west of the study area and (with reference to the ExA question) is not in the space between NE Spit Buoy and the VTS limit (Ref NRA Fig 9 APP-089). The Applicant further seeks to make a concluding statement on the status of this area which has been confirmed by the MCA to not be: i) under any IMO routing measure ii) to not be a sea lane. Whilst the Applicant notes the comment *'should' be treated as a recognised sea lane'* the status of this area has not been revised and it cannot be formally considered as a sea lane under EN-3 paragraph 2.6.161. iii) A formally designated route
				TH response: a) TH has no comment. b) As stated in our previous written and verbal statements TH consider this to be an area of	The Applicant notes THLS response on this and comments: b) Reference is made to navigational hazards such as sandbanks, coasts and other users

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		vessels and pilot transfer between the southerly extent of VTS control as shown on charts and the NE Spit Racon buoy; and b) whether THLS agrees with the Applicant that being outside the controls exercised within the limits of Port of London Authority, the area of sea including around the TOWF should be described as "an area of open sea" as argued by the Applicant in the [REP5-018] submission; and c) whether THLS agrees with the Applicant's case at [REP5-018] as referred above that: i. there "*is no formally designated or charted inshore route*..." or ii. "there "*is no formally designated …route immediately to the north of the project*" or iii. "*there is nothing in the Pilot Books to indicate that (the route around the TOWF) is an important route to be followed when route planning*".		general navigation. We would not describe it as "an area of open sea" as there are numerous navigational hazards in the area such as the sandbanks, coast and a lot of other marine users. c i) This is a correct statement. c ii) This is a correct statement. c iii) Admiralty Pilot Book NP28 4.66 1 states "The Downs and Gull Stream form a passage bounded to the W by coastal banks and to the E by Goodwin Sands. Vessels of a suitable draught en-route from the Channel to the Thames Estuary generally use it in preference to the route E of Goodwin Sands." As this route brings vessels to the Goodwin Knoll lightbuoy the next waypoint on their course is likely to be the Elbow Buoy bringing them to the west of the existing windfarm.	– which is accepted and embedded in the Applicants assessment of navigation risk. However, the Applicant notes that no counter comment has been made with regards to the ExA question (and the Applicants response to this question) regarding this area being outside the PLA statutory and competent harbour authority area boundaries. The Applicant is content that 'an area of general navigation' would be equally applicable. c) i) noted ii) noted iii) Notwithstanding that this area mentioned by TH lies to the south and outside the project area; the Applicant notes that although the Downs and Gull stream are navigable areas to the west of Goodwin Sands, these are significantly constrained in sea room and depth (with a shallower critical limiting depth than NE Spit area) and are thus more constrained then the area to the west of the wind farm. Therefore: whilst use of this area is possible (by smaller vessels) it is, as TH indicate, draught limited and the relationship between any route in this area cannot be inferred to apply to the area to the west.
3.12.6.	London Pilot Council (LPC); Port of London Authority / Estuary Services Ltd (PLA), Port of Tilbury London Ltd, London Gateway	**Sea Room at NE Spit Racon buoy** Would the IPs comment on the following: a) Do they consider that the distance of 2.5nm (effectively 1.5nm plus 1nm buffer at the narrowest point) between NE Spit Racon buoy and the proposed TEOW as currently proposed by the Applicant would be a "*distance that is acceptable for continued safe pilot transfer operations*" in the context of the uses of this sea space.	a). Whilst the Applicant notes this ExAQ is directed at IP's (and welcomes independent comment by IP's on this) the Applicant seeks to clarify with regards to (a) that the distance of 2.5nm between NE Spit Racon Buoy and the proposed TEOW, and the basis of the portions of this distance available as sea room and the buffer, is dependent on the number and size of vessels in this area and whether they are transiting or undertaking other operations. Very limited numbers of pilot transfers take place in this 'narrowest point' although it is recognised 'some (limited) transfers' occur in the area of	**LPC response:** No response was received from the LPC for this question. **PLA/ ESL response:** a) The PLA and ESL would not consider the reduction to 2.5nm (1.5nm with a 1nm buffer) to be an acceptable distance for boarding and landing operations. Although this area is used less frequently than the area directly north of the NE Spit diamond for boarding and landing, it is used by large vessels	**PLA/ESL** a) The Applicant notes this position and comments that the mix of traffic in this area has been considered when calculating the necessary searoom for transit and pilotage. It is important that the metric being applied in this question relates to the distance between NE Spit Buoy and the SEZ boundary which is the (agreed) limiting width of sea room for larger vessels only. It is therefore important to consider that not only do

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	Port Ltd (PoTL/LGPL), UK Chamber of Shipping (UKCoS); Trinity House (THLS)	b) Would the embedded risk control of the SEZ as proposed be sufficient in combination with other risk controls proposed by the Applicant to reduce all of the perceived risks to shipping and navigation to As Low As Reasonably Practicable (ALARP) in their opinion. c) Is it appropriate for the 1nm safety buffer to be reduced for short durations by the net effect of a 500m "rolling" safety zone. d) Can relevant sea space between NE Spit Racon buoy and the proposed TEOW reasonably be defined as the zone between the inner limit of an amended Structures Exclusion Zone in an arc around the NW sector of the windfarm, extending from a line due west of the SW corner of the SEZ to the currently charted no-anchorage line and from the line of the North Foreland sector light as extended through the NE Spit Racon buoy?	more sea room to the north and towards the Tongue. This is evidenced in material provided by ESL as well as AIS data and explained further in Section 3.6 of Appendix 28 to Deadline 5 Submission: Addendum to Navigation Risk Assessment. Thus transits have been the primary basis for assessing sea room and the available sea room and buffer distances, dependent on numbers and sizes of vessels is provided in Table 10. b). The Applicant notes that the NRA A conducted with IP involvement demonstrated that all hazards were assessed as ALARP or lower, and that no IP's have put forward, identified or requested the inclusion of controls identified by the Applicant but not put forward. Specifically, with regards the perceived risks to shipping and navigation being ALARP the Applicant would note that the PLA's submission of a revised hazard log at D4C concluded the risks to be moderate. Whilst the definitions presented within the PLA's D4C submission indicated a change in methodology, the Applicant would note that up until around the 19th May 2019, following ISH8 and Deadline 5, there was a worked example NRA publicly available on the PLA's website which includes clear definitions. This accompanying text has since been withdrawn from the PLA website (around the 19th May 2019) but the matrix, and simplified spreadsheet method of assessment that PLA referred to at ISH8 as forming an alternative to the use of the algorithm based Hazman 2 software remains publicly available at the following weblink: https://www.pla.co.uk/assets/fm197plariskassessmenttemplate.xlsx, and is provided at Annex B to this Deadline 6 submission. The link provides a clear reference to moderate scores being "Efforts should be made to reduce risk to 'As low as reasonably practicable' (ALARP), but activity may be undertaken". It is important to note in this context that PLA's instructions for NRA (http://www.pla.co.uk/Safety/SMS/Navigational-	and contains a complex mix of transiting vessels and vessels on manoeuvre, with a range of commercial, leisure and fishing vessels. The previously-stated requirement for 3 miles sea-room (2nm plus 1 mile buffer) for boarding and landing should apply, regardless of how many vessels are using that particular area for boarding and landing. b) The PLA and ESL cannot agree with the Applicant that the SEZ in combination with other risk controls proposed by the Applicant reduces the perceived risks to shipping and navigation to ALARP; the PLA and ESL still do not have the confidence that the impact of the reduction in sea room in relation to the understanding of on-site operations by ESL is captured in the data and approach to the NRA/NRAA. The primary concern is maintaining safe operational sea room on the inshore route. The proposed reduction of sea room at the NE Spit Buoy and Elbow buoy both leave a much reduced and limited amount of sea room for pilotage operations. A shipping liaison group, enhanced promulgation of information, relocation of buoyage and enhanced optimisation of TEOW line of orientation and symmetry are essentially measures based around further discussion and provision of information about the risks created by the project; they will have very limited impact in terms of mitigating the risks caused by reduced sea room in a route used for boarding and landing services that are critical to ESL, the PLA, and the goods and services that depend on safe shipping in this area. c) It is not appropriate for the 1nm buffer to be reduced by 500m temporarily or otherwise. Any safety zone implemented would need to be in addition to the 1nm.	very minimal transfers take place in this absolute width (and 2nm + 1nm of sea room remains available to the north and south of this point - which would be applicable if the Tongue were to be moved) but that it is a limiting width for the largest draught vessels only. The fuller width of sea room extending to the west of the NE Spit Buoy and over the NE Spit Bank remains available for usage by the large majority of vessels which use this area (e.g. commercial, leisure, pilotage and fishing vessels). b) The Applicant considers that a robust understanding of potential impacts and the associated risk has been sufficiently captured in the data (provided by the Applicant, ESL and PLA), through consultation and in recent NRA A which PLA and ESL participated. The Applicant considers that the increase in sea room as a result of the introduction of the SEZ, together with the suite of risk controls (which the Applicant considers provide benefit well in excess of 'further discussion and provision of information') together with the risk controls that have been identified by the PLA in their own assessment effectively mitigate the risks associated with the proposed Thanet Extension project. The Applicant also considers it important to reiterate that PLA's revised NRA submitted at Deadline 4C, when considered against PLA's published risk assessment template and the associated guidance which requires operators to align with the template, concludes the project to be ALARP. c) The Applicant has no further comment to make beyond their submission made at D6 which is repeated in the appropriate column of this document for ease of

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			Risk-Assessment-Guidance-to-Operators-and-Owners) state "It is logical, and not unreasonable, that the approach to and method of risk assessment undertaken by owners/operators in such circumstances is the same or similar to that employed by the PLA. The result of this specific risk assessment can then interface seamlessly with the wider port SMS". The Applicant has therefore sought to use similar methods to those utilised by PLA and has identified the perceived risks to be ALARP. The PLA's D4C submission, notwithstanding the apparent change in methodology made prior to the PLA worked example being withdrawn, concludes the project risks to be moderate, and therefore ALARP with risk controls (which are provided and set out in the NRAA). It therefore remains the Applicant's position that the project risks are ALARP, and that this aligns with the conclusions drawn by PLA through reference to their standard and recommended approach to NRA published and publicly available on their website until 19th May. c). The Applicant notes that if rolling safety zones are applied for, and that 500m zones are requested, additional risk controls identified within the original NRA will be place such as guard vessels, that will provide a reduction in risk, likely to be equivalent or better than a small temporary safety zone. The Applicant also notes that this matter has been agreed as commonplace with the MCA in the SoCG submitted with this Deadline 6 submission. d) The Applicant notes the definition of sea space as stated by ExA and, for refers to Figure 20 of Appendix 28 to Deadline 5 (NRA Addendum REP5-029) which is repeated below for ease of reference showing the sea space in pink and yellow as represented with the SEZ. However, it should be noted that this is a precautionary definition of sea space as applies to the very limited number of deeper draught vessels that transit and undertake pilotage operations in this area. The analysis of AIS data has shown that the	The area for boarding and landing will be reduced by the proposed scheme, as there is only one area to the north of the NE Spit diamond where there is 2nm plus a 1nm buffer. Therefore there is no flexibility to use alternative locations, such as to the north or at the Elbow when a 500m rolling safety zone is in place. The risk assessment for the NRAA did not cover the construction phase so this has not been assessed with the SEZ in place. d) The PLA and ESL would agree with this definition of relevant sea space. **POTLL and LGPL response:** (a) The Ports are of the view that further assessment is required to fully understand the sea room requirements for pilot operations in the area referred to. Further assessment is required in particular for the future baseline scenario, particularly when such operations are taking place alongside vessel transits. (b) As above for (a) notwithstanding the Ports' positon [*sic*] that an SEZ is not the appropriate means through which to secure mitigation (the Ports have proposed an Order Limits reduction). (c) The Ports defer to the response of PLA/ESL on this matter. (d) The Ports defer to the response of PLA/ESL on this matter. **UK CoS response:** No response was received from the UK CoS for this question. **TH response:** a) TH has no comment. b) TH are of the opinion that the mitigation suggested would reduce the perceived risks to what the applicant considers ALARP. However the NRAA only identifies a limited amount of	reference. The Applicant can confirm that the O&M phase works are spatially and temporally limited to a specific location such as a WTG. As such a maximum worst case is a partial overlap of a safety zone with the SEZ for the duration of the activity. d) Noted and the Applicant has no further comment to make beyond their submission made at D6 which outlines that this is the definition of sea room for the large deep draught vessels only and that additional sea room is available, and routinely used by transiting and vessels transferring pilots. This is repeated in the appropriate column of this document for ease of reference. **POTLL and LGPL** a) The Applicant notes this position, which is at odds with the POTLL and LGPL response at 3.12.18 below in which they consider their remit to be limited to consequence of hazard related to Stakeholder / business and the determination of any economic impact due to vessel needing to divert around the windfarm. The Applicant comments that the sea room definition in this area for vessels under transit and turning in order to transfer pilots has been calculated in accordance with the methodological guidance recommended by POTLL/LGPL together with review of significant datasets, bridge navigation simulation and collision risk modelling which all draw together to understand the complexity of the operations and their interactions. Notwithstanding this matters relating to the need, or otherwise, for a navigation simulation are set out in Annex A to this document.

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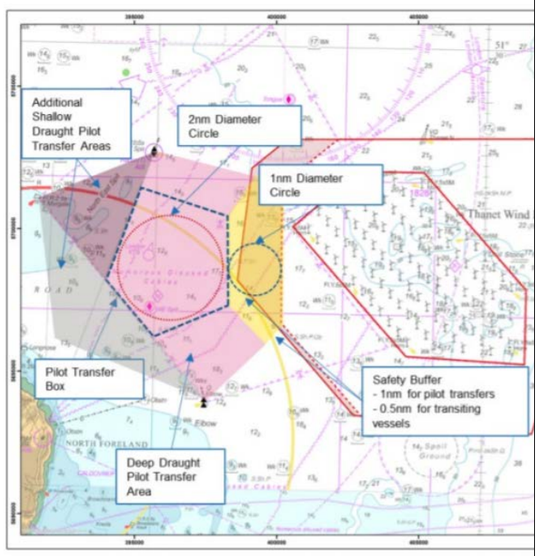
			majority of vessels are able to, and routinely do, transit to the west of the no anchoring line and over the NE Spit Bank and therefore a greater sea space is available to the majority of vessels in this area (as indicated by 'additional shallow draught pilot transfer areas' in the figure below) than this precautionary definition which can be considered relevant to vessels of deeper draught.  	general risks and we cannot categorically state that "all" risks to shipping and navigation have been reduced to ALARP as this concept also has a commercial element involved for the applicant. c) Any reduction in the available sea room for a short period of time will have an adverse effect on the risk posed whilst navigating the area. It is also not apparent how long a "short duration" would be as turbine maintenance could last numerous days.	b) The Applicant can confirm that an SEZ, or equivalent exclusion zone, is a well-established means of controlling project parameters that represent a risk or hindrance to certain receptors. In this context it is considered reasonable to restrict above sea structures that may impinge on available sea room, but it is not considered necessary to restrict seabed infrastructure such as cables. The installation of cables within areas of general navigation, and across formal navigation designations such as international IMO routing measures, is common with established forms of risk control that the Applicant has applied. Examples include European interconnector cables that are already installed across or in proximity to the inshore route, and have crossed the approaches to Rotterdam and one of the primary North Sea Traffic Separation Schemes. c) No comment – see above response to PLA/ESL d) No comment – see above response to PLA/ESL **TH** a) No comment b) The Applicant welcomes the statement by TH regarding reduction to ALARP. The Applicant notes that commercial impact, not associated with navigation hazards occurrence (defined as causing adverse impact if realised – e.g. collision, contact grounding, etc.) falls outside the scope of a navigation risk assessment. Further, the Applicant, through consideration of sea room necessary for all current and future vessel transits of the inshore route, does not concede that route deviations are necessary for commercial vessels and as

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					such no commercial impact, outside of specific navigation hazards, will be realised as a result of the development of the TEOW. c) The Applicant has no further comment to make beyond their submission made at D6 which is repeated in the appropriate column of this document for ease of reference
3.12.7.	The Applicant, Port of London Authority / Estuary Services Ltd (PLA), London Pilots Council (LPC).	**Relocation of Tongue DW pilot diamond** In [REP5-039] the NRAA (revised) at para 168 the Applicant notes: '*The TEOW, depending on final turbine layout may require the relocation of the Tongue Pilot Diamond slightly further north (noting ESL pilot boarding locations as presented in Section 2)*'. In [REP5-069] D5 comments on the Applicant's Deadline 4C Appendix 2 para 114-115, PLA express their concerns that the relocation of the Tongue boarding diamond and consequent costs of so doing have not been considered in the application or evidence to the Examination. In [REP5-070] response to Action Point 17 from ISH8, PLA states '*ESL and PLA therefore believe there will be an increase in traffic at the existing Tongue DWD*' and that '[t]*he reduction in sea room between the Tongue DWD and SEZ (by approx. 0.7nm) would require the Tongue DWD to be relocated (even if there is no increase in usage)…ESL would suggest a relocated Tongue DWD should be approximately 2.4nm North-North-East of its current location.*' a) Would the Applicant clarify whether their proposals require the relocation of the Tongue pilot diamond in order for pilot boarding or landing at that location to be at	*a)* The Applicant notes that with the SEZ in place and a WTG in the final design located at the closest point of the TEOW to the Tongue Deepwater Pilot Diamond, then the proposed project WTG would be 0.7nm closer to the Tongue Deep Water Pilot Diamond (Tongue DWD) compared to the existing TOW WTGs. The Tongue DWD diamond is located 1.9nm from the existing wind farm boundary and 1.2nm from the SEZ boundary. Should the pilot diamond require to be relocated it would therefore appear to be proportionate to relocate by 0.7nm, and not by 2.4nm. In light of this whilst the Applicant does not consider the pilot diamond itself to be relocated, any relocation desired by IPs would not need to be such a significant distance to the north and could more appropriately be located within areas already utilised. The Applicant also notes that the Tongue Pilot Diamond accounted for 1.3% of pilot transfers in the NE Spit Pilot Transfer area in 2018 and is therefore considered to only be used a minority of time. The Applicant also notes that there appears to be some considerable spatial variability in the transfer locations of vessels using Tongue DWD - with some transfers being undertaken at some distance away from the diamond itself. This serves to demonstrate that the precise location	**PLA and ESL Response:** a) No response provided. b) i. The PLA and ESL maintain their opinion that the repositioned Tongue DWD would be approximately 2.4nm NNE of its current location (Action Point 17/ISH8). ii. Whilst difficult to give a specific capital cost the factors that would need to be taken into account are fuel, increase in passage time (and the implications this could have for launch capacity), possible staffing increases/changes (both for ESL and Pilots), increase in maintenance costs and the impact on service resilience because of increased exposure to poor met ocean conditions. iii. There is likely to be increased strain on the pilotage services and pilots due to the longer transfer times. In the longer term the port may become less attractive to vessels, in particular container vessels, which may reduce employment opportunities and have a corresponding negative social and economic effect on the port and related services. iv. Any increase in running costs to ESL arising as a result of the Applicant's scheme should be met by the Applicant.	**PLA and ESL** b) i) The Applicant notes the PLA/ESL position and refers to the Applicants submission made at D6 to part a of this question (which is repeated in the appropriate column of this document for ease of reference) regarding the basis of any relocation distance. The basis for the PLA/ESL relocation of 2.4nm remains unclear, and to maintain the currently provided clearances from the Tongue Deep Water Anchorage and TEOW would mean a relocation as provided by the applicant of approximately 0.7nm. ii) The Applicant notes that the Tongue Deep water accounted for only 1.3% of pilot transfers in 2018. The context of any increase in transfer distance, which the Applicant has identified to be around 0.7nm, is therefore negligible in capital costs terms, and in any case costs such as fuel costs, are in any event not capital items. iii) The Applicants notes the ESL / PLA response, but as the relocation of the Tongue Pilot boarding diamond would result in very slight increases in transfer times for vessels that choose to deviate, and no increase for larger vessels that navigate around the OWF already, the conclusion of which is a minor effect. As such the PLA/ESL statement around adversely affect the port, employment, staffing or any other social and economic effect appears to have limited weight that can be apportioned to it. iv) & v) The Applicant has begun discussing a commercial agreement based on an agreed

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		a safe distance from the proposed extension, taking into account the need for the North Thanet cardinal buoy to be displaced as a consequence of the proposed extension and the density of traffic between the TOWF and the Tongue anchorage. b) If any relocation is proposed: i. to the extent that this is known, to where would relocation occur; ii. what if any capital costs are incurred; iii. what if any additional running costs (revenue costs) are incurred by pilot services; iv. who will meet these costs; v. is there any basis for a commercial agreement or other secured provision for contribution by the Applicant to these costs; and vi. have the navigation effects of any relocation been taken sufficient account of in the NRA/NRAA? If b) and specifically b) v are responded to, a form of security should be outlined at Deadline 6 and final drafts / confirmation provided at Deadline 7.	of the diamond is a reference point and the pilot launch will normally confirm to the ship a preferred location in relation to the diamond with a heading and speed for transfer. An example was provided by the Applicant in the Statement of Evidence [REP4C-004] and showed that vessels such as the *Ougarta* LNG vessel at 291m in length utilised the Tongue Deep Water Pilot Diamond when boarding a pilot, prior to the passage, not into the Princess Channel, but through Longsand Head to the North (this figure is repeated at Annex A to this document). The Applicant considers that the Tongue DWD is therefore commonly used for boarding of such vessels, which are (in a similar vein to the NE Spit Pilot Boarding Diamond), diverted from their intended track to board a pilot. This process of diverting a vessel from the most economically efficient track to board a pilot is unusual, unless adverse weather restrictions are in place. The Applicant notes that the PLA / ESL suggestion for 2.4nm for relocating the Tongue DWD is as "*This will keep boarding and landing at a safe distance from the Tongue anchorage and the northern boundary of the extension but will inevitably increase passage time and running costs to ESL and pilotage.*" The Applicant does not understand the extent of this relocation at 2.4nm, in the context of a 0.7nm encroachment of TEOW compared to TOW. The Applicant notes that based on the final position of the Thanet North Buoy the extent of any change to the Tongue DWD should be in the order of 0.7nm NNE taking into consideration the Tongue Anchorage – a representative maximum relocation is presented in the figure at Annex E titled 'Tongue Deep Water Pilot Boarding Station overlaid on Fig18 of APP-089 - Vessel traffic density (combined winter and summer surveys)' which shows the Tongue DWD locations as described in this text against a background of vessel traffic density from the NRA (Fig 18 of APP-	v. The Applicant has been requested to meet these costs but no agreement or commercial arrangement has been agreed to. vi. The PLA and ESL note that the NRAA (para 168) suggests the boarding position may need relocation and the NRA Executive Summary (page v) recommends greater use of the Tongue DW position as key mitigation. ESL and the PLA do not believe that the full navigational effects of relocating the Tongue DW position have been fully assessed or taken into account. The PLA and ESL have not been involved in any risk assessment process with the Applicant which considers an alternative location of the Tongue diamond and are not aware of any such assessment.	distance and displacement payment mechanism, to be agreed based on pilot boarding diamond data. It remains the Applicant's position that any displacement mechanism should be focussed on maintaining the current distance (0.7nm) from a WTG. Any further relocation requested, whilst not related to the project effect can be considered in discussion with the PLA/ESL. vi) The Applicant would note that the NRA A with the SEZ in place, advised that the Tongue pilot boarding diamond may need to be relocated dependent on the preferences of the pilotage operators. As vessels are not necessarily boarded at the diamond its relocation is not considered to be a requirement to reduce risks to ALARP but is recognised by the Applicant as being a preference of the pilotage operators. As the boarding of vessels occurs within the vicinity of the diamond, some further to the west, and some further to the east and north, depending of the particular route the vessel is taking into / out of the Thames Estuary the extent of any relocation of the notional pilotage diamond would necessarily only need to reflect the status quo, i.e. 0.7nm distant from a WTG. v) Reference in the original NRA, which relates to risk controls not taken forward, is considered to be superseded by the introduction of the SEZ and subsequent NRA A assessment, which included ESL / PLA in the Hazard workshop and discussion of the Tongue area, and showed that without relocation, hazards were at ALARP or lower level.

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			089) to indicate position relative to vessel transits. Should appropriate relocation incur additional cost the Applicant would be willing to arrange a commercial agreement or other security to the extent that it covers the additional steaming time. Whilst the Applicant has not been able to discuss such an arrangement with the IPs, it would be reasonable to assume an evidence-based displacement payment would be most suitable, taking into account the historic use of the diamond through pilot records to set appropriate benchmarks and agreeing a per-transfer cost for transfers to a relocated diamond that were demonstrated through data provided by the IPs. This could be secured through a condition requiring approval from the SoS for the approach to determining the displacement payment and the quantum. In relation to the PLA and ESL view that the use of the Tongue DWD would increase post the TEOW construction, then there is no evidence to suggest this, even if as PLA / ESL assert vessels may choose to navigate around the windfarm (something the Applicant does not agree with), as boarding would take place at the NE Spit pilot diamond, in which the PLA / ESL requirement for 2nm + 1nm buffer has been made available by introduction of the SEZ. Therefore, the Applicant fundamentally does not consider that the use of the Tongue Deep Water Pilot diamond will increase as represented by the PLA / ESL. This is evidenced by the decrease in the Tongue usage evident between 2017 and 218 from 93 transfer to 86 transfers a 7.5% reduction, despite the PLA / ESL noting the trend towards larger vessels, which would presumably more likely be served at a deep water pilot diamond such as the Tongue.		

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			b) If any relocation is proposed: *i. to the extent that this is known, to where would relocation occur;* The Applicant proposes that if a relocation is necessary, the relocation should be a maximum of 0.7nm to the NNE. *ii. what if any capital costs are incurred;* Capital costs for relocation are related to costs of changing the pilot boarding station location on publications such as Admiralty Chart, PLA publications, and the man time cost in doing so in consultation with relevant authorities (MCA / TH). This is anticipated to be minimal. The Applicant does not consider any other capital costs to be necessary. *iii. what if any additional running costs (revenue costs) are incurred by pilot services;* The running costs would be based on 2018 pilot transfers to Tongue relate to additional steaming time of 0.7nm to and from the relocated pilot diamond by the pilot launch and crew, and 0.7nm extra steaming time for the pilot when on a vessel. Based on 86 transfers in 2018, then this would total 0.7nm additional distance x 2 (there and back) x 86 transfers = 120nm additional steaming distance for the pilot launch, which at around a 20 -24 knots cruising speed for the pilot launch service speed would equate to 6 additional operational hours per year. A similar calculation for pilotage results in 0.7nm additional steaming x 86 transfers = 60nm additional steaming on a vessel for pilots, which with vessels transiting at around		

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			12-14 knots results in 4-5hrs additional time on vessels per year. The Applicant therefore notes that any additional running costs, if required, would be negligible. *iv. who will meet these costs;* The Applicant would be prepared to meet the reasonable costs of an agreed relocation of the pilot diamond. *v. is there any basis for a commercial agreement or other secured provision for contribution by the Applicant to these costs; and* Whilst for the reasons cited above, the Applicant does not consider the movement of the Tongue DWD to be necessary, should appropriate relocation of the pilot diamond be approved by the relevant authorities and be commensurate with the encroachment of WTGs in the final layout, the Applicant would consider this to be an evidenced change in pilot boarding which would be markedly different to perceived behavioural changes of vessels (which the Applicant does not consider would need to occur). As such, the Applicant would be willing to arrange a commercial agreement or other security to the extent that it covers the additional steaming time and pilot time from the existing location of the Tongue DWD to a relocated position. Whilst the Applicant has not been able to discuss such an arrangement with the IPs, it would be reasonable to assume an evidence-based displacement payment would be most suitable, taking into account the historic use of the diamond through pilot records to set appropriate benchmarks for the use of the diamond and agreeing a yearly cost for the additional steaming and pilot time associated with transfers to a relocated diamond.		

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			This could be secured through a condition requiring approval from the SoS for the approach to determining the displacement payment and the quantum, subject to the change being relative to the reduction in distance from WTGs and being approved by the relevant authorities. *vi. have the navigation effects of any relocation been taken sufficient account of in the NRA/NRAA?* The original NRA considered the relocation of pilot transfers to the Tongue DWD as an additional risk control measure and as such, was considered to reduce risk - albeit the additional risk control was not adopted. The NRA A did not consider the relocation of the Tongue DWD any further, as at 0.7nm it would not materially affect either the hazard risk scores, or identification and implementation of risk control measures. If b) and specifically b) v are responded to, a form of security should be outlined at Deadline 6 and final drafts / confirmation provided at Deadline 7.		
3.12.8.	London Pilots Council (LPC)	**Alternative pilot transfer locations for deep-draught and ULCS vessels** [REP5-061] para 2.4 LPC states *'the pressures of multiple large vessel boardings at the Sunk pilot station, has created an immediate demand for deep draft Class1 and Ultra large (ULCS) vessels to transit the North Edinburgh Channel to and from the NESP at drafts up to 13.5 meters, having boarded or landed a Pilot at the NESP. This is a major factor in the future growth of business in the Port of London.'* At para 2.7 it says *'[i]t is not possible tonserve* [sic] *Ultra Large vessels transiting the North Edinburgh Channel in a position directly to the North of*	Whilst the Applicant recognises this question is directed at LPC the Applicant wishes to clarify, for the benefit of the ExA, the basis of the scenario presented by LPC and on which the ExA have asked this question. LPC have predicated the scenario on one where the North Edinburgh Channel could be dredged and made into a navigable channel for vessels with draughts of up to 13.5m. The Applicant considers this fundamental change in depths and associated navigation practices to be conjecture and the future use of the North Edinburgh Channel has no reliable status in planning terms.	**LPC response:** No response was received from the LPC for this question.	The Applicant has no further comment to make beyond their submission made at D6 which is repeated in the appropriate column of this document for ease of reference.

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		the NESP Racon Buoy as this area comprises the busiest East/West Traffic route.' Would LPC please comment on the spatial and economic implications of alternative pilot transfer to and from deep draft Class 1 and UCLS vessels if dipping down to the NE Spit pilot station is deemed unsafe? In commenting, if an alternative location is to be used, which should it be, what are the effects of the change and has it been sufficiently assessed?	This consideration is made with reference to the following points: • This is a position made by LPC only • This does not appear to be consistent with the PLA's position. The PLA have stated their position in this regard during examination (Ref Section 4.6 of REP-142) in which the PLA stated that future dredging options have been considered and no decision has been made at this time although North Edinburgh Channel would not be likely to be the selected location. In any event, the PLA stated that dredging at the selected location would likely be to 10m below chart datum, for vessels of routinely up to 12m during higher tides (and not 13.5m as stated by LPC hence this does not support the LPC's predicated basis of future transits of deep draught Class 1 or ULCS vessels). • By way of historical context it is noteworthy that the PLA have previously determined North Edinburgh Channel to no longer be viable to navigation (due to the dynamic and mobile sediment accumulation in the area and reduction of depth) and removed channel buoyage for navigation safety reasons (Source: https://www.pla.co.uk/assets/Environmental_Assessment.pdf). As per Section 16 within the referenced document this decision was made by the PLA and included consideration of in combination effects and specifically the London Gateway Developments and offshore wind farms (i.e. future traffic profiles). Furthermore, the North Edinburgh Channel is currently designated (by the PLA) as a sand placement site for disposal of dredge material (from the Princes Channel and other dredging activity in the approaches). • The North Edinburgh Channel and Fishermans Gat lie within areas of international designation (Margate Sands SAC) and therefore the Applicant notes that seeking a licence for dredging would require an HRA and to be submitted before the MMO and Natural		

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			England as a plan or project. No such plan or project is known to exist. In summary, the LPC presented scenario, of deep draught class 1 or ULCS vessels up to 13.5m draught, on which ExA have based this question, cannot be considered credible beyond an accepted aspiration. This is due to the significant dredging that would be required to enable onwards transit into the Thames estuary (in the vicinity of Edinburgh Channel and/or Fishermans Gat and likely in other areas) which is not being progressed at this time in planning terms and nor have the PLA presented a supporting scenario supporting this fundamental and significant change of displacing the navigation of large vessels from the SUNK and into the study area and NESP in particular.		
3.12.9.	The Applicant	**Implications of pilot station relocation if needed** In [REP3-004] response to point 4 of [REP2-048] from Sunk User Group the Applicant refers back to [REP2-011] Appendix 4 to D2 responses which states "*The Applicant, at the Pilotage Study Report undertook analysis of the time, distance and cost involved for launches servicing the various stations and this should be used in understanding the commercial impact*". Would the Applicant please clarify with additional detail how this answer and the Pilotage Study report addresses the [REP2-048] point 4?	The Applicant notes that REP3-004 relates to "*Deadline 3 Submission -Annex B to Appendix 1: MCZ Chart illustrating Goodwin Sands with relevant projects"* which the applicant considers may be an incorrect reference and therefore the applicant is unsure of the appropriate reference. The Applicant notes the reference to the Sunk Users Group – which does not have operational oversight of the NE Spit Study area, that at point 4 of [REP2-048] noted: *"4) If the NE spit pilot station had to be relocated further seaward, this will unfortunately result in extra costs, not just financially, but also in time, to pilots, and pilot launch transiting times. Being exposed further out to sea, may also have the result of more probable likelihood of unfavourable sea and swell conditions. This could result in more vessels not being served and*	**PLA Response:** The PLA and ESL note that this question is for the Applicant to respond to. However, they would like to draw the ExA's attention to a specific element of the pilotage study to be considered alongside the answer the Applicant provides to this question. The Pilotage Study Report (PEIR Review Volume 4 – Offshore Annexes/Annex 10-1) refers, at section 3.3, to two alternative pilot boarding positions (table 3/section 3.3 is unclear on specific relocation areas). ESL has not discussed the commercial impact of relocation in any detail with the applicant. The PLA and ESL also note that the pilotage study uses an assumed launch speed of 24knots, whereas ESL would use 20knots as an average passage speed therefore further increasing the duration of pilotage acts due to relocation.	The applicant notes the clarification re: 24kts and confirms that this was clarified in discussions with ESL on completion of the pilotage study and 20kts was subsequently used thereafter for all assessment (ref: Table 11 of the NRA REP-089). The Applicant can confirm that discussion with pilotage operators with regards an appropriate mechanism for agreeing displacement payments have commenced and a relevant DCO requirement has been added to the revised Deadline 7 DCO (Appendix 5)

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			having to wait considerable time for wind conditions to be in their favour." The Sunk User group are simply pointing out that if a pilot station were relocated, then additional cost and operational impacts could occur. The Applicant notes that REP2-011 relates to *"Deadline 2 Submission –Appendix 19: Revised Application Document. Doc 2.3 Land Plans (Onshore)–Revision D",* however it is believed that the ExA is referring to the Pilotage Study [ES Volume 4, Annex 10-1] at "Section 3.3 Alternative Pilot Arrangements", in which analysis is presented on the increase transit time for the pilot launch if pilot boarding were to take place at either the: • Option 1: Board pilots to the south of the wind farm, between Ramsgate and North East Goodwin • Option 2: Board pilots near to North East Spit east cardinal, to the west of the wind farm and the Tongue station. The analysis presented notes that there is no difference in distance if the pilot launch transits to Option 1 and that the launch would have to travel an additional 2.9nm were to travel to Option 2, an additional 7.25 minutes per transfer. It is important to note that the context of the Pilotage Report relates to the PEIR RLB, which was reduced at the western extent for the ES submission to the current RLB, and further reduced as a result of implementing the SEZ. As such comments on "*constrained fairways*" no longer apply.		

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			Further it is the Applicants firm view that there is no need for pilot transfer locations to change as the 2nm plus 1nm has been met for the NE Spit Pilot Diamond, with the SEZ in place, and that most other operational areas for pilot boarding are unaffected by the TEOW. However, and despite the Applicants firm view on this matter, specific analysis is presented in response to ExQ 3.12.7. on commercial impact of moving the Tongue pilot diamond, and within ExQ 3.12.10 on relocation of any transfers that could be impacted at Elbow as a result of the TEOW with the SEZ in place.		
3.12.13	The Applicant (the engagement of other IPs and Other Persons in the subject matter of this question is noted and comments on the Applicant's response at Deadline 6 can be provided at Deadline 7)	**Allowances for traffic growth in collision risk modelling: NPS Ports policy compatibility** The Thames Estuary contains existing ports that meet the NSIP scale criteria for ports set out in s24 PA2008. NPS Ports envisages the location of new ports being determined by the market, but the fact that the Thames Estuary is a current and prospective location for future NSIP scale port development is demonstrated by the relatively recent development of London Gateway Port (which NPS Ports at paragraph 3.4.8 identifies as the largest capacity addition to UK container handling capacity in a single consent between 2005 and 2012) and more recently by the granting of development consent for the Tilbury 2 NSIP (which is now beyond its judicial challenge period and can be considered a concrete addition to consented capacity). London Gateway Port has been developed to support the potential addition of 4 further berths (a greater than doubling of current capacity). It is also possible to envisage additional NSIP-scale port development in the Thames beyond these two locations.	a) The Applicant notes this and can confirm that rather than historic trends the Applicant has sought to benchmark future growth against the PLA's Thames Vision which provides for considered growth. Further to this the Applicant has considered other forecasts including those put forward by the MMO as part of the South East marine spatial planning process which not only consider an increase in trade, but also assume that Thanet Extension is consented. These combined forecasts consider there to be a likely increase in cargo vessels, and a likely shift towards larger vessels to accommodate this. As confirmed during ISH8 by LGL/POTL where there is a shift to larger vessels these are unlikely to use the inshore route. The Applicant concurs with this observation and has noted in response to other ExQ3 that larger vessels are likely to utilise the SUNK for pilotage, as is currently the case. Whilst the Applicant notes this shift it also notes that overall volumes of smaller vessels may continue to grow and as such an overall uplift of 10% is considered to reflect future visions identified by local stakeholders as well as a change in the overall vessel mix likely to access the Thames estuary.	No responses from Interest Parties were received for this question	A detailed analysis of historic and future trends in tonnage, and vessel arrivals at Port of London has been provided at Appendix 16 of this Deadline 7 submission. The Applicant can confirm that the 10% future baseline for vessel traffic is considered robust.

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		NPS Ports paragraph 3.4.11 identifies that port '[c]apacity must be in the right place if it is to effectively and efficiently serve the needs of import and export markets. The location of ports in England and Wales has changed over time, in response to changes in global markets, in the size and nature of ships, and in the transport networks which support them. Currently, the largest container and ro–ro terminals are in the South East…'. Paragraph 3.4.12 identifies that it is in the national interest for there to be competition between ports, which drives efficiency and lowers costs. This means that port development 'requires sufficient spare capacity to ensure real choices for port users. It also requires ports to operate at efficient levels, which is not the same as operating at full physical capacity.' Spare ports capacity is viewed as a desirable contribution towards the decongestion of land transport routes through coastal shipping (paragraph 3.4.14) and the provision of national logistics resilience (3.4.16). Drawing these factors together, NPS Ports (paragraph 3.4.16) concludes as follows: '[e]xcluding the possibility of providing additional capacity for the movement of goods and commodities through new port development would be to accept limits on economic growth and on the price, choice and availability of goods imported into the UK and available to consumers. It would also limit the local and regional economic benefits that new developments might bring. Such an outcome would be strongly against the public interest.' Paragraph 3.5 urges NSIP decision-makers to accept what amounts to an urgent need for new ports	b) The Applicant can confirm that the NPS Ports policy assumptions about port and traffic growth rates (NPS growth rates) are relevant insofar as they recognise an overall growth rate in trade by growth in for example container vessels. The Applicant has considered this, and as identified in response to a) has considered that whilst the overall trend to support the NPS growth rates is a transition to larger vessels, and therefore an overall reduction in vessel numbers, other vessel types are likely to increase. The growth rates identified in the MMO marine spatial plans also identify both a growth in trade and a shift towards larger vessels to service this growth. In view of this the Applicant remains of the view that for the study area in question, i.e. the inshore route in particular, a 10% growth is realistic and adequately accounts for the NPS growth rates of relevance to the study area. The wider region, in particular other approaches such as the SUNK, will likely increase in usage as vessel size trends require deeper water approaches, noting that the SUNK is inherently a narrower approach that requires traffic flow management. i) In light of the above it is the Applicant's view that the 10% traffic growth assumption used to inform the future baseline of the NRAA in this application sufficiently address the growth assumptions underpinning the NPS Ports growth rates. It is also of note that whilst the Applicant accepts the NPS identifies that it may not always be sound to refer to historic trends, the Applicant considers it would also not be appropriate to overlook historic trends to give context and understanding to a future trend analysis. In this context the Applicant notes that the most recent quarterly trend note for ports, published by the Department for Transport (PORT0502: UK major port traffic, total tonnage and units, by port: quarterly from 2009) highlights that the overall % change in trade (reference to tonnage) between 2009 and 2018 is 7% for London; but that the change between Q4 2017 and Q4 2018 is 11%. The growth between 2009 and 2018 should also		

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		capacity and normally to presume in favour of its development. The port capacity demand forecast used in NPS Ports (paragraph 3.4.3) (MDS Transmodal central forecast for Great Britain 2007: 2005 to 2030) is acknowledged not to have factored in the growth effects of the post-2008 economic downturn. Equally however, it is acknowledged not to take into account other new drivers for additional port capacity, including offshore wind farm development and servicing. NPS Ports suggests that the net effect of the economic downturn on this forecast should be considered to be a delay but not ultimately a reduction in the eventual levels of demand for port capacity, in particular for unitised goods (paragraphs 3.4.4, 3.4.5). Summarising the implications of the NPS Ports forecast for growth by main cargo type and breaking these figures down into linear annualized growth with no allowance for economic cycles suggests the following: **Forecast ports capacity growth by cargo type to 2030** 25 yrs Annual 25 yrs % Annu % Containers (million teu) 13 0.52 182 7.4 Ro-Ro (million tonnes) 85 3.40 101 4.0 Non-unitised (million tonnes) 18 0.72 4 0.1 a) NPS Ports implies that the combination of a geographic shift in demand for port capacity towards the south east together with forecast GB growth rates for ports capacity when taken together suggest that trends extrapolated from historic traffic on the Thames Estuary may not provide a sound basis for forward planning for ports capacity and effects of ports going forward. Please set out your observations on this.	be considered in the context of the depression of 2008/9, the recovery from which would be expected to be shown as a greater increase between these years than may otherwise be expected. The decline in tonnage for major ports associated with the depression is clearly shown in the Figure 43 of the NRA. The Applicant therefore acknowledges that there has been a recent spike in trade tonnage, but benchmarks this against a decade of data to give an overall 10% predicted increase (noting that increases in tonnage does not directly correlate with increases in vessel numbers). This is also important to contextualise regionally through reference to Felixstowe, which has seen a reduction in 12% overall and a spiked decline of 15% between Q4 2017-and Q4 2018. This is important to note as London Gateway in particular have identified during examination that there has been a recent significant shift in trade from Felixstowe to London Gateway as a result of Gateway winning a suite of clients from Felixstowe. This therefore highlights a shift in shipping as a result of competition, but does not indicate an overall 10% increase in vessel traffic to the region. The Applicant has therefore sought to identify a balance between future trends as a result of increased port capacity and vessel movements against future trends in inter port competition. In this context the Applicant considers the 10% future baseline to be appropriate. ii) and iii) in light of the response to i) the Applicant has no response to questions ii) and iii) at this stage but will respond where necessary to IP submissions. d) The Applicant has undertaken an assessment of future traffic profiles that are based on IP visions for the region. Further to this the Applicant has undertaken a detailed quantitative and qualitative analysis of the required searoom to ensure not only existing activities can continue, with any predicted impact minimised,		

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		b) Are the NPS Ports policy assumptions about port and traffic growth rates (NPS growth rates) relevant to the adoption of growth assumptions for the NRA and NRAA for this Application and if not, why not? c) If the NPS growth rates are relevant, in the policy context around the need for ports development set by NPS Ports, acknowledging the Thames Estuary to be an existing and a prospective location for NSIP scale port development: i. does the 10% traffic growth assumption used for NRA purposes in this application sufficiently address the growth assumptions underpinning NPS Ports as summarized above; ii. if it does not, could it reasonably be concluded that waters around the development would experience higher traffic levels than those included in the NRA and NRAA; and iii.if (ii) is the case, do the NRA and NRAA provide a sound basis on which to assess the effects on navigation risk of the proposed development in a context where NPS Ports compliant use and development continues to occur? d) Are there circumstances in which the proposed development could form a constraint on shipping traffic capacity that would limit the ability of existing and/ or prospective NSIP scale ports to contribute effectively to meeting the national need for port capacity assessed in NPS Ports?	but by virtue of providing for consecutive transit of the largest vessels (4*333m vessels, noting only 1 has passed the inshore route in 21 months as evidence in Appendix 27 of the Applicant's D4C submission) the Applicant has provided for a future baseline which comprises concurrent passage of larger vessels than currently regularly transit the inshore routes. In light of this the Applicant's evidenced position is that the proposed development will not form a constraint on shipping traffic capacity that would limit the ability of existing and consented NSIP scale ports scale ports to contribute effectively to meeting the national need for port capacity assessed in NPS Ports. The Applicant is unaware of any other prospective NSIP scale ports that would be material to the proposed Thanet Extension project either with regards cumulative effects, or the ability of the region to meet trade forecasts.		
3.12.14.	Trinity House (THLS)	**Effects on visual navigation**	The Applicant notes that this question is for Trinity House, but has the following observations to make:	**TH response:** a) TH consider the proposed extension would not obscure the major light in the area at North	a) This is noted b) This is noted, but the Applicant notes that appropriate lighting to mitigate this will be

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		Please would THLS comment on the following statements in the NRA: a) the NRA summary that "*the positioning of the wind farm is not considered to have a significant effect on visual navigation…*" [APP- 089] NRA p129 para 17. b) the conclusions of the NRA that "*markings of the arrays may diminish the effectiveness of the major navigational lights adjacent to the site*"? [APP-089] NRA p93 para 7.8.2. c) [REP1-012] Applicant's Response to [RR-044] ESL-4 Para. 7.8.2 "*…Offshore wind farms provide landmarks for vessels and are used as part of the general navigation toolkit*." and Para 7.9.6 "*A review of previous studies undertaken and discussions with stakeholders on the impacts of the existing wind farm have not identified any significant adverse impacts which may increase the risk of an accident to [sic] shore based or ship board communications, radar or positioning systems.*"	a) The Applicant considers the proposed wind farm is not considered to have a significant negative effect on visual navigation. The presence of a windfarm, particularly in the navigationally challenging and shallow waters of the Thames Estuary, would have a positive effect in that it provides a large, unambiguous and conspicuous visual (and radar) reference for any mariner in establishing his location. In modern times, satellite navigation systems largely tend to diminish the importance of visual references as the primary navigation source, but as a source of absolute positional truth the importance of a windfarm as an aid to navigation cannot be denied. b) The Applicant notes that the characteristics of any array lighting will have been specifically designed and mandated by Trinity House so as not to present any possibility of confusion with any nearby navigational lights. c) A wind farm presents a unique and unmistakable navigationally significant mark both visually and by radar. Even if two farms are proximate to each other, the shape of the arrays by radar and their visual appearance are always such that they are quickly and easily distinguishable and thus gives the mariner a unique and distinct navigational point. With regard to radar shadows, any fixed object will cast a radar shadow but the wide spacing (over 100m apart) and low density of the arrays will have a relatively limited effect against a properly set up and well maintained 3cm or 10cm band radar (typical frequencies for marine band navigation radars).	Foreland. However, there could be the possibility that the buoys in the area would take longer to be seen and identified when approaching from the East. This could be compensated by the presence of the windfarm itself and any aids to navigation installed on the turbines. b) TH agree with this statement and the fact that the effectiveness of major navigational lights can be diminished by the presence of a windfarm array. This can be from physical obscuration or from additional lights on the array being confused with aids to navigation. c) TH cannot disagree with the applicants RR-044 ESL-4 Para 7.8.2 as it is extremely general. Para 7.9.6 can also be taken as a general statement depending on the perception of the term "significant adverse impacts". Studies have shown windfarms to have an adverse effect on systems like radar and radio with varying degrees of severity. This was shown by the radar pictures presented by the London Pilots at 1SH8 however we were all unaware of the radars setup at the time the picture was taken. This is down to the knowledge and experience of the operator which comes back to our previous submissions that not all mariners operating in the area have the same levels of competency.	detailed in the aids to navigation management plan as secured in the DML(S). c) This is noted and agreed. The Applicant has responded separately to the radar pictures and the underpinning case presented by LPC. In general terms the Applicant accepts that operative competency will vary, albeit radars are utilised by trained and qualified mariners.
3.12.15.	Port of Tilbury London Ltd / London	**Future growth of shipping traffic** In [REP5-012] D5 Appendix 7 para 81 the Applicant notes that Mr Crockett for POTL/LGPL accepted at ISH8 a figure of 10%	The Applicant notes this question is directed to POTL/LGPL, PLA and LPC, who have yet to provide any detailed or substantive analysis on growth forecasts for the TEOW Study area, and	**PoTLL and LGPL response:** (a) The Ports do not accept that 10% is a robust assumption for growth of vessel numbers in the inshore route, or that Mr. Crockett conceded	A detailed analysis of historic and future trends in tonnage, and vessel arrivals at Port of London has been provided at Appendix 16 of this Deadline 7 submission. The Applicant can confirm that the

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	Gateway Port Ltd (POTL/LGPL), Port of London Authority / Estuary Services Ltd (PLA) and London Pilots Council (LPC)	growth for the inshore route and at para 92 that an increase in "larger vessels which would necessarily use the …SUNK pilot boarding ground"; and at para 98 the Applicant states "…as vessel size increases use of SUNK over NE Spit boarding grounds would therefore be apparent…". Would POTL/LGPL, PLA and LPC: a) confirm this understanding of 10% growth of use of the inshore route; and b) provide a reasoned estimate for growth of traffic using the NE Spit Pilot Boarding Diamond; and c) with reference to their submissions at D5, confirm whether larger vessels would necessarily use the SUNK approach to the ports; and d) what net difference is likely to be made to the overall traffic movements to and from the Ports of London and Sheerness over the life of the TEOW project due to increase in ship movements to and from the PoT and DPWLG; and e) provide evidence of what difference to the volume and profile of traffic using NE Spit PBD (whether or not via the inshore route) would be likely if a capital dredge were made of North Edinburgh Channel or Fisherman's Gat (as have been stated in evidence to this Examination as being under consideration although not as yet as firm project proposals), in particular the likely growth in Class 1 and 2 and other large vessels; and f) what might be a likely range of the quantum of economic and commercial effects on the efficient use of tidally constrained berths at the London and Sheerness ports by adding approximately an	would like to note the following Applicant clarifications to the EXA questions. *a) confirm this understanding of 10% growth of use of the inshore route; and* As noted by the ExA this was confirmed by HR Wallingford representing the IPs at ISH8 as is recorded in session 3 of 5 at approximately 1:28:00.	such during his verbal representations at ISH8. Mr. Crockett made the point that discussing aggregated growth is somewhat misleading as it is the growth in certain sectors (for example container traffic where growth is anticipated to be high) which will inform the quantum of economic impact. The reduction in sea room is likely to disproportionately affect larger vessels (noting, that the Applicant's pilot simulation study only considered vessels up to 240m). It is therefore relevant that, notwithstanding the Applicant's aggregate growth assumption of 10%, it is the Applicant's contention that there will be a trend towards larger vessels and thus the future baseline growth in vessels greater than 240m LOA is likely to be more significant. Growth in large vessel-orientated sectors such as container traffic therefore needs to be taken in to consideration and weighed appropriately when considering the economic impact of the proposals. (b) As the data available to the Ports relates only to POTL/DPWLG vessel traffic, it is not possible to comment on growth in wider (total) usage of the NE Spit Pilot Boarding Diamond. The HR Wallingford Report (REP4C-016) identifies that in the year to 30 November 2018 a total of 754 and 160 POTL and DPWLG bound vessels respectively utilised the NE Spit. Within the Ports' Deadline 1 representations (REP1-148) at Table 3.2 of Appendix A, the Ports identify projected growth in throughput of approximately 285% and 265% respectively between 2018 and 2038. If these growth proportions are applied to the numbers of vessels utilising the NE Spit identified above then this would suggest that in the period to 2038 the number of POTL and DPWLG bound vessels utilising the NE Spit would grow to 2149 and 424 respectively, an increase of 1395 and 264 vessels respectively. It is acknowledged that there is a trend towards larger vessel sizes which may reduce vessel numbers using the NE Spit to an extent as the very largest vessels would have a	10% future baseline for vessel traffic is considered robust. The Applicant and PoTTLL and LGPL has demonstrated (though analysis of AIS datasets) that use of the inshore route has been shown to be largely limited to smaller vessels, and that larger vessels (especially container vessels) tend to navigate into / out of the Thames Estuary via the SUNK and or to the east of the TEOW in the present case and therefore use of the inshore route for larger vessels is unlikely to be as hypothesised by the POTLL / LGPL. Whilst the Applicant notes the basis here, it urges caution on inferring a direct relationship between increased tonnages of cargo (and not even vessel numbers), with a directly corresponding increase in vessels at the NE Spit Boarding Diamond. This gives no consideration to the mix of vessels (in a baseline or future case) by length, draught, and manoeuvrability that choose to transit and undertake pilot transfers (through choice or existing physical constraints) at alternatives to the inshore route and the NE Spit pilot boarding diamond. The Applicant has provided further commentary on the methodological basis of adopted by this IP at REP 6-038 -Action Point 17. Notwithstanding this a detailed analysis of historic and future trends in tonnage, and vessel arrivals at Port of London has been provided at Appendix 16 of this Deadline 7 submission. The Applicant can confirm that the 10% future baseline for vessel traffic is considered robust.

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		hour's inbound steaming time should masters carrying time-critical or time-sensitive cargo decide (based on "dynamic risk assessment") to divert passage around the east of the Thanet WF and board a pilot at NE Spit instead of otherwise taking the shorter route to the NESP pilot diamond?		draft above that which could be served at the NE Spit. As highlighted in the Ports' Deadline 4C submissions (REP4C-016), the expectation is that the majority of the growth in vessel sizes will be represented by a shift towards vessels of 280 – 320m LOA and such vessels are capable of boarding a pilot at NE Spit.	
				(c) Table 5.2 of the HR Wallingford Report identifies a ruling depth (chart datum) of 8.1m in the Princes Channel. On the basis of a 4.8m maximum tide height and 1.3m under keel clearance, it is considered that vessels of up to 11.6m draft could route via the Princess Channel. Deeper draft vessels will be required to use alternative routes, such as the SUNK.	The Applicant refers to their response to 3.12.11 (REP6-026) in which they stated a maximum draught vessel of 11.3m would use the inshore area (and Princes Channel) and thus can be considered comparable with the HR Wallingford conclusion. This is notwithstanding that PLA and LPC have stated that vessels of 333m LOA will have draught restrictions of between 9 and 10m variously (through risk assessment which the Applicant has requested but not seen) and thus it must be recognised that larger vessels by draught/length may, in the baseline, have a draught constraint imposed through broader reasons of navigational safety.
			b) provide a reasoned estimate for growth of traffic using the NE Spit Pilot Boarding Diamond; and The Applicant notes that available data on usage of the NE Spit Pilot Diamond is limited, but based on response to ExQ3 3.12.10, that pilot transfers at NE Spit have declined over the last 3 years, despite increases in trade volumes occurring for the PLA. As such the Applicant considers that it is unlikely that there would be any increase is vessel traffic at the NE Spit Pilot Boarding Diamond. The PLA have, at ISH8, noted an 11% increase in pilotage operations during 18/19. This increase (if sustained throughout 2019 which is not certain) is offset by declines during previous years and as such growth may be considered to be neutral the last 3 years.	(d) POTL/LG response on matters relating to future baseline. Representation is presented in full in Appendix 16 to this Deadline 7 submission.	The Applicant has responded to this response at Appendix 16 to this Deadline 7 submission.
				(e) The Ports are not aware of the details of any potential future dredging of the North Edinburgh Channel and are therefore unable to offer a response to this question.	This is noted and that details of any potential future dredging of the North Edinburgh Channel is not associated with the ports anticipated growth.
				(f) There are a number of unknown variables which make it difficult for the Ports to empirically assess the quantum of economic and commercial effects outlined. The Ports have however provided information below in order to try and assist the ExA in their analysis of quantum as far as possible. Information provided by the Ports at Deadline 5 (REP5-071) identified that DPWLG had a total REEFER (refrigerated shipping container) throughput of 147,942 TEU and POTL had a total throughput of perishable cargo of 789,611	The Applicant notes that POTLL / DPWLG are not able to provide any basis of figures for this calculation. The basis of unplanned diversion is also absent of any specific frequency of occurrence – the Applicant would note that this is because vessels are mandated by IMO SOLAS Chapter 5, Annexes 24 & 25 titled "Voyage Planning" and "Guidelines for voyage planning" respectively, which give specific regulatory information with regard to the passage plan. A passage plan is a comprehensive, berth to berth

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				tonnes in the year to 30 November 2018. This equated to an average of 140 TEU per vessel and 219 tonnes per vessel respectively (noting that not 100% of vessels which visit the Ports are REEFERs or carry perishable cargo). Applying weighting against differential vessel sizes (using vessel size proportions in Table 2 of the Ports' Deadline 2 submissions (REP2-050)) suggests that, for vessels over 250m this would increase to an average of 277 tonnes and 297 TEU per vessel respectively. Paragraphs 6.5 and 6.6 of the HR Wallingford Report (REP4C-016) identified that in the year ending 30 November 2018 a total of 534 and 79 inbound vessels transited the inshore route to POTL and DPWLG respectively. Therefore, if we are to apply the unweighted average of REEFERs and perishable cargo per vessel outlined above this would suggest that in the year to 30 November 2018 a total of 116,946 tonnes of perishable goods heading for POTL and 11,046 REEFER TEUs heading for DPWLG transited the inshore route. POTLL/LGPL contend that the Applicant has not provided sufficient information to determine the impact of the proposed TEOWF on the ability of vessels to continue to transit the inshore route/board a pilot at NE Spit. It is therefore considered impossible at this stage to determine what proportion of these perishable goods/REEFER TEU would be subject to diversion, whether it be planned or based on the dynamic assessment of the ship's Master. The effect of diversion, in cost terms, depends on a number of other factors. For planned diversions the cost impact would be expected to be limited (to a large extent to the cost of the 1 hour additional steaming time). It is not considered that a tidal window, for example, would be missed in a planned diversion. An exception to this is that some short sea services from Europe compete with road haulage with very small	guide, developed and used by a vessel's bridge team to determine the most favourable route, to identify potential problems or hazards along the route, and to adopt Bridge Management Practices to ensure the vessel's safe passage.

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				margins such that a very small increase in transit times can significantly affect commercial decision-making. The cost impact of the unplanned diversions which the ExA alludes to (i.e. based on dynamic assessment) will depend on a number of factors including the nature of the product, the shipping service, tidal conditions at the time and berth availability. Products such as chilled lamb and pharmaceuticals are of particularly high value. Some fruit products such as tomatoes have a very short life (approximately 2 weeks from picking). Short sea services such as those from the Mediterranean and Rotterdam are far more susceptible to time delays than other services. Should the Master's dynamic decision to re-route result in a tidal window being missed then the delay, and thus cost impact, can be very significant, particularly if berth availability does not allow the rescheduling of the vessel call on the next available tide. KPMG calculations (summarised in a 2018 House of Lords EU Committee Report) suggest that one day of delay for a lorry will easily cost a business 600 to 1000 euros (https://publications.parliament.uk/pa/ld201719/ldselect/ldeucom/129/129.pdf see paragraph 46). Longer sailing times or late arrivals often result in the need to utilise 'last-minute' hauliers who charge premium rates of between 20 – 25% higher than standard.	
			c) with reference to their submissions at D5, confirm whether larger vessels would necessarily use the SUNK approach to the ports; and	**PLA/ ESL response:** a) The PLA and ESL are concerned about the figure of 10% growth being used to reflect the growth in usage of the inshore route. When conducting an NRA, the figure for the increase in use of a route should include all users,	The Applicant has provided a detailed analysis of historic and future trends in tonnage, and vessel arrivals at Port of London has been provided at Appendix 16 of this Deadline 7 submission. The Applicant can confirm that the 10% future baseline for vessel traffic is considered robust.

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			The Applicant notes that vessels greater than 7.5m do not have to pay a surcharge for pilotage for boarding a pilot a the SUNK compared to the NE Spit, and therefore it is considered that the PLA have prioritised use of the SUNK for vessels with draughts greater than 7.5m. It is considered, that whilst vessels greater than 7.5m and up to around 10m draught do use the NE Spit and Princess Channel, this is primarily for the convenience and profitability of both the pilot service (as the vessel transit duration is less the time on board for pilots is less and therefore their utilisation can be higher) and ESL's pilot launch service which can service the vessel (at the SUNK an alternative, service is used which is not owned / operated by the PLA). Therefore, it is evident that efficiency, convenience and profitability are directing vessels that would otherwise use the SUNK to use the NE Spit.	commercial and otherwise. They are concerned that this 10% figure appears to conflate port growth with growth in usage of the inshore route. It would appear that the 10% figure includes the route to the East of TOW (not just the inshore route) which can be used by larger traffic bound for ports other than London and Medway. This is a route frequently used by very large vessels bound for Harwich. Growth of inshore route useage should encompass all users, commercial or otherwise, when conducting an NRA. It does appear that route usage growth has given way to port growth. It is not clear whether the 10% traffic growth is just for the inshore route. We have assumed that it is not, so includes traffic that uses the route to the East of TOW which can be used by larger traffic bound for ports other than London and Medway; this is a route is frequently by very large vessels bound for Harwich.	The Applicant notes the 10% increase in vessel traffic is applied to commercial vessels for reasons laid out in REP 6-038.
				b) Overall, future growth of traffic using the NE Spit is expected to be in line with the Ports' projections for future growth. In addition, a capital dredge of the North Edinburgh Channel or Fisherman's Gat would bring in additional traffic which currently uses the Sunk, which could be an additional 1000 vessels per year. This is an estimate for vessels potentially engaged in pilotage at the inner boarding ground rather than for all shipping.	The Applicant has previously stated their understanding of the status for a future dredge of either of these channels (as repeated in this document) and notwithstanding this IP's position notes that the predicted 1000 vessels per year is not evidenced and, if this were to occur, would presumably require risk assessment and revision to the baseline management of navigation in the area including pilotage (e.g. whether a 1 boat service would be sufficient).
				c) Vessels that are too deep to use the Princes Channel would necessarily use the North channels via the Sunk deep water route or Long Sand Head. However they do not necessarily have to use the Sunk Pilot station. Vessels such as the LNG ships bound for the Medway take Pilots in the vicinity of the Tongue and then transit to the north.	The Applicant has previously stated their understanding of the status for a future dredge of either of these channels (as repeated in this document). The use of Tongue and NE Goodwin are complementary to use of SUNK (and NE Spit) and should therefore also be considered in the context of capacity and resilience to pilotage provision in the event of SUNK being off station.

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				The future dredge of the North Edinburgh Channel or Fishermans Gat will allow larger vessels, especially those approaching the ports from the south to use the NE Spit instead of the Sunk and optimise their journeys in and out of the Thames and Medway. Even if growth was focussed on larger vessels, a good proportion could still be served at the NE Spit, it is not a fair assumption that all large vessels will only use/or focus on the Sunk. The importance of the NE Spit will also increase as a proven bad weather station. This is because larger ships face a larger impact when they are delayed and the NE Spit currently provides a more resilient operation than the Sunk when time 'off-station' is considered.	Larger vessels with deeper draughts are inherently limited in their ability to transit the Princess Channel and NE Spit area due to existing depth limitations and these restrictions will continue to exist in the event of this dredge aspiration at North Edinburgh Channel or Fishermans Gat.
			d) what net difference is likely to be made to the overall traffic movements to and from the Ports of London and Sheerness over the life of the TEOW project due to increase in ship movements to and from the PoT and DPWLG; and The Applicant notes that analysis presented in the NRA A shows that whilst trade increased at the PLA since 2004, ship arrivals have actually decreased significantly. Therefore, the Applicant does not consider that there will be an increase in ship arrivals, but that there will be an increase in trade, which will be accommodated by larger vessels which are unlikely to transit in the vicinity of the TEOW. The Applicant has utilised a 10% growth figure which reflects a balance of a ten year trend in growth (7%) against recent peaks in growth (11%) for the Port of London as noted in ExQ3.12.13, which it considers to be precautionary.	d) These Ports, rather than the PLA and ESL, are be best- placed to advise on projected increases in ship movements to and from the ports.	The Applicant has no comment to make
				e) The feasibility studies for the North Edinburgh Channel or Fisherman's Gat channel dredge estimated that there were just over 1000 vessels in a year of drafts between 8m and 13m (based on 2017 data) that used the Sunk, but approached from the South. For these vessels it would have been feasible for them to have taken pilots at the East Spit and used the North Edinburgh Channel or Fisherman's Gat, as a more optimal route. The majority of these vessels fall into Class 1 or 2, either by length, draft or both. From an ESL perspective this could lead to a significant upturn in traffic at the NE Spit PBD, particularly improving potential for class 1 vessels to use the southern route (class 1 vessels accounted for 23% of overall ESL boarding and landing in 2018).	The Applicant has responded separately regarding considerations on North Edinburgh Channel and Fishermans Gat. This is repeated within this document for ease of reference. Notwithstanding that the PLA has not provided the Applicant with the feasibility studies or the underlying data and evidence base behind this assertion, it is noted that vessels of up to 13m draught are stated which appears to be in excess of what would transit within the inshore route at NE Spit and/or the Princes Channel.
				f) The economic and commercial effects on berths at the London and Sheerness ports are best identified by those Ports. In terms of time	This response is noted although the Applicant maintains the inshore route remains viable for continued navigation and therefore re-

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				the effect on any diversion around the eastern side of the windfarm would be at least 1 hour, which could be increased by poor met ocean conditions. In terms of distance the diversion is 14nm (if the vessel comes to the inner boarding position) or 11nm (to the vicinity of current Tongue DWD). The additional time would have a significant impact on the cost-effectiveness of ESL's pilot and boarding operations and knock-on economic and commercial effects on vessels using those ports.	routing/deviation as described by this IP is not required.
			*e)*As noted in the Applicant's more comprehensive response to EXQ 3.12.8 on this matter there does not appear to be any proof of a project or plan for capital dredge of the North Edinburgh Channel or the Fisherman's Gat (and certainly to the extent and depth as indicated by LPC in their submissions to date) and as such these options remain no more than possible aspirations noting it would be the PLA who would be responsible for their implementation and not LPC.	**LPC response:** No response was received from the LPC for this question.	The Applicant has no further comment although notes that the premise of using Fishermans Gat and/or North Edinburgh Channel originated from LPC at Deadline 5.

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			f) Whilst no detailed data is available on "carrying time-critical or time- sensitive cargo" the Applicant notes that the presence of the TEOW will be a factor in the passage plan of any vessel engaged on trade to from the London and Sheerness Ports, indeed this will be well known long in advance of any actual passage, and as such the Applicant would note that its presence should be planned for. Further to this, it is understood perishable cargos are generally carried on smaller feeder container vessels of around 130-180m in length. The vessel noted at the site visit for POTLL as a "time critical vessel" was the *Ensemble* a 134.6m container vessel, which was not tidally contained - it is the case that time critical vessels are commonly not tidally constrained. The Applicant also noted in the Statement of Evidence [REP4C-003] that it is a frequent occurrence for vessels to arrive at a port early and stooge or wait around prior to entry – primarily due to berth, pilot or water depth availability. Indeed, at the site visit on 15th April to DPWLG, three vessels were alongside and two vessels out of the three arrived at the port approaches and waited, even though MetOcean characteristics were not challenging. The premise therefore that an hours' additional steaming time could have anything, but negligible consequences is not accepted by the Applicant, who notes the vessel transits are dynamic and affected by a number of factors, which are considered in the round when passage planning – the least of which would be the proposed TEOW. Notwithstanding this the Applicant has provided a contextual consideration of economic effects at Annex C to Appendix 26 of this Deadline 6 submission.		

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3.12.16.	Port of Sheerness Ltd (PSL)	**Effects on navigation-shipping routes adjacent to the development** In the Applicant's Response to [RR-011] Port of Sheerness Ltd PSLM-1, it is stated that: *a) "All existing routes remain navigable by existing vessel traffic and potential changes to these routes (in terms of time and distance) that may arise as a result of the proposed project have been identified and assessed. The conclusions are presented in Table 10 of the NRA (PINS Ref APP-089/ Application Re 6.4.10.1) and are that the changes are considered minimal."* b) "*The changes to routing are considered to be minimal with no alteration to shipping lanes/routes beyond a reduction in the route between the Array and land to the south-west; this change is in an area with significantly less traffic than other routes within the immediate area. As such it is not expected that there would be any significant effect on routing of traffic."* Does Port of Sheerness have any further comments to make on the development proposal in relation to shipping traffic and potential commercial or economic consequences of any effects to shipping and port operations?	The Applicant notes this question is for the Port of Sheerness and will respond to any representation made in due course.	**PSL response:** Port of Sheerness Limited(PSL), is the Statutory Harbour Authority for the River Medway and a 50% shareowner in Estuary Services Limited(ESL). ESL & Port of London Authority (PLA) as formal IP's have made various representations regarding the effects on navigation routes adjacent to the proposed extension and, in particular NE Spit / Tongue / Elbow routes and pilotage boarding and landing areas. PSL pilots make significant use of these pilot boarding & landing areas and consider the extension proposal will result in economic and commercial consequences for all three stakeholders, should it be Consented in its current form. PSL support submissions made on behalf of ESL at various stages of the Consultation process and continue to support through their shareholding in that company. PSL would support a commercial discussion and engagement that mitigates any/all of these issues through pragmatic and robust navigational risk assessments and commercial impact reduction.	The Applicant notes these comments with regards to the relationship of PSL's position to ESL submissions, noting that the Applicant has engaged extensively with ESL throughout pre-application and examination.
3.12.18.	Port of Tilbury London Ltd, London Gateway Port Ltd (PoTL/LGPL)	**Answers given at ISH8 by POTL/LGPL Expert witness** In [REP5-018] at para 76, the Applicant states that in questioning of expert witness Mr Vincent Crockett {VC}, "*VC accepted that all other input scores had been agreed at the workshop*" and "*there were no comments on the risk controls*". • Would PoTL/LGPL comment on this record of answers given?	The Applicant can confirm that Mr Crockett agreed the categorisation of vessels to have been agreed at the workshop although noted that the preference of POTL/LGPL would have been for a more granular approach, this appears in the recording of ISH8, part 3 of 5 at 1:18:00. Following this Mr Crockett at 1:34:40 agreed that all other input scores were agreed including baseline and inherent scores.	**POTLL and LGPL response:** The Ports have been consistent throughout the examination process in clarifying that their primary interest lies in the potential economic consequences of the proposed TEOWF. It is considered that an increased risk, or the perception by mariners of an increased risk, would give rise to economic consequences if such increased risk, or perceived increase in risk, results in mariners taking alternate actions (i.e.	The described remit of Mr Crockett and Mr Hutchinson at the hazard workshop is noted. The Applicant has welcomed their participation beyond the specific subject of potential economic consequence (for example, Mr Crockett referred to incident reports in regard to contributing to likelihood discussions), control measures such as NE Spit Racon Buoy and appropriate manning of vessels engaged in coastal passage. The Applicant has provided at Annex B of this submission email correspondence between Mr Crockett of POTLL

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				re-routing or seeking alternate pilot boarding stations). At the hazard workshop on 29 March 2019 POTLL/LGPL were represented by Mr. Crockett and Mr. Hutchinson. The remit of the Ports' representatives was to ensure that the economic consequences were appropriately considered by the Applicant and IPs. Neither Mr. Crockett nor Mr. Hutchinson are master mariners nor do they have experience of commanding or piloting commercial vessels. Minded by the above, during the workshop Mr. Crockett and Mr. Hutchinson limited their comments to matters relating to property or stakeholders. No comment was offered with regard to likelihood of accidents or the appropriateness/effect of risk controls. POTLL/LGPL defer to the other IPs who are responsible for maritime safety in this regard. At ISH8 Mr Crockett, in his verbal representations, confirmed that POTLL/LGPL had not offered comment on the scoring applied to matters beyond consequence scores relating to Property and Stakeholders. He also confirmed that POTLL/LGPL had no views on the hazard scoring subsequently put forward by the PLA.	and DPWLG and the Applicant noting feedback from this IP on 02-Apr (and prior to the workshop follow up telecon) and 05-April. The Applicant also notes Mr Crockett's active participation in the 27-Feb workshop on suitable agreed methodological guidance for determination of sea room.
3.12.19.	Port of London Authority (PLA); Maritime and Coastguard Agency (MCA); Trinity	**Embedded and additional risk controls in NRA and NRAA** In [REP5-012] D5 Appendix 7 para 81 the Applicant states that "*the embedded and additional risk controls identified as part of the Addendum NRA do not need managing by the PLA*" and at paras 82 and 90 commits to 2 lines of orientation that would ordinarily be left to later confirmation with MCA and TH.	The Applicant will respond in due course to Port of London Authority (PLA); Maritime and Coastguard Agency (MCA); Trinity House (THLS) responses.	**PLA/ ESL response:** a) The PLA and ESL consider that the promulgation of information (enhanced or otherwise) will need the PLA to inform shipping, and London VTS. It is also possible that the PLA would need to give out navigational warnings if there are works in the area. b) In the PLA and ESL's view, the Applicant's statement does not address the concerns raised in earlier representations. The extent to which	**PLA/ESL** a) The Applicant will manage the implementation of promulgation of information although it is agreed that some components of this could be delivered/administered by PLA as they see fit, and the Applicant will provide the PLA with the necessary information to do so. This accords with the MCA understanding as below.

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	House (THLS)	Would the PLA, MCA and THLS comment on: a) whether they agree with this statement; and b) whether it addresses the concerns raised in earlier representations; and c) whether there are other considerations of involvement by IPs in maintaining the effectiveness of such embedded or additional risk controls that should be considered by the ExA; and d) whether the commitment made by the Applicant to 2 lines of orientation (thereby proposed as embedded rather than additional mitigation) changes the IPs' view on the "double-counting" of embedded and additional mitigation?		the PLA and ESL agree with the mitigation proposed is set out at 3.12.21. c) See 3.12.21: no further comment d) No further comment **MCA response:** a) MCA agrees with the statement: "the embedded and additional risk controls identified as part of the Addendum NRA do not need managing by the PLA". The responsibility of managing risk controls listed in the Addendum NRA (Rev B) paras 134 & 135 should remain with the wind farm operator. However, it is not yet known what the implications will be for third parties through the use of the Shipping and Navigation Plan, and the establishment of the Shipping and Navigation Liaison Group. b) MCA's previous comments at deadline 5 remain: "Optimise TEOW line of orientation and symmetry' is a duplicate of 'Layout plan to be submitted to MCA for approval prior to construction' in Paragraph 133. Part of this approval process is to ensure the turbine layout design allows for vessels and SAR helicopters to safely transit through the wind farm, therefore it aims to optimise lines of orientation and symmetry". c) The MCA has no other considerations to offer at this time. d) The MCA welcomes the applicant's commitment to at least two lines of orientation. MCA still contends that this is a duplicate of the embedded risk control "Layout Plan to be submitted to MCA for approval prior to construction". MCA and TH approval of a layout plan is a standard DML condition and the discussion on layout with MCA and TH will take place post-consent, if granted. MGN543 Annex 2 section 2.d. states: "Developers should plan for at least two lines of orientation unless they can clearly demonstrate that fewer is acceptable." Any layout plan submitted to MCA and Trinity	b) Noted and refer to Section 3.2.21 c) Noted and refer to Section 3.2.21 d) Noted and refer to Section 3.2.21 **MCA** a) The agreement of MCA is noted b) The Applicant has committed to provide the layout plan, which will be submitted to the MMO and MCA for approval in accordance with the requirements of the DCO (this is the embedded risk control component). The further mitigation measure of optimised lines of orientation is secured in the schedule of mitigation and will be reflected in the layout plan submitted pre-construction (and is an additional risk control). This is therefore not a duplicated risk control. c) No comment d) As per item (b). It is considered that this remains an additional risk control and not embedded. The Applicant notes that there is precedent in other ORIE projects for lines of orientation not being symmetrical in either one or two planes of symmetry and therefore it is entirely appropriate for this risk control to remain as an additional risk control measure and not embedded - the Applicant also notes this concurs with TH position (below).

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				House should plan for two lines of orientation and this would therefore be considered as optimised under this paragraph. **TH response:** TH state that the lines of orientation are ordinarily agreed post consent by both ourselves and the MCA before the MMO have the final sign off for the DML. This is normally achieved through post consent meetings where the lighting and marking are also agreed by all parties for Maritime Search & Rescue operations. This also includes Identification marking requirements as discussed with the Fishermen at 1SH8. The criteria laid out in Para 134 & 135 as embedded and additional risk control measures cause TH concern especially Para 135. The "Enhanced Promulgation of Information" is only what we would expect to see and is nothing different to that currently being promulgated by any other windfarm including the existing Thanet OWF. It is not apparent what obligations will be put on participants involved in the "Shipping and Navigation Liaison Group". As this is derived from the Shipping and Navigation Plan suggested at previous hearings would this be considered a statutory body with implications on all IP's? The "Enhanced Optimisation of TEOW line of orientation and symmetry" and commitment to two lines of orientation means very little unless it is written into the DCO/DML as this is subject to post consent deliberations and MCA guidance through MGN543. TH acknowledge and welcome this commitment if it becomes binding on the applicant.	**TH** The Applicant notes and agrees that lines of orientation are ordinarily agreed post consent (noting ref to MCA comment above). Para 135: "Enhanced Promulgation of Information": The Applicant does not agree because the proposed information relates to not only standard aspects that might be ordinarily included in OWF's but for the TEOW is site and project specific and, for example, also includes WFSV passage plans, maintenance programmes, outputs of the shipping and navigation liaison group and fisheries together with links to local yacht clubs. Para 135: "Enhanced Optimisation of TEOW line of orientation and symmetry". The Applicant notes this comment and provides assurance that this is secured in the Schedule of Mitigation, and layout plans committed to within the DMLs to ensure it is a binding commitment on this additional risk control as proposed. The Applicant notes the comment on Drill Stone and notes that this was identified that its 'likely relocation is as necessary depending on final layout of TEOW and updated based on post consent monitoring' (which is a TH requested risk control). Thus there is no expectation of relocation without assessment and review with TH and the Applicant does not seek to suggest that TH assets would need relocation unless TH concurred with such an assessment.

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				TH do not consider it appropriate for the applicant to be promoting the "likely relocation of Drill Stone" as this is a TH asset and subject to our requirements and assessment of the maritime traffic in the area in conjunction with the risks acceptable to ourselves.	
3.12.20.	Port of London Authority (PLA); Maritime and Coastguard Agency (MCA); Trinity House (THLS); POTL/LGPL and PLA and London Pilot Council (LPC); Thanet Fisherman's Association (TFA); UK Chamber of Shipping (UkCoS); Port of Sheerness Ltd (PSL)	**Textual changes to the NRAA made at deadline 5** Would the IPs comment on the recent textual changes in regard to traffic projections made at Deadline 5 to the NRAA (rev B) [REP5-039] insofar as relevant to this DCO application: a) Para 121: "…*slightly downward trend in chargeable ship arrivals over recent years…*" albeit "…*PLA figures do not include other estuary ports…*"; b) Para 122: "…*precautionary 10% uplift in hazard likelihood has been applied…in line with other OWF NRA assessments…and is reflected in the Tilbury 2 NRA…*"; c) Para 123: "…*It is important to note …[that the MMO] future analysis for the region assumed that overall freight tonnage would increase, by between 1% and 2% per [sic] the trend for larger vessels would continue, and that the Thanet Extension OWF would be consented*." d) Para 124: downward or static trend for recreational and fishing activity; and	The Applicant will respond in due course to Port of London Authority (PLA); Maritime and Coastguard Agency (MCA); Trinity House (THLS); POTL/LGPL and PLA and London Pilot Council (LPC); Thanet Fisherman's Association (TFA); UK responses.	**MCA response:** In matters of commercial operations MCA defers to the local ports to help inform decisions regarding the safety of navigation at a local level. The MCA recognises that the sources of data the applicant has used may be appropriate on a national scale, however all offshore renewable energy projects are assessed on a case by case basis and the 10% figure is challenged by the local ports as an unrealistic figure. **PLA/ ESL response:** a) The 'All Trade' figures for 2018 (including intra-port information) indicate that there has been a slight downward trend in ship arrivals over 2018 in particular. However, the ships that have been coming into the Port are getting bigger and so there has not been a downward shift in tonnage etc. coming into the Port. In addition, data gathered by the PLA for the first 3 months of 2019 shows an 11% rise in the number of ships entering the Port, indicating an upward trend in vessel movements. ESL served 622 vessels over 199.9 loa in 2016 and 757 in 2018, an increase of approximately 21%.	The Applicant has provided a detailed analysis of historic and future trends in tonnage, and vessel arrivals at Port of London has been provided at Appendix 16 of this Deadline 7 submission. The Applicant can confirm that the 10% future baseline for vessel traffic is considered robust. The Applicant has provided a detailed analysis of historic and future trends in tonnage, and vessel arrivals at Port of London has been provided at Appendix 16 of this Deadline 7 submission. The Applicant can confirm that the 10% future baseline for vessel traffic is considered robust.

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		e) Para 125: additional WSV (traffic) associated with the TEOW; "*WSV engaged on other projects within the Thames Estuary and transiting through the study area are anticipated to remain largely the same…based on consultation.*"		The PLA and ESL do not agree with the 10% increase in shipping/vessel growth for the TOW extension area and therefore do not agree that a pro-rata increase in risk of 10% is still applicable. The Tilbury 2 NRA was completed in 2017 and already in this year we have seen an upturn in trade, so these forecasts need updating. Given the complicated and varied nature of the traffic transiting and manoeuvring in the vicinity of the proposed Thanet Extended Offshore Windfarm, and that the proposed extension is in open waters rather than a river, it is not appropriate to draw a direct comparison with the Tilbury 2 development. Furthermore, the Tilbury2 risk assessment was for a specific part of the river and would not be affected by growth in some other areas such as London Gateway Port.	The Applicant has provided a detailed analysis of historic and future trends in tonnage, and vessel arrivals at Port of London has been provided at Appendix 16 of this Deadline 7 submission. The Applicant can confirm that the 10% future baseline for vessel traffic is considered robust.
				c) In the MMO 1127 future analysis document table 85 (Section 13.4/page 307) under the local stewardship scenario it suggests 1% annual growth in tonnage between 2017 and 2036, it also assumes slower growth for international shipping but an increase in smaller coastal vessels and windfarm maintenance vessels with regional shipping routes likely to show a larger increase in density. The MMO future analysis would not appear to suggest the increase in freight will be handled by fewer but larger ships, it actually appears to support an increase in traffic on localised regional routes and suggests an increase in smaller regional ports rate of growth.	The Applicant has provided a detailed analysis of historic and future trends in tonnage, and vessel arrivals at Port of London has been provided at Appendix 16 of this Deadline 7 submission. The Applicant can confirm that the 10% future baseline for vessel traffic is considered robust. Further to this it is relevant to note that the MMO future analysis states quite explicitly that the trend towards larger vessels will continue.
				d) The PLA and ESL do not agree with a long term projection of static/negative growth in the recreational sector. The RYA water sports participation survey 2017 does suggest a relatively small amount of growth in vessel ownership however it also recognises the South East as one of the highest use areas. It seems a broad assumption to relate national recreational boat ownership with localised recreational	The Applicant notes PLA's position with regards to minimal growth of recreational growth. The Applicant maintains a static/negative consideration as put forward on Page 10 of REP6-049. No evidence has been put forward as to a future increase of overseas recreational users albeit they are included in the MGN543 compliant survey and the RYA intensity maps and trends as suggested by this IP were not put

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				activity. The RYA survey is also, we believe, based on UK based survey participants only. The inshore route is frequently used by vessels crossing from the channel from Holland and Belgium who would not be considered by a study of domestic recreational sea users. It is also noted that NRA Section 6.3 (Summary of Future Traffic Profile) suggests a "steady increase" in recreational and fishing vessels although it is unclear if this is included in the 10% overall uplift by the applicant. The MMO future analysis document (section 11.4/table 67/page 228) also suggests potential growth for the fishing industry in the south east with regard to stock recovery over 20 years and the local stewardship scenario places emphasis on this growth having a positive impact on the 10m (and under) fleet specifically. The vast majority of fishing vessels operating around the inshore route and TOW are under 10m. We would suggest the national fleet numbers do not necessarily reflect regional fishing activity.	forwards by yacht clubs consulted. This is therefore incorporated within the aggregate increase in vessels within the study area of 10%). In the context of recreational and fishing vessels this is considered to be a suitably precautionary and robust assumption given the recognised overall decline in fishing vessels, and the marginal growth in recreational vessels. With regards the MMO future analysis document, and commercial fishing, whilst the future analysis report identifies a potential positive impact on stocks, this should be seen in the context of national statistics and regional industry representations. The Thanet Fishermen's Association in particular note (in their D6 submission) that there has been a decline in the inshore fleet in the Thames Estuary region over recent years, due to cumulative economic, legislative and industrial factors, as supported by the MMO figures for the under 10m fleet in the UK Sea Fisheries Statistics 2017.
				e) The PLA and ESL consider that the estimate for WFSV traffic increase is highly conservative given the relative youth of the offshore wind industry. Recently, the PLA has seen the London Array windfarm increase from 4 onsite WFSVs to 18 because of a summer maintenance programme. This has included work at night which was not previously the case. Although currently TOW does not work at night, this could change in the future. The PLA and ESL also note that in the NRA/Section 7.3.2/Results (collision modelling) it tests a scenario of WFSVs doubling on site and not remaining static for the Thanet wind farm.	The Applicant cannot comment on the assumptions that underpinned the London Array project and whether the increases in vessel traffic is within that project's consented envelope. The Applicant can however confirm that the proposed maximum design envelope for Thanet Extension with regards WFSVs is appropriate and has been defined according to the maximum design scenario anticipated. Any deviation from the assessed envelope would require a variation to the deemed marine licences to be agreed with the MMO in consultation with relevant stakeholders.

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				The MMO future analysis document (section 13.4/table 85/page 307/308) suggests an increase in wind farm maintenance vessels under the Nature@Work and Local Stewardship categories. It is difficult to understand what the predicted increase in WFSVs would be for the construction period (Annex D to Appendix 31 of Deadline 5/page 17). If WFSVs are provisionally incorporated within commissioning vessels, this would mean an estimate of 7 vessels making a total of 480 trips over a 3 year period. This would give an average return of 160 trips per year across, potentially, 7 vessels. This appears very low given our experience of traffic volume during construction or high maintenance periods for offshore wind farms.	
				TH response: a) TH has no comment. b) TH has no comment. c) TH has no comment. d) TH has no comment. e) TH has no comment.	The Applicant has no comment.
				POTLL and LGLP response: (a) The Ports refer to the response provided to question 3.12.15 (b) and (d) above. (b) Para. 122 of the NRAA does not provide a full reference to assist the Ports in identifying a specific reference in the Tilbury 2 NRA. The Ports do, however, highlight that paragraph 14.36 of Volume 6, Part A of the Tilbury 2 Environmental Statement (ES) dated October 2017 states: *"Based on 2016/17 data there will be an increase in the vessel movements in the Thames Estuary of up to 10% as a result of the development of Tilbury2"*	The Applicant can confirm that the POTLL and LGLP reference to the Tilbury2 application is accurate. The Applicant would also note however that the excerpt provided appears to only be a partial reflection of the Tilbury2 application. The full excerpt identifies that the 10% increase is *against a 2017 baseline*. There appears to be limited allowance made for any *future* baseline. The Applicant would also note that at the Accompanied Site Inspection, during the guided tour provided by the Port of Tilbury, that specific reference was made to much of the proposed traffic increase at Tilbury and Tilbury2 is an increase in 'upstream' vessels, that is vessels

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				It is therefore clear that the significant additional growth at DP World London Gateway and other port facilities along the Thames will result in overall growth of vessel movements in the Thames Estuary significantly in excess of the 10% allowed by the Applicant for future growth and that the Tilbury 2 ES is consistent with other representations made by POTLL/LGPL in this respect. (c) The reference at Para. 123 of the Applicant's NRAA is to "annual growth" rates. As discussed in response to question 3.12.15 (d) above, such rates would result in compound growth of 29.4% for the period 2017 to 2036. If this was extended at 1% per annum for the remainder of the reasonable planning horizon (to 2054) it would result in compound growth from 2017 to 2054 (i.e. 35 years) of 54.8% (if applied at 1% for 2036 to 2054) or 84.8% (if applied at 2% for 2036 to 2054). The Ports' assessment presented in response to 3.12.15(d) indicates that this would correlate to an increase in vessel numbers of 37.8% to 54.5%. (d) No comment. (e) No comment.	transiting between Tilbury and locations further up the Thames. It is also noted that the increase in traffic predicted for Tilbury2 does not confirm port of origin, with much anticipated to be from the SUNK and other northern approaches. Given the IPs have recognised a small proportion of their vessels to transit the inshore route any increase in future traffic would be a proportion of the overall increase predicted. To address this the Applicant has provided a detailed analysis of historic and future trends in tonnage, and vessel arrivals at Port of London has been provided at Appendix 16 of this Deadline 7 submission. The Applicant can confirm that the 10% future baseline for vessel traffic is considered robust.
				London Pilots Council response: No response was received from the LPC for this question.	The Applicant has nothing further to add.
				TFA response: Para 124: A downward, or static trend is also evident in recreational and fishing vessel activity categories in the area, and therefore no uplift to account for future growth has been included. This is evidenced in national trends for recreational craft (boat ownership trends show static numbers between 2007 and 2017) and fishing vessels (pg 13 of UK Sea Fisheries Statistics 2017 – MMO - shows <=10m vessel no. at 2014 – 2,573, 2015 – 2,598, 2016 – 2,569, 2017 - 2,512). Thanet	The Applicant notes that the MMO Future Trends analysis partially attributes increases in fish/shellfish stocks to the construction of the Thanet Extension OWF. Further, the overall trend is considered to be one of recovery to existing numbers of commercial fishing vessels rather than a net increase. Notwithstanding this the Applicant has assumed a general increase of 10% which is anticipated to be in excess of any future growth and is therefore a precautionary basis on which to assess potential impacts.

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				Fisherman's Association have stated that due to economic industry impacting fishing. The paragraph above correctly mentions that Thanet Fishermen's Association has stated that there has been a decline in the inshore fleet in the Thames Estuary region over recent years, due to cumulative economic, legislative and industrial factors, as supported by the MMO figures for the under 10m fleet in the UK Sea Fisheries Statistics 2017. However, the MMO document also mentions the potential uplift in shellfish landings for the inshore fleet, and the potential for the inshore fleet to improve, as below: UK Sea Fisheries Statistics 2017 MMO. Page 229. 6 to 20 year projection *Under BAU, stocks are stable but landings are below 2017 levels, due to declines in shellfish stocks. Efforts to manage local stocks and prioritise the inshore fleet under LS result in the redistribution of catches from larger to smaller vessels, and reduction of shellfish landings by under-10m vessels results in rebuilding of the stocks and higher levels of landings overall compared to BAU. Stock recovery under N@W results in the highest level of landings of the three scenarios. The implementation of MPAs and windfarms affects where mobile demersal fishing can take place, reducing the spatial footprint of seabed abrasion pressure. This is most pronounced under N@W, with the operation of the London Array and Thanet extension areas, as well as MPAs. Some effort would likely be redistributed to fishing grounds outside of the affected areas where intensity would increase. Under LS, the increasingly local focus of economic activity and decline in international markets potentially has the greatest impact on the fisheries sector under this scenario, resulting in reduced exports for fish and shellfish. However, this is offset to some extent by increasing local consumption of fish and shellfish, particularly in*	

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				combination with increased tourism, and development of local markets. With the potential repatriation and redistribution of quota for the inshore section, improved regional management and the drastic reduction in international pulse beaming etc, it is hoped that the Thames Estuary and Thanet inshore fleets will see an uplift in vessel numbers and increased stability over the coming years.	
				UK CoS response: No response was received from the UK CoS for this question.	The Applicant has no further comments.
				PSL response: PSL were not directly consulted in regard to the HAZID workshop or the development of the NRA or NRA Addendum and therefore cannot comment on the textual changes other than:- There has been an increase in chargeable ship arrivals at Medway ports using NE Spit Boarding and Landing Station of 7.82% comparing 2016 and 2017 Pilotage Acts and 5.16% comparing 2017 and 2018 Pilotage Acts, representing a total increase of 12.98% over a 3 year period. PSL consider this trend will continue. Whilst the trend may be for larger vessels in the Estuary as a whole, the River Medway has terminals unsuited to such vessels and therefore consider the continued use by smaller vessels in the future should be taken account of when quantifying and forecasting future trade. PSL would support a commercial discussion and engagement that mitigates any/all of these issues through pragmatic and robust navigational risk assessments and commercial impact reduction.	Whilst the Applicant notes that an increase in pilotage acts has been observed, this needs to be seen in the context of a decline previously. The Applicant has provided a further response on this at (REP6-026) and, in summary, notes that pilotage declined between 2016 and 2018. As such a growth of 12.98% over a 3 year period represents a recovery rather than net growth. Furthermore, the Applicant has provided a detailed analysis of historic and future trends in tonnage, and vessel arrivals at Port of London has been provided at Appendix 16 of this Deadline 7 submission. The Applicant can confirm that the 10% future baseline for vessel traffic is considered robust.

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3.12.21.	Port of London Authority (PLA); Maritime and Coastguard Agency (MCA); Trinity House (THLS); POTL/LGPL and PLA and London Pilot Council (LPC); Thanet Fisherman's Association (TFA); UK Chamber of Shipping (UkCoS); Port of Sheerness Ltd (PSL)	**Additions to the NRAA made at deadline 5** Would the IPs comment on the recent textual changes in regard to risk assessment made at Deadline 5 to the NRAA (rev B) [REP5-039]: a) Para 135: Additional Risk Control: Enhanced promulgation of information (redrafted); Shipping and Navigation Liaison Group Terms of reference (redrafted); Post-consent Monitoring (redrafted); Enhanced optimisation of TEOW line of orientation etc (redrafted); Aids to Navigation etc (redrafted); b) Paras 141 to 144 and Table 19: New insertion in rev B; c) Para 145: "*…the assessment of cost benefit in the original NRA remains valid*." d) Para 146: Summary results of the hazard workshop (New Annex C to Deadline 5 submission) "*…ID's 4-18 [sic]…were updated based on IP comments…*"; e) Ranked Hazard list (now Table 20) changed to omit columns for individual baseline and inherent risk scoring with colour grading; the highest inherent risk score now being 4.80 (previously 4.34); residual risk scores added to rev B. f) Para 147: hazards with baseline risk ALARP-rated now seven in number (previously four in number); g) Paras 152-154: New paras on hazard likelihood including a return rate for all commercial vessel collisions of 1 in 10 years to reflect stakeholder concerns; h) Para 157: hazards with inherent risk ALARP-rated now eight in number (previously four in number); i) Paras 158-160: New text on residual risk assessed;	The Applicant will respond in due course to Port of London Authority (PLA); Maritime and Coastguard Agency (MCA); Trinity House (THLS); POTL/LGPL and PLA and London Pilot Council (LPC); Thanet Fisherman's Association (TFA); UK Chamber of Shipping (UkCoS); Port of Sheerness Ltd (PSL) responses.	**MCA response:** a) In the applicant's ISH8 written response (Appendix 7 to Deadline 5 Submission: Response to ExA Action Points arising from Issue Specific Hearing 8 – Shipping and Navigation, section 82) it explains that Information Dissemination is an embedded risk control measure however this is not listed in the Addendum NRA (Rev B) para 134. MCA contends that the promulgation of information, as stated in the NRA Addendum Rev A section 134, should be an embedded risk mitigation measure since the charting of hazards, issuing Notices to Mariners and promulgating information to fishing and recreational users are standard practices in the industry for notifying mariners and ensuring they have up to date information so they can safely plan and conduct their passage. Therefore, MCA's opinion is that these need to be separated from the risk control in para 135 into its own embedded risk control in para 134. It is noted that the risk control measure has been amended to "Enhanced Optimisation of TEOW line of orientation and symmetry". Although it is not understood how, by definition, an optimised layout can be enhanced, MCA does not agree that early commitment to two lines of orientation can be considered as an additional risk control measure for the operational phase of the wind farm. Nor do we agree that commitment to two lines of orientation is enhancing optimisation of the layout, as explained above in our response to 3.12.19 (d). The intention of at least two lines of orientation applies to wind farms with multiple rows and columns to allow vessels and SAR helicopters to safely navigate through the wind farm. It is likely the locations of the Thanet Extension turbines will surround the current wind farm in one or two columns and the MCA will also be concerned that the rows and columns align with the current turbines at Thanet OWF (in accordance with MGN543 Annex 2 section 2.e.).	MCA a) This observation is noted although the Applicant notes the differential in this case is that the Risk control has been enhanced to include WFSV plans, maintenance programmes and outputs of the shipping and navigation liaison group – which are in excess of the standard practice embedded risk control measure for dissemination of information. The Applicant has provided further information and clarification in response 3.12.19 with regards to lines of orientation and the commitment to secure this in the Schedule of Mitigation confirming its elevated status to an enhanced risk control measure. In addition to the Applicant's position, it is worthy of note that precedent is made for non symmetrical extensions to exist in wind farms – e.g. Walney Extension it is clear that this early stage commitment is further or enhanced mitigation.

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		j) Paras 169-173: New Text on Risk Control Validation; k) Para 174: Added conclusions text on hazard consequence scores provided by PLA/ESL at D4C "…*which has been used to update some hazard consequence scores.*" l) Para 178: Added text on feedback from DPWLG on risk consequence scores; and m) Para 184: New text varying the Recommendations made in the revA NRA Addendum m) Para 184: New text varying the Recommendations made in the revA NRA Addendum.		It is noted that the "Enhanced Optimisation of TEOW line of orientation and symmetry" risk control measure in the Addendum NRA (Rev B) does not include this in the explanation.	
				b) It is not understood what "Enhanced Promulgation of Information" means since Promulgation of Information is not included as an embedded measure in para 134. It is noted that this is separate to "Shipping and Navigation Liaison Group", therefore the implication is that there are two levels of information that can be promulgated to mariners for their safety. If there is enhanced information that could be disseminated to mariners, in addition to the common practices of issuing Notices to Mariners, charting hazards, notifying fishing organisations, this is counter-productive for ensuring safety of navigation. MCA does not agree that "Enhanced Promulgation of Information" and "Enhanced Optimisation of TEOW line of orientation and symmetry" are appropriate additional risk controls, rather they are more suited as embedded risk controls. As such we are unable to confirm agreement of likelihood reduction scores.	See above response and also 3.12.19
				c) Although there is not a specific section in the original NRA that addresses cost benefit analysis, if the NRA Addendum (Rev B) is referring to the risk controls that are identified but not recommended in para 138, MCA agrees that they are disproportionate.	The Applicants notes that the MCA have agreed with the qualitative Cost Benefit provided within the original NRA at Table 22 of the original NRA. The Applicant has also commented on this at 4.12.2 of REP6A-002.
				d) It is not clear what amendments were made following IP comments.	The Applicant has noted that hazard scores were updated based on review of the PLA risk assessment issued at Deadline 4c and feedback

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					from POTLL / DPWLG on most likely stakeholder / business consequence scores for commercial vessels. The Applicant has also commented on this at 4.12.3 of REP6A-002.
				e) It is assumed the individual baseline and inherent risk scoring columns have been omitted to make it easier for the reader.	The Applicant notes that full details are contained within Annex C of the NRA A (as noted in the Table 20 title) and that the table has been formatted best fit page size.
				f) For baseline risk i.e. the current status quo, it is reasonable to expect the risks are being managed to acceptable levels. The scoring of the risks was discussed but not agreed by IPs, and those not completed during the workshop were scored by the applicant.	The Applicant notes that the MCA agreed the minutes of the workshop as an accurate reflection of the workshop, and that the ports (POTT/LG) confirmed a consensus was reached at the meeting. The Applicants notes that the MCA have agreed that it is reasonable to expect the risks are managed to acceptable levels and therefore the Applicant take this to mean that the baseline risk scores are acceptable. Whilst hazards 5-18 were not scored at the workshop, they were rescored based on the risk assessment produced by from ESL / PLA / LPC submitted at Deadline 4C and comments made by POTLL / DPWLG on most likely stakeholder / business consequence scores for commercial vessels and no substantive evidence to dispute the scoring provided in the NRAA.
				g) These paragraphs show that, in this instance, the applicant has taken the qualitative data (expert opinion of IPs) into account in addition to quantitative data.	The Applicant notes that the MCA have agreed that the Applicant has fully taken on board the qualitative data (expert opinion of IPs) in addition to the quantitative analysis.
				h) According to the risk matrix in Figure 25, these scores fall into the category of 'Tolerable with controls', not automatically ALARP. It is understood the risk scores have been calculated using the consultants risk scoring software however it is not clear on what these calculations are based.	The Applicant would note that the appropriate reference is Table 18 of the NRA which mandates the tolerability levels of risk scores, and as both embedded and additional controls have been met the ALARP level definition, especially in the absence of further cost effective risk control measures.

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				i) MCA does not agree with the list of additional control measures and is unable to agree these risk scores.	The Applicant notes this, however it considers that the effectiveness of the additional controls have been benchmarked against the PLA's own risk assessment and reviewed by experienced mariners and is therefore confident that the hazard scores are accurate and confirm the project is ALARP.
				j) It was understood the bridge simulation study would have fed into the risk assessment, not as part of a validation exercise.	The Applicant has provided for the specification of any additional simulation study noting the objective is to validate the risk controls rather than form a direct input. Further response with regards the detail and need for a pilotage simulation is presented at Annex A to this Deadline 7 submission.
				k) This is accepted.	The Applicant notes this and welcomes MCA agreement.
				l) MCA is content with the added text.	The Applicant notes this and welcomes MCA agreement.
				m) MCA is content with this paragraph.	The Applicant notes this and welcomes MCA agreement.
				PLA/ ESL response: a) Enhanced Promulgation of information: The PLA and ESL believe this constitutes embedded mitigation. The issuing of NTMs is already in place and they are still unsure of how this would be enhanced. It is also difficult to see the advantage of issuing the WFSVs passage plans as they will often take the same track toward the existing site. The PLA and ESL are unsure of how realistic it is to expect the Applicant's WFSVs to be able to adhere to the timings published in a passage plan given the need, we assume, for onsite vessels to have flexibility. It is also difficult to see how NTMs can reduce the issues of reduced sea room, the local operators will already be aware of the reduction in sea room and will be trying to operate within it.	**PLA/ESL** a) The Applicant has provided more detailed response to the MCA response to this question (3.12.21) with regards to the status of this risk control as embedded. NTM's are a component of the original dissemination of information risk control (and therefore embedded) but the Applicant's proposals go beyond standard measures and as such it is considered that the promulgation is an enhanced or further mitigation measure beyond those already embedded. It is not understood why it is thought that WFSV would not be able to maintain a passage plan to site – which relates to routing and speed (in relation to wake and impact to fishing and recreational craft) and other factors not relating to time (in which it is agreed

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				Shipping and Navigation Liaison Group ("SaNL Group"): Whilst the final structure of this group is to be determined and as such the PLA and ESL appreciate this is only an outline of the group's role in making recommendations for mitigation, they are still unsure of its overall effectiveness in helping reduce the issues caused by a physical reduction in sea room. Whilst it is agreed that a group of this sort is a good idea, the PLA and ESL do not think that it should be considered as a form of mitigation itself. Instead it should be viewed only as a tool for assessing issues and then trying to establish further mitigation in the future. ESL and the PLA also believe that any shipping related issues identified on the inshore route would result in third party management either by ESL, the PLA, MCA, Trinity House. Although the group could theoretically advise on what mitigation could be introduced, it should not be regarded as mitigation in and of itself. Post Consent Monitoring: This could be a good information tool to inform the SaNL Group but it will be a retrospective tool for traffic analysis. Again, the PLA and ESL are unsure how effective this would be, particularly as it is assumed that it will probably be AIS based and therefore not cover all vessels. The smaller, more at risk vessels, are less likely to have AIS. The PLA and ESL do not believe that this can be considered as mitigation for reduced sea room. Aids to Navigation/Buoyage: The PLA and ESL would consider aids to navigation to be embedded mitigation because the two main buoys (Thanet North and Drill stone buoy are already in place) and will only require moving. Any additional buoyage would, it is assumed, be related to the construction phase and whilst aiding navigation will likely serve to further reduce sea room on the inshore route.	flexibility needs to be maintained). Flexibility within the site will be maintained for WFSVs, however this does not impinge on the wider use of the searoom. SaNL: The Applicant notes this comment but notes the remit of the group is 'to consider systems and procedures that can be utilised to maintain navigation safety, the group could, for example, review the risk assessment and risk controls in place and adopted by the PLA as part of the 2015 NRA and as part of the NRAA and asses the need for further controls'. The Applicant maintains this is a risk control – without such further control measures have no basis for identification, stakeholder involvement and implementation. Post consent monitoring: This has been requested by TH and serves as an important tool to validate aids to navigation plans (this also feeds into the SaNL) which will consider AIS in context with qualitative input, incident data review, and any other non AIS data inputs that are provided including access to Succorfish data for commercial fishing vessel movements. AtNS: Will be considered in consultation with TH who are the statutory body in this regard. Further information is provided above and it is noted this could include possible introduction of cardinal and lateral marks should that be necessary in the future marking of the inshore route and following due assessment.

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				b) Currently there have been no discussions regarding risk control effectiveness per se. The current review of risk control effectiveness is based upon the Applicant's weighting and the PLA's 2015 risk assessment (which obviously was not reviewing the area with reduced sea room with TEOW in place). Whilst noting the benefit of liaison between relevant authorities and stakeholders the PLA and ESL do not agree with the risk mitigation scores, including that which has been attributed to the Shipping and Navigation Liaison Group. It has been given an effectiveness score of 30% against the likelihood of collisions and contacts. However, it is the implementation of any additional mitigation identified and implemented that will reduce the risk, rather than the existence of the Group itself, as explored above.	The Applicant accepts the representation made by PLA that it is the implementation of additional mitigation measures that will reduce risk. It is the Applicant's view that the working group will facilitate the implementation at an early stage and effectively reduce risk in a timely, efficient, stakeholder lead manner. The Applicant has provided details of the risk control effectiveness applied within NRA A and has benchmarked them in the NRA A at paragraph 144. Where it is noted that effectiveness scores applied are significantly below those applied to similar controls identified and implemented by the PLA.
				c) The PLA and ESL have not seen a full cost benefit analysis and do not believe that one was contained in the original NRA.	A qualitative cost effectiveness assessment is contained in the original NRA at table 22, which as noted above is agreed by the MCA.
				d) The PLA and ESL recognise that their concerns regarding broad groupings of vessels types in the NRA were reviewed and partially addressed. However after the workshop they still have concerns about the breakdown of hazard types. For example a class 1 or 2 vessel in collision with any other vessel is too broad a category. In the original NRA the hazards logs were more specific but an awareness of the time pressures at the workshop lead to a broader approach. The PLA and ESL believed there would be a final presentation after the workshop which would be similar to that in the original NRA. It has become clear that the Applicant does not intend to produce such a presentation. It is noted that the scores have been updated following the hazard workshop, but the scores	The Applicant presented the proposed approach, of an NRA Addendum focussing on key areas, categories of vessels, and hazards, to stakeholders in advance of the hazard workshop. As confirmed in the meeting minutes all parties confirmed that there were no matters arising from the matter. The applicant sought to work with stakeholders to undertake an analysis of hazards in a timely and efficient manner, seeking a balance between describing the process to non (HAZID workshop) experts for whom this was the first hazid workshop that they had been party to, and sufficient detail to discuss and agree baseline and inherent scores for a representative number of hazards. Following a successful definition of hazards 1-4 (for which a consensus was reached

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				are still based on a different methodology to that used in the original NRA. For example, the methodology used at the workshop to assess consequence was not the same as that used for the original NRA. In the original NRA each hazard was scored for the total consequence. e.g. for a collision between two vessels the consequence was scored for the combined consequence to both vessels. However, at the workshop on 29th March the hazards were only scored for the consequence to one vessel. When assessing the likelihood of a collision for a Class 1 or 2 vessel, the most likely and worst credible consequences were assessed. The consequence to the Class 1 or 2 vessel was scored, but the score did not take into consideration the consequence to the vessel with which it collided. It was explained to workshop participants that the consequence to the other vessel would be scored in a separate hazard for the other vessel. However, this leads to an underscoring of the risk. For a collision between a Class 1 or 2 vessel and a fishing vessel the consequence to the Class 1 vessel is scored in one hazard and the consequence to the fishing vessel is scored in a separate hazard. Therefore the total consequence of the collision is split between two risk scores, giving a lower score for each than if they had been combined.	at the workshop) the Applicant applied the qualitative narrative and principles agreed at the workshop to the remaining hazards. Inherent within the iterative and extensive discussions on the day was the principle of 'which vessel are we considering' for a given hazard. The principles agreed for Vessel A, and the narrative surrounding the hazard in the round were subsequently applied to vessel b. As such the Applicant contends that the process inherently discussed principles that would reasonably be applied to both sides of the equation. The PLA assertion that the methodology employed leads to underscoring is therefore not accurate, and is considered a standard approach.
				e) The PLA and ESL can see no reason why the two columns have been omitted from revision B.	These columns are presented in Annex C as noted in the title to this table.
				f) Four out of the seven hazards referred to are risks of collisions, where the PLA and ESL believe the methodology for assessing them to be flawed. Therefore the PLA and ESL do not agree that there are seven hazards with a baseline risk ALARP.	The methodology follows that being used by the PLA on other assessments within their jurisdiction as required by PLA guidance and in accordance with templates published on the PLA website (as identified previously by the Applicant). As noted by the MCA above, it is "reasonable to expect the risks are being managed to acceptable levels" and as the scores of these hazards fell into

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					the ALARP zone, and risk controls were applied by the PLA and others as part of the 2015 NE Spit NRA, then it stands to reason that ALARP level scoring and acceptability are confirmed.
				g) In the original NRA the baseline collision likelihood was 1 in 6 years (NRA/section 7.3.2/page 80), within 10nm of the development. It is difficult to understand how the original NRA had an overall analysis of all collisions resulting in a baseline of 1 in 6 reduced to 1 in 4 (post collision modelling). The NRAA does not present the overall collision rate, just the rate for commercial vessels. The risk assessment scores cannot be compared, not only because of the different hazard types, but because of the different methodologies utilised. The 2015 PLA risk assessment was scored on the overall consequences of a collision to both vessels, whereas the NRAA risk assessment was only scored for the outcome to one vessel.	The 1 in 6 years baseline collision relates to all vessels as derived by the original CRM conducted as part of the original NRA. A CRM was not conducted for the NRAA, and as such a comparable number is not presented. Notwithstanding this a revised independent CRM has been submitted at D6 which confirms the risk to increase by 4% between baseline and post introduction of Thanet Extension with SEZ in place.
				h) Four out of the eight hazards referred to are risks of collisions, where the PLA and ESL believe the methodology for assessing them to be flawed. Therefore they do not agree that there are eight hazards with inherent risks at ALARP.	The Applicant considers the approach to be acceptable. It is consistent with the PLA approach in their own methodology and it has not underscored hazards. The Applicant notes their response to the IP at item d of this question.
				i) These hazards are at the low end of ALARP as defined in the NRAA, but the PLA and ESL do not consider the collision risks to be at the low end of ALARP, due to the way in which they have been assessed and scored. (see d above).	The Applicant considers the approach to be acceptable. It is consistent with the PLA approach in their own methodology and it has not underscored hazards. The Applicant notes their response to the IP at item d of this question.
				j) See Responses to ISH8 Action Point 20 (PLA 23/ ESL23).	Noted
				k) Some of the hazard consequence scores have been updated, but the scores for collision risks have not been re- scored to reflect the same methodology that was used for scoring the original NRA.	The identification of collision hazards were agreed by ESL / PLA at the workshop and only subsequently did ESL / PLA request a different methodology be employed. Nonetheless the approach used in the NRAA is entirely

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					appropriate as set out in response to part [] of this question.
				l) Some of the consequence scores have been updated but, again, the scores for collision risks have not been re-scored to reflect the same methodology that was used for scoring the original NRA.	The identification of collision hazards were agreed by ESL / PLA at the workshop and only subsequently did ESL / PLA request a different methodology be employed. Nonetheless the approach used in the NRAA is entirely appropriate as set out in response to part [] of this question.
				m) Paragraph 184 of the NRAA appears to undermine the principle of the SaNL Group. The Applicant appears to be declaring that the PLA/ESL are the primary navigation users so therefore any navigational issues should be resolved by them and the MCA. This would seem to suggest that the NRAA's conclusion that all risks have been reduced to ALARP means that any future navigational issues around TEOW are not as a result of the wind farm. If that was the intended meaning, the PLA and ESL cannot agree to this.	The Applicant's observation at Para 184 reflects the baseline, which PLA and ESL operations dominate. The Applicant's observation relates to any measures that would reduce *baseline* risk would most appropriately sit with those IPs and MCA. The Applicant agrees that the responsibility for risk management associated with the inherent/post construction phase, appropriately resides with the Applicant. The NRA therefore identifies that most risk in the area is as a result of PLA / ESL operations, and that it is not the TEOW responsibility to unilaterally mitigate baseline risk, when ESL / PLA do not think additional risk controls are necessary (noting they have been identified and not all implemented – demonstrating there is a accepted basis by the PLA for the baseline risk profile in this area).
				TH response: a) See response to 3.12.19. With reference to Post Consent Monitoring, TH welcome the proposal and suggest provision is made for inclusion within the appropriate DMLs.	The Applicant notes TH response.
				b) The risk control effectiveness table is the applicants own assessment and was not debated with IP's at any of the workshops or other forums. As such it is still our opinion that much of the risk mitigation suggested is reliant on other parties changing their operations and procedures. Whilst this should be expected to a certain degree by all involved, the overlying question is will these changes be made	The Applicant does not require management of any risk controls by ESL or PLA. The purpose of the Shipping and Navigation Liaison Group is to specifically respond to representation by the ESL / PLA made throughout the examination that they are include in any review of operations within the TEOW study area.

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				enforceable through legislation and are they accepted by those organisations? These commitments again should be assessed alongside the applicant's statement in [REP5-012] 05 Appendix 7 para 81 as some require management by ESL and PLA.	
				c) TH accepts that an NRA carried out using the ALARP principle will have a cost benefit consideration included. We do not comment on cost implications to any party concerned.	The Applicant notes this response from TH.
				d) TH were involved in the workshop identifying potential risks and agree the applicant has taken note of these deliberations.	The Applicant notes this response from TH and that it considers the Applicant has taken note of deliberations from the hazard workshop.
				e) TH agree that the scoring system adopted by the applicant has shown an increased final figure although still within the ALARP range. The omission of the columns does not make a fundamental impact on the final score.	The Applicant welcomes this response from TH but does note it has not omitted any detail, by ensuring full details on the scoring were contained within Annex C of the NRA A, as identified in the caption to Table 20.
				f-h) It should be noted that all of the figures and highlighted risks were derived from a workshop where only 4 risks were discussed. The scoring from these risks was reached by general consensus and not agreement. The remaining risks were scored by the applicant's team post workshop and they have decided to highlight what could be considered the major risks. The improved return rate shown of 1 in 10 from what was shown in the original NRA of 1 in 4.5 is, in our opinion, caused purely by the reduction of the original red line boundary and subsequent introduction of the SEZ as there appears to be no additional mitigation measures suggested.	The Applicant notes TH response
				i-l) TH note these statements but have no comment additional to our verbal and written representations previously submitted.	The Applicant notes TH response.

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				m) See response to 3.12.19 as this section only summarises previous statements throughout the NRAA.	The Applicant notes TH response.
				POTLL and LGPL response: (a) POTLL/LGPL defer to the response of the PLA/ESL on this matter.	a), b) and c) – The Applicant notes the POTLL and LGPL defer to PLA / ESL on these matters. d) The Applicant does not consider that a most likely outcome of a hazard would result in consequence to Stakeholder / Business of £100,000 to £1,000,000. POTLL / LGPL are conflating "Most Likely" occurrences of a hazard, that would commonly result in minimal consequence outcomes with "worst credible" unlikely occurrences with a higher consequence magnitude. With regards a worst credible hazard the Applicant agrees with the IPs that a collision or grounding could in the worst credible scenario result in losses >£100k and has categorised the score for that hazard accordingly. f, h, i) The Applicant has provided further detail on consequence considerations in the assessment in Section 4.12.3 of REP6A-002 j) Noted and the Applicant has provided further response to this in Annex A of this Appendix.
				(b) POTLL/LGPL defer to the response of the PLA/ESL on this matter.	
				(c) POTLL/LGPL defer to the response of the PLA/ESL on this matter.	
				(d) Notwithstanding that some factors which inform scoring are still not clearly understood, the Ports do not agree with the consequence score of 2 for property or stakeholders in the most likely scenario for vessel (Class 1 to 4) collision or grounding or for property in the event of a contact (noting Table 17 of the NRAA prescribes a value to a category 2 consequence of £10k to £100k). The Ports are of the view that such incidents clearly have the potential to have direct consequences for property or stakeholders in excess of £100k, and therefore should be scored as category 3 as an absolute minimum. Furthermore, the Ports contend that further indirect consequences exist (for example as a result of a revised routing of pilot boarding arrangements in reaction to an incident) which have not been considered by the Applicant.	
				(e) No comment.	
				(f) As discussed in response to Item (d), the Ports do not agree with the scoring of some consequences. Use of more appropriate scoring would likely alter the summary set out in Paragraph 147.	
				(g) No comment.	

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				(h) As discussed in response to Item (d), the Ports do not agree with the scoring of some consequences. Use of more appropriate scoring would likely alter the summary set out in Paragraph 157.	
				(i) As discussed in response to Item (d), the Ports do not agree with the scoring of some consequences. Use of more appropriate scoring would likely alter the summary set out in Paragraph 158 – 160.	
				(j) Representations regarding the need or otherwise for a pilotage simulation is presented in Annex A to this Deadline 7 submission	
				(k) No comment.	
				l) and m) No response provided	
				London Pilots Council response:	It is noted that LPC have not provided a submission
				TFA response: Paragraph 135: Shipping and Navigation Liaison Group (already adopted by the Applicant) TFA is not averse to becoming a part of this group and is already a part of similar groups for other purposes, although as a voluntary organisation, this is an additional burden. The concern about this as a mitigation measure is whether it manages to function as a pro-active rather than reactive measure.	The Applicant notes that TFA would agree to be part of the Shipping and Navigation Liaison Group and welcomes their commitment of involvement. The Applicant also notes TFA concerns, and would direct the TFA to Appendix 15 to Deadline 7 Submission: Outline Shipping and Navigation Liaison Plan and annex for more details on the proactive nature of the group.
				PSL response: PSL were not directly consulted in regard to the HAZID workshop or the development of the NRA or NRA Addendum and therefore cannot comment on the textual changes. In consideration of the lack of common ground	The Applicant does not agree that a further HAZID workshop is necessary as the NRA A was conducted, in so far as possible and available with the time available, with IP involvement and fundamentally agreement on methodology.

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				between the stakeholders and Applicant, PSL consider a further HAZID workshop and revised NRA together with a further pilot transfer bridge simulation be conducted prior to any Consent on the proposed development. PSL would support a commercial discussion and engagement that mitigates any/all of these issues through pragmatic and robust navigational risk assessments and commercial impact reduction.	Further refinement was subsequently made on hazard scores following stakeholder feedback. However the Applicant considers the agreement of the methodology, agreement on the results of the workshop and the findings of the assessment To be accurate, and to accurately reflect what was agreed at the workshop.
3.12.23.	Trinity House (THLS)	**Decrease of navigational risk since 1997** Would THLS comment on the Applicant's statement in [REP2-014] para 49 *"… navigational risk has decreased locally and internationally since 1997 (for instance due to new technology)…"*?	The Applicant notes that this question is for Trinity House but would make the following observations: Since 1997 there have been a number of technological, legislative and operational changes that have led to a national and local reduction in navigation risk in and around ports, and in coastal waters such as in the vicinity of TEOW. This includes (but is not limited to): 1. The introduction of technology such as Automatic Information System in 2002-2007 (implemented by vessel category), which as identified by the MCA "*is a major development in improving safety of navigation*" (ref. http://solasv.mcga.gov.uk/Annexes/Annex17.htm). 2. Introduction of legislation such as the UK Port Marine Safety Code in 2003 mandating the need for improved management of navigation safety in ports and their approaches, following the grounding due to pilotage error on the *Sea Empress* in the approaches to Milford Haven. 3. Introduction of the ship board operational improvements, such as the IMO International Safety Management (ISM)	**TH response:** TH do not agree with this statement. Whilst there has been an increase in the technologies available to the marine user (eg electronic charting and satellite navigation devices) not all mariners are equipped with these devices to the same level, and it has been shown that not all make full use of the equipment available to them. There are still numerous vessels with a reliance on traditional navigation methods. The introduction of AIS systems to the marine user has had an impact on navigation for those mariners with access to it but this also has limitations. There are still numerous incidents globally, some extremely serious, every year involving navigational errors and poor risk management.	The Applicant notes that TH does not agree with the MCA that AIS "*is a major development in improving safety of navigation*" – however TH do state that "*navigation risk has decreased locally and internationally since 1997*", and the Applicant believes this is due to a number of technological, legislation and operational changes, and has provided examples of each.

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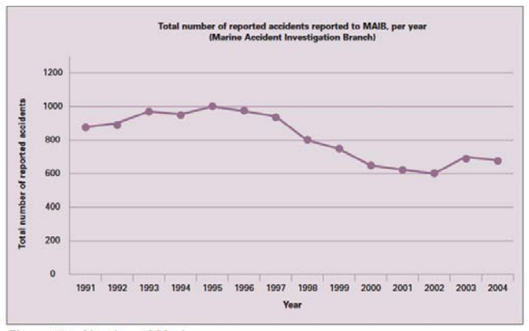
			Code, which established safety-management objectives and requires a safety management system for vessels. The decrease in risk is also evidenced by MAIB reported accidents per year (analysis between 1991 and 2004 which is presented at pg 84 of MCA guidance - in "Guidance On The Assessment Of The Impact Of Offshore Wind Farms: Methodology for Assessing the Marine Navigational Safety Risks of Offshore Wind Farms"), which shows a general decline in the total number of reported accidents reported to the MAIB, per year, since a peak of around 1000 in 1995 to around 650 in 2004.  *Figure 27 – Number of Marine Accidents (1991 / 2004)* This is further evidenced in Table TSGB0517 Marine Accident Fatalities and Injuries Reported: 2005 to 2016 of the Department for Transport: Transport Statistics Great Britain 2017. 2017 Edition available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/664323/tsgb-2017-print-ready-version.pdf, which shows there has been a reduction in fatalities in UK waters (from any incident type - often not navigation related) from 41 fatalities in 2005 to 19 in 2016.		

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			The Applicant therefore confirms it's position and will respond to responses provided by Trinity House.		
3.12.40.	Maritime and Coastguard Agency (MCA); Trinity House (THLS)	**Final recommendation from competent maritime authorities** MCA's D5 submission [REP5-063] recommends that in order to mitigate risks to as low as reasonably practicable in the ALARP range, the Applicant should consider "*increasing the sea room between the NE Spit buoy and the SEZ boundary to a distance that is acceptable for continued safe pilot transfer operations*". The ExA wishes to note that there is no longer any time remaining in the Examination timetable for further material change to the application nor for additional mitigation involving alteration of pilot transfer locations (which may need further simulation to demonstrate feasibility of safe navigation and pilot transfer operations in limit-state conditions and in any case could not be recommended to the Secretary of State as risk mitigation without additional Navigation Risk Assessment). Therefore, the ExA seeks a final recommendation from the MCA and THLS on the overall acceptability of the NRA, the NRAA and the application (subject to the SEZ and other proposed risk controls as they currently stand) from the perspective of shipping and navigation safety in all MetOcean Conditions in which PLA pilot operations are able to operate at present. On the basis of the project as proposed, including the NRA, NRAA and other submitted evidence, what is the final	This question is noted by the Applicant and we welcome the ExA's request for an independent perspective and recommendation from MCA and THLS noting, in particular, their statutory responsibilities and expertise relevant to this application.	**MCA response:** It is MCA's view that, had time allowed, our preference would have been for the applicant to increase the sea room for pilot transfer operations, as per D5 submission, to the satisfaction of IPs. We are grateful to the applicant for the hard work undertaken in order to try to address the IPs concerns, to satisfy MCA requirements for stakeholder approval at a local level. The introduction of the SEZ has no doubt improved the amount of available sea room, and reduced the constriction placed on vessels operating in the western extent. However, the MCA remains concerned regarding the following: 1) the available sea room for Pilot operations to be carried out and the failure to obtain IP agreement regarding the risks to pilotage. This therefore has implications on our considerations for the safety of navigation; 2) The MCA does not agree with the list of embedded and additional risk control measures as detailed above and therefore are unable to accept the final risk scores as ALARP; 3) It is yet to be confirmed what subsea infrastructure, cables, jack up and other construction equipment can be utilised in the SEZ, and how these risks will be mitigated. We also note safety zones could be enforced in the SEZ; and 4) We remain concerned about the consequence of an incident in this highly complex area for navigation. Based on the above concerns the MCA is unable to agree that the proposed project is acceptable with regards to the safety of navigation.	The Applicant notes the MCA response to this question, as the statutory organisation for navigation safety in the TEOW study area, and the confirmation from them that the introduction of the SEZ to alleviate qualitative concerns raised by IPs is an improvement. The Applicant considers the SEZ provides for an acceptable area of available sea room for transit of through vessel and for pilot boarding. In specific response to MCA concerns: 1. The Applicant has provided adequate sea room and notes, in particular, that the highest density area of pilot transfers at the NE Pilot Diamond has the 2nm plus 1nm sea room request by ESL / PLA, and the residual effect on the remaining pilot boarding areas would be very minimal. This is underpinned by the NRAA. Further, the Applicant does not consider that IP statements should be taken to be the defining conclusion of risk, and based purely on qualitative judgements without evidential basis. The Applicant has undertaken a robust NRA and NRAA supported by additional studies and incorporating expert mariner and local stakeholder qualitative feedback and considers that this body of evidence demonstrates the acceptability of the proposal irrespective of whether all IPs are in full agreement. As was evident at ISH8 there are no consistent positions even between IPs on these matters and therefore these views must be taken in the round, but that the evidential basis provided by the Applicant is considerable,

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		recommendation of the MCA and THLS to the ExA/SoS in respect of the acceptability of the proposed development in navigation safety terms?			robust and follows MCA guidance requirements. 2. Notwithstanding whether risk controls are located within an embedded or additional category (which the Applicant has addressed above) this should not affect the MCA's ability to comment or accept the ALARP basis of results. 3. The Applicant has confirmed within the DCO and explanatory memorandum, in addition to the SEZ clarification note submitted at Deadline 5 (Annex A to Appendix 7 to Deadline 5 Submission), what activities will be undertaken in the SEZ. In brief it is the Applicant's position that no above sea structure or associated oversail will be permitted within the SEZ; cables and temporary O&M operations will be permitted and the risks managed through well-established means that are secured in the NRA A and Schedule of Mitigation. 4. It is very important to note that the consequence of an incident does not change as a result of TEOW. If the consequence in the baseline scenario (ie present day) is not acceptable when considered in context with its likelihood (ie the resulting risk score) then the Applicant would expect the statutory regulators in this area to have identified this and taken action to reduce the risk. The MCA basis for acceptability in their concluding statement does not appear to the Applicant to be independently based on any guidance requirements of MGN 543 (M+F) or any other guidance provided by the MCA but the comments above (which the Applicant considers have been addressed) and its stated reliance exclusively on local IP's who are commercial operators in the area.

ExQ3 PINS Question number:	Question is addressed to:	Question:	Applicant's Response:	IP Response:	Applicant's comments on IP response:
				TH response: TH note the MCA statement and are of the opinion that any future increase in sea room would be welcome. However, with the inclusion of the SEZ and the knowledge that turbines could not be placed outside of the stated boundary allows us to know the maximum extent of surface structures to the west, as such we consider the proposed area acceptable for surface navigation when there are no structures within the SEZ. It is still not apparent how structures like Jack Ups and other construction/maintenance equipment installed in the SEZ temporarily are to be mitigated for. TH have previously submitted that the original NRA was a valid document but we disagreed that the increased risk was acceptable. With the introduction of the NRAA it is not easily apparent what document is relevant during construction. As such the NRAA was completed in a limited time period but does highlight the improved risk levels during the operational phase with the introduction of the SEZ. "On the basis of the project as proposed, including the NRA, NRAA and other submitted evidence", TH are content, with some reservations, that the project would be acceptable. We are still concerned that available searoom can be reduced with the introduction of "temporary" structure within the SEZ which, depending on their location, could have an effect on the marine operations in the area. We are also aware that any safety zones established will also reduce the space available. As has been stated by Captain Barker (TH) in his verbal submissions at 1SH5 & 1SH8 the proximity of the development to the coast and the range of	**TH** The Applicant welcomes the input from Trinity House on this point and subject to confirmation of excluded activities within the area between the RLB and the SEZ, TH have stated they consider the proposed area to be acceptable for surface navigation. The Applicant has confirmed within the DCO and explanatory memorandum, in addition to the SEZ clarification note submitted at Deadline 5 (Annex A to Appendix 7 to Deadline 5 Submission), what activities will be undertaken in the SEZ. In brief it is the Applicant's position that no above sea structure or associated oversail will be permitted within the SEZ; cables and temporary O&M operations will be permitted and the risks managed through well-established means that are secured in the NRA A and Schedule of Mitigation. The Applicant welcomes the comment that the NRA is a valid document and that the NRAA identifies the improved risk levels on the basis of confirmation of construction activities and installations within the SEZ boundary. The Applicant welcome that TH, as a statutory body with responsibility for management of aids to navigation and the associated safety of navigation, have endorsed the SEZ (subject to the above confirmations) and the accompanying suite of documents and accept the ALARP findings by concluding 'the project would be acceptable'. The Applicant notes the comments relating to consequence and, whilst recognising the consequence of a worst credible scenario as described by Captain Barker, it maintains that the consequence of an incident does not change as a result of TEOW.

ExQ3 PINS Question number:	Question is addressed to:	Question:	Applicant's Response:	IP Response:	Applicant's comments on IP response:
				marine activity in the area, mean the consequences of an incident in this location could be extremely severe. All phases of the project must be considered and not just the operational phase highlighted in the NRAA when assessing the project. TH are of the opinion that the aids to navigation established at this windfarm, if consent is granted, may need to be in excess of what is our current policy. TH are also aware that the proposed development will have an impact on pilotage operations in the area and there will be a commercial and safety impact on these operators. It is outside of our remit to comment on these.	

3 Applicant's comments on IP's responses to Deadline 5 Submissions and additional commentary

6 This section provides the Applicant's responses to the IPs responses to Deadline 5 Submissions for Shipping and Navigation interests.

7 The Applicant has provided responses to the IPs on DCO matters in Appendix 3 of the Applicant's Deadline 7 Submission.

8 The Applicant has provided responses to the IPs on all other matters in Appendix 4 of the Applicant's Deadline 7 Submission.

Table 2: Applicant's responses to IP commentary on Applicant Deadline 5 Submissions

Document submitted by the Applicant	IP	IP Commentary:	Applicant's response:
REP5-012 Para 91	POTLL and LGPL	Excerpt: *It is noted that Vince Crockett at ISH8 on behalf of London Gateway noted that the growth for the inshore route was unlikely to be greater than 10%.* A response to this comment is provided in the accompanying Deadline 6 document by POTLL/LGPL in response to EXQ 3.12.15(a).	The Applicant has provided a detailed analysis of historic and future trends in tonnage, and vessel arrivals at Port of London has been provided at Appendix 16 of this Deadline 7 submission. The Applicant can confirm that the 10% future baseline for vessel traffic is considered robust.
REP5-012 Para 96	POTLL and LGPL	. It is noted that the MMO1127 document refers to annual growth. The compound effect of a 1% increase for 10 years followed by a 2% increase for 8 years is a total increase of 29.4% (noting this would only relate to the period from 2017 to 2036 whereas the 'Reasonable Planning Horizon' with regard to the TEOWF has been defined as to 2054 (i.e. 35 years from 2019)). If the lower figure of 1% per annum was applied to the period 2036 to 2054 then the total compound growth from 2017 to the end of the Reasonable Planning Horizon would equate to 54.8%. It is accepted that these figures relate to growth in terms of freight tonnage as opposed to ship numbers. As indicated by POTLL and LGPL's Deadline 2 submission (Doc Ref: REP2-050) a 22.5% increase in freight tonnage between 2016 and 2018 equated to an increase in vessel numbers of 566 (from 3638 to 4204), equivalent to a 15.6% increase. Applying the same correlation to the 54.8% increase in freight tonnage figure would give rise to a 38% increase in ship numbers. It is also noted that growth of shipping associated with the Thames Estuary is not occurring in a "usual business scenario" and that the significant displacement of trade from other UK ports towards Thames Estuary ports (a result of the significant additional and consented infrastructure along the Thames) is likely to result in increased growth from the level suggested in the MM01127 document.	
REP5-024 Page. 13, Item 2.3	POTLL and LGPL	It is noted that the document titled 'The Shipping Industry and Marine Spatial Planning - A Professional Approach - November 2013' which was submitted by the Applicant to the examination at Deadline 4B [REP4B-003]) states: "Non mariners often consider that offshore sea lanes do not need much more 'corridor width' than in-port channels, which may be measured in hundreds of metres. They fail to take into account that service and support	The Applicant notes this comment which was a contextualising comment. However, notwithstanding this, the appropriate MSP guidance was applied to both transit and pilot transfer sea room calculations at all the agreed reference locations and in line with this guidance which, it should be noted, was put forward by this IP's marine expert (Mr V Crockett) who has expertise in the design and simulation of port and harbour approach channels.

Document submitted by the Applicant	IP	IP Commentary:	Applicant's response:
		levels in port differ to those offshore, as do navigational accuracy and visual references." In light of the above text in the Marine Spatial Planning Document, the statement made by the Applicant is questionable. The use of hundreds of metres of width along with the assumptions made about danger and the ability to alter course are akin to what the Marine Spatial Planning Document would characterise as the considerations of non-mariners. This calls into question the level of expertise that has informed the statements made by the Applicant in respect of the assessment of suitable sea space.	
REP5-024 Page 7, Item 9	POTLL and LGPL	Vessels travelling to/from the port of Felixstowe would not pass through the inshore channel and thus the Applicant's statement is somewhat misleading. It is noted that the Applicant has confirmed in its statement that there has been a decline in vessel calls to Felixstowe whilst overall ship calls have remained broadly level. It must therefore follow that there has been an overall increase in vessel calls to the Thames Estuary.	The Applicant notes the context of their statement at REP5-024 Item 9 which was actually in reference to the decline of container ships at Medway corresponding to container ship rise arriving at DPWLG (relating to a decline at Felixstowe). The Applicant was awaiting further details at Deadline 5 from IP's in relation to Action Point 19 from ISH8 which it has addressed at Action Point 17 and 19 of REP6-038.
REP5-018 Para. 76, Item (e)	POTLL and LGPL	The figure of 22.5% in the HR Wallingford report originates from data provided in the table on page 2 of the Deadline 2 submission of POTLL/LGPL (Document ref: REP2-050). This identifies an increase in total throughput at POTL and DPWLG from 19,276,273 tonnes (2016) to 23,614,378 tonnes (2018). The table also identified that such increase in throughput corresponded to an increase in vessel numbers from 3,638 to 4,204, an increase of 15.6%.	The Applicant has provided a detailed analysis of historic and future trends in tonnage, and vessel arrivals at Port of London has been provided at Appendix 16 of this Deadline 7 submission. The Applicant can confirm that the 10% future baseline for vessel traffic is considered robust.
REP5-018 Para. 76, Item (e)	POTLL and LGPL	Figure 4.1 actually demonstrates a small increase in vessel numbers over the 4 ports and 8 year period considered (an increase of about 100 vessel arrivals). If only the ports which are served by the inshore channel are considered (i.e. Felixstowe and Southampton are removed) then Figure 4.1 demonstrates an increase of approximately 550 vessel arrivals (equal to a 35.5% increase) over this 8 year period.	It should firstly be noted that Figure 4.1 presents container ship calls only and the Applicant notes, as they have previously stated, this needs to be taken into context with the of decline in total vessel calls (ie all vessel types) over the same 8 year period) as noted in Figure 26 of REP5-039 and further clarified in relation to PLA ship arrival statistics at page 22/76 of REP6-038.
REP5-018 Para. 89	POTLL and LGPL	It is not disputed that masters of vessels will undertake dynamic risk assessment on approach to channels and other areas of sea. As a result, the impact of an increase in risk will not necessarily	The Applicant notes that vessels are mandated by IMO SOLAS Chapter 5, Annexes 24 & 25 titled "Voyage Planning" and "Guidelines for voyage planning" respectively, which give specific regulatory information with regard to the need of vessels to passage plan their intended voyage. A dynamic risk assessment, necessitating a change to the passage plan will only be considered if safety parameters of the passage plan are breached

Document submitted by the Applicant	IP	IP Commentary:	Applicant's response:
		lead to an increase in accident occurrence as the master of a vessel will take actions to avoid such risk. Actions and measures taken to avoid risk (for example seeking an alternative (longer) route) will result in an economic impact for the shipping organisation, cargo owners and potentially the destination port. The perception of risk is therefore a material factor in considering whether economic impacts will occur as a result of the wind farm extension. By focusing on the risk/hazard, the Applicant has unfortunately failed to consider the economic impact of the alternative action, resulting from the perceived increase in risk. In this respect its DCO application was, and still is, lacking in a material way.	– this will not relate to fixed objects such as OWF - but will relate to dynamic variables such as berth availability, tidal height and metocean characteristics, or vessel factors such as mechanical deficiencies. Therefore, the available width of sea room for transit on the onshore route, which was assessed and defined in accordance with guidance to ensure that sufficient sea room is provided, would not, in itself be subject to such a dynamic risk assessment. In addition, despite the Applicant's position that there would be no reason why commercial vessels would need to avoid the inshore route, an assessment of the commercial or economic impacts put forward by IPs was set out at Deadline 6 (REP6-020).
REP5-018 Para. 94	POTLL and LGPL	The Ports are not convinced that the assumption that a 10% increase in vessel numbers equates to a 10% increase in risk is a sound and robust conclusion. This is because the increase would mean that not only would there be 10% more vessels which could have an accident but there would also be 10% more vessels for the original vessels to have an accident with. To use a worked statistical example of the scenario of a vessel to vessel collision, if 100 vessels occupy an area of sea, any one vessel can potentially impact 99 other vessels. Thus there are 99 potential outcomes for each of the 100 vessels and therefore 9900 potential outcomes. If the number of vessels is increased to 110 then any one vessel can impact 109 other vessels. Thus each of the 110 vessels has 109 potential outcomes and therefore the there is a total of 11,990 potential outcomes. In the worked example given, a 10% increase in the number of vessels results in a 21% increase in the number of potential outcomes. It can therefore be seen that a 10% increase in vessel numbers does not equate to a 10% increase in risk.	The Applicant has provided a detailed analysis of historic and future trends in tonnage, and vessel arrivals at Port of London has been provided at Appendix 16 of this Deadline 7 submission. The Applicant can confirm that the 10% future baseline for vessel traffic is considered robust. The basis of the example provided by POTLL and LGPL, and the analysis, is not clear in how this applies (specifically in the multiplication between vessels and potential outcomes [which are undefined]). The Applicant notes a general premise that collision likelihood is not necessarily linear around the full frequency distribution of vessel exposure vs collision likelihood, but that around specific likelihood values a linear assumption of vessel exposure vs collision likelihood provides for a conservative and precautionary estimate of increased collision likelihood. This is evidenced in the peer reviewed scientific paper *Rawson, A. Rogers, E. Foster, D. Phillips, D. (2014). Practical Application of Domain Analysis: Port of London Case Study. Journal of Navigation, 67.*
REP5-018 Para. 94	POTLL and LGPL	The Ports consider that the characterisation by the Applicant (given both at issue specific hearings and in written representations) of the timeline following the workshop has been somewhat unclear. The Ports wish to provide clarity on this point. The statement highlighted at paragraph 105 indicates that there was no request for increasing individual hazard scores. This is, however, contradicted by other statements made by the Applicant, for example, in paragraph 29 of (REP5-018) in which it is stated that "There was one point raised by the ports in the evening after the meeting finished [29 March 2019] relating to consequence scores".	Para 105/29 statement: The Applicant has checked this statement and clarifies that feedback was received on 2nd April by Mr V Crockett and 5th April by Mr T Hutchinson and the Applicant considers this to be when the points raised rather than the referred 29th March. These two correspondences are provided at Annex B to this document. it relates to the considers that there may be an error on the date referenced here. Ref Pt 3.6 statement: The Applicant is not aware of having any specific request for risk score changes prior to these emails.

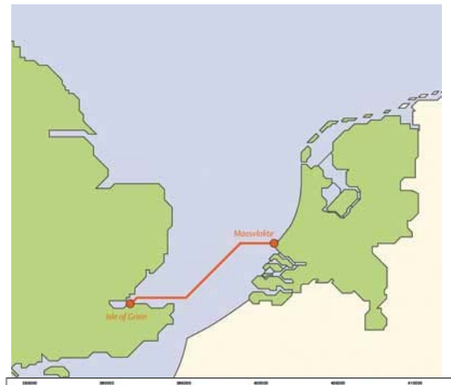
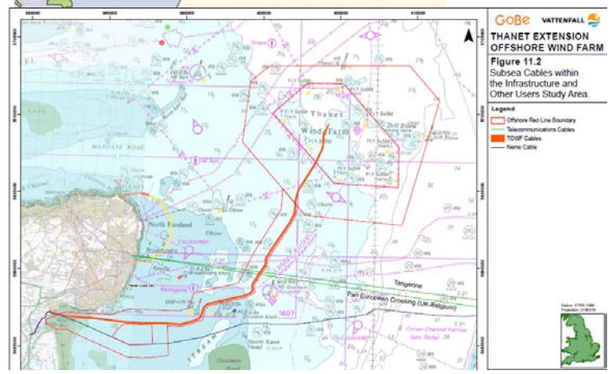
Document submitted by the Applicant	IP	IP Commentary:	Applicant's response:
		In addition, at point 3.6 in the Responses to PLA/ESL D4C representations (REP5-024) it is stated that: No specific request for changes in hazard scoring on either the 4 hazards scored at the workshop or the 14 hazards as initially scored by Marico Marine were received after the workshop despite requests being made for review of the hazards not scored at the workshop, with the exception of DPWLG who requested increase to some consequence classifications input scores on the day of releasing the NRA Addendum [5 April 2019] – which was included as a sensitivity. POTLL and DPWLG wish to make it clear that they did raise concerns in respect of the Hazard scores promptly following the workshop.	
Not Applicable	TFA	Thanet Fishermen's Association attended the Hazard workshop in March in the hope of gaining a better understanding of how risks to Fishing vessels had been assessed and consequences had been scored. However, it was clear that there was a general lack of understanding on a number of points including how scoring worked, why Fishing vessels were grouped with recreational vessels, why consequences for vessels in collision were separated etc. As an association not used to dealing with these kind of assessments, TFA has to be guided by the knowledge of the other IP's in attendance but would maintain that any change to navigation in this area must have an impact on the small commercial Fishing vessels that work here and the risks to those vessels.	The Applicant recognises TFA's uncertainty on certain aspects of the mechanisms of the hazard workshop, but has found the inputs provided to be constructive, relevant, and complementary to the understanding of qualitative concerns.
Not Applicable	NATS	As there have been no material changes to the locations or heights of the turbines, NATS anticipates no impact from the SEZ and its position of NO OBJECTION remains unchanged.	No comment
Internal Ref: PLA 21 / ESL 21	PLA and ESL	Response to the Applicant's Consultation on a Material Change to the Application submitted on behalf of the Port of London Authority and Estuary Services Limited.	This response was provided to the Applicant as a consultation response on the SEZ material change. A full point by point response was provided in Annex E to Appendix 28 of the Applicant's Deadline 6 Submission.
Comments on the Applicant's response to London Pilot Council's Deadline 4C submission PINS Ref REP5-024 Section 1.6	PLA and ESL	Excerpt: "The Applicant recognises and welcomes agreement in the area of Elbow – where sea room has been agreed and justified on the evidential basis of limited number of transfer as evidenced by analysis of distribution of pilotage density" The PLA and ESL understand that the agreement of Interested Parties in relation to sea-room at the Elbow is only in the context of vessels in transit. The sea room in the Elbow area has not – at	The Applicant notes that PLA and ESL do not agree on the basis of the assessment but note this comment was made with regards to LPC. In this regards it is noted that at that time LPC had submitted a layout drawing reflecting this sea room consistent with the Applicants statement. However, LPC have subsequently further revised their basis of sea room and the Applicant has responded on this in Section 2.4 of REP6-038 in order to demonstrate the change and seek clarification from LPC (noting that no further comment has been provided by LPC since their D5 submission).

Document submitted by the Applicant	IP	IP Commentary:	Applicant's response:
		least so far as the PLA and ESL are concerned – been agreed or justified in relation to pilot boarding and landing operations.	
Comments on Deadline 5 Submission by London Pilot's Council	PLA and ESL	Excerpt: *"Traffic management is required to maintain two miles of sea room and a practical amount of buffer zone between the operational sea room and the existing Windfarm to ensure a safe operation. The LPC require a minimum of 2 miles of sea room and a 1 mile safety buffer zone to safely operate vessels of this type at the NESP."* The PLA and ESL note that the LPC requirement for boarding and landing is 2 miles plus a 1 mile buffer. This is the same as that being requested in the PLA and ESL submissions.	Please see above comment by the Applicant re the LPC submission
Applicant's responses to action points arising from ISH8 PINS Ref REP5-012	PLA and ESL	The PLA and ESL acknowledge that the number and type of hazards were changed from the Application and the NRA Addendum (NRAAA), partly based on feedback from IPs. However, the changes made it difficult to compare the NRA and the NRAA. For example, rather than comparing collisions between Class I and each other category of vessels separately, the NRAA compared collision risk between Class I and all other vessels together. The refinements in the NRAA would have made it quicker to carry out the revised risk assessment in the short time available, but it makes it very difficult to see what comparisons can be drawn between the risks in the NRA and the NRAA.	The Applicant notes the PLA and ESL comments however the methodological design of the NRAA was undertaken in consultation with both parties, with the NRAA superseding the NRA for all O&M phase impacts.
Applicant's responses to action points arising from ISH8 PINS Ref REP5-012	PLA and ESL	The PLA and ESL consider that incident data analysis cannot be heavily relied on, because the statistics are based on areas of operation where risks have already been mitigated. The area in question is an area where a new hazard has been introduced in the form of the extension, which has not yet been mitigated. Therefore, we do not agree that the approach is precautionary.	The incorporation of incident data to define baseline risk profiles (i.e: using the highest form of evidence available for the study area) is industry practice and in accordance with MGN543. The basis of this comment by PLA/ESL is flawed in that no new hazards have been created as a result of TEOW. The presence of the TEOW is more accurately considered a potential additional cause to the existing navigational safety hazards (eg collision, contact, grounding) and that the use of baseline incident rates provides the most accurate starting point to identify the magnitude of any change in risk bought about by the TEOW and associated risk controls (whether embedded or additional). As the incident data from the area does not identify any collisions in the inshore route between Elbow and NE Spit Racon buoy, there has necessarily been a precautionary approach as the Applicant is not suggesting that as a result of this baseline no incidents will occur.

Document submitted by the Applicant	IP	IP Commentary:	Applicant's response:
Applicant's responses to action points arising from ISH8 PINS Ref REP5-012	PLA and ESL	The PLA and ESL acknowledge that these were identified as the key area and the key phase. However, they believe that the very short time available was the main driver for not considering other areas or phases.	The matters were presented to IPs for agreement, with full opportunity given at that time (or in advance of the workshop) to agree or place disagreement on record.
Applicant's responses to action points arising from ISH8 PINS Ref REP5-012	PLA and ESL	It was agreed by IPs to use the PLA classes to break down vessel size, but other considerations which should ordinarily have been assessed, such as hazardous cargo vessels, were not considered by the Applicant in the interests of time.	The Applicant does not agree with this representation. LPC, present at the workshop, identified hazardous cargoes, as did the ports representative from HR Wallingford and these were factored in to the agreement of worst credible consequence scores
Applicant's responses to action points arising from ISH8 PINS Ref REP5-012	PLA and ESL	In relation to the Application NRA, the PLA and ESL consider that there was only limited consultation with PLA on the NRA methodology and there was no consultation regarding the hazard scoring.	The Applicant can confirm that the final hazard scoring was not provided to the PLA/ESL, although meetings were sought in which to discuss the hazard scorings around the time of application.
Applicant's responses to action points arising from ISH8 PINS Ref REP5-012	PLA and ESL	The PLA and ESL wish to clarify that the independent mariners did not have local expertise of navigating large vessels in the vicinity of a windfarm to board and land pilots.	The Applicant responded to this at ExQ3 3.12.1 (page 40/153 of REP6-026).
Applicant's responses to action points arising from ISH8 PINS Ref REP5-012	PLA and ESL	The Applicant's recreational craft assessment is still reliant upon AIS data which does not cover all recreational craft (Appendix 27 to Deadline 4: Data Analysis and Validation). Whilst the PLA and ESL agree that the RYA heat map can indicate route use for its members, they would still suggest the high volume of visiting recreational craft from Europe, in particular Holland and Belgium, is not recognised. This traffic is significant because of the approach it takes from the North of the windfarm through the inshore route, in ESL's experience more frequently through July and August.	The Applicant, in its response, identified that the use of other sources of recreational traffic to complement the site specific survey data (which includes visual, radar and AIS) is common place within NRAs and is industry practice in accordance with guidance. The Applicant would note, for reference, it has identified the PLA's reliance on AIS data within the North East Spit NRA as a regional example
Applicant's responses to action points arising from ISH8 PINS Ref REP5-012	PLA and ESL	The PLA and ESL would place more significance on line of sight as an important part of navigational safety. Larger turbines further apart do not necessarily mean a lower amount of interference with radar or visual impact. The PLA and ESL disagree that rows of larger turbines surrounding the existing turbines will result in 'the line of sight visually and by radar would be better than that currently experienced with the various wind farms in the Thames Estuary' and has seen no evidence from the Applicant as to how that could be the case.	The Applicant seeks to clarify this statement in that the turbines are larger and spaced further apart which comparatively gives a better line of sight through the new turbines than the existing array.

Document submitted by the Applicant	IP	IP Commentary:	Applicant's response:
Applicant's responses to action points arising from ISH8 PINS Ref REP5-012	PLA and ESL	The PLA and ESL have not seen any evidence from the Applicant that "worse case scenario" covers worst case MetOcean conditions and surrounding traffic. The angle of approach to the inner boarding ground will become clear once a final position for the Thanet North Cardinal Buoy has been placed so this an assumed angle of approach. The courses provided as a worst case demonstration do not tell us where this vessel engages with the pilot boat or the possible impacts on those bearings on other traffic. ESL would also need to assess what type of vessel is being considered when judging whether there is in fact "ample sea room".	Discussions to date have not included the specific relocated position of the Thanet North buoy although it is assumed, as per standard practices, this will be reviewed and agreed in the Aids to Navigation plan in conjunction the final agreed layout. The courses were provided as an indication for the transit down to the NE Spit Pilot diamond. As we know vessels engage with the pilot boat throughout this area and not in one specific location. Regarding the type of vessel the assumption here is the current vessels which routinely use the NE Spit and the Applicant has assumed that existing baseline limitations that are in place for the additional agreed vessels, such as LNG, 333m LOA (Cap Sans) which have been put in place by IP's through risk assessment, will be adopted as a baseline.
Applicant's responses to action points arising from ISH8 PINS Ref REP5-012	PLA and ESL	It is not uncommon for ESL to request a vessel to steer toward the windfarm but if this is the case, they require a suitable distance (the 2nm+1nm buffer or more) between the ship and a turbine. This suitable distance is what they consider will become harder to achieve with reduced sea room. The PLA and ESL do not agree with the suggestion that being a prudent mariner means a person will have the ability to see through a windfarm, particularly at night or in poor met ocean conditions. They would suggest the prudent mariner would assume that he cannot see through a windfarm and allow for suitably cautious passing distances in their passage.	The Applicant has provided separate commentary on the basis for the 2nm sea room plus 1nm buffer requirement and provides no further comment at this stage. The Applicant notes that transfers do take place with the vessel heading towards the windfarm. However, transfers could equally take place on the reciprocal heading with the vessel proceeding away from the windfarm and the Applicant considers that the sea room provided within the SEZ area ensures flexibility to undertake this manoeuvre with appropriate buffers. The prudent mariner draws upon all available information to assess the situation. This would include whether he could see through the windfarm or not. If he found he couldn't, and that this was relevant to safety of navigation, then he would possibly take a more cautious approach.
Applicant's responses to action points arising from ISH8 PINS Ref REP5-012	PLA and ESL	Figure 38 in the NRA (Section 5.6 Seasonality) summarises the daily transit rate through Traffic Gate E, which the Applicant uses to represent inshore route use. It summarises a daily transit rate of between 32 (winter) and 45 (summer) transits per day. This is based on the results of the traffic survey which is the only data set present that could capture non-AIS traffic. Gate E is not assessed in the NRAA per se, the transit analysis in the NRAA covers the area between Elbow Buoy to SEZ and NE Spit Buoy to SEZ and only includes vessels with AIS. ESL and the PLA are of the opinion that the inshore area is being assessed in its entirety, not solely as an area of passage but an area of passage/pilotage/recreational use/commercial fishing and an access route to an important safe haven for small vessels	The Applicant clarifies that it has not used a 'single gate' in order to assess the inshore route. With regards to the more recent data analysis using gates (as reported in REP4-018, REP4-030 and REP4C-003) the Applicant has considered gates between Elbow to SEZ and NESP to SEZ for the inshore route and also the PLA provided AIS data (as provided to POTL and DPWLG and subsequently the Applicant) which considers a gate approximately aligning with the Elbow/SEZ gate which was (presumably) provided by PLA on the basis that this represents the inshore route. The Applicant therefore considers that it has drawn upon additional experience and records of PLA and ESL (in terms of AIS data and summary ESL records) and others to review and benchmark against the original datasets and inform the NRAA.

Document submitted by the Applicant	IP	IP Commentary:	Applicant's response:
		(Margate Roads anchorage). With this in mind, the PLA and ESL think it would be difficult to assess inshore route usage relying on a single 'gate'. Any vessel interacting with the inshore route should be given consideration in the NRA. From their experience and records, ESL and the PLA do not agree that only 11 vessels transit the inshore route per day.	The utilisation of gate analysis, together with the wider vessel traffic analysis tools and techniques from the AIS data, MGN543 compliant survey data and the collision risk modelling inherently ensures that a spatial and temporal understanding and the interactions of various users and activities is obtained, in accordance with guidance, to inform the assessment.
Applicant's responses to action points arising from ISH8 PINS Ref REP5-012	PLA and ESL	Action Point 15 The PLA and ESL have directly responded to this issue at ExQ3 3.12.15 (see PLA 27 / ESL 27).	Noted
Structures Exclusion Zone Consented Works Clarification Note PINS Ref REP5-012	PLA and ESL	Due to the lateness of the hazard workshop within the Application process and the very limited time available to assess the hazards at the workshop, it was agreed that the focus of the hazard workshop would be the operational phase of the project. This phase of the project was considered to be the most important, and there was no time available to consider other phases of the project. In the event it was not possible to complete the risk assessment for the operational phase at the workshop. The construction phase is remains of concern to ESL and the PLA, particularly given that it is not meaningfully covered by the Navigation Risk Assessment Addendum.	The Construction phase was assessed in the original NRA. The introduction of the SEZ results in a lower risk profile than the RLB layout of the original NRA and thus provides an evidential basis for the construction level hazards to be reduced to ALARP.
Structures Exclusion Zone Consented Works Clarification Note PINS Ref REP5-013	PLA and ESL	From the material submitted by the Applicant, there would be no restriction on a jack up barge being located wholly within and right up to the outer limits of the SEZ. On the SW side of the proposed extension a jack up barge could extend up to 200m from the foundation pile; that would be to the outer limit of the SEZ. This would restrict the use of the SEZ for navigation by other vessels.	The Applicant can confirm that short term, discrete construction and O&M activities will be permitted within the SEZ in order to service cables that may be within the SEZ, or WTGs that will be at least 80m distant from the SEZ (within the array development area). As such any safety zone applied to an O&M or construction vessel will temporarily impinge on the SEZ. The Applicant considers this in practical terms to be firmly established by precedent for cable installation at this location, or indeed for fishing vessels which may be deploying fishing gear (and therefore of limited manoeuvrability) and as such any vessel navigating through the area should appropriately seek to avoid the fishing vessel by 500m.
Structures Exclusion Zone Consented Works Clarification Note PINS Ref REP5-013	PLA and ESL	Comparison cannot be made between complex interaction between through traffic and vessel maneouvres [*sic*] in the inshore route with traffic schemes in which the traffic is all going in one direction or along one route. The BritNed and Nemo interconnectors were installed while bisecting busy, but relatively simple traffic separation schemes.	The Applicant would highlight that the BritNed and Nemo interconnectors both bisected not only the internationally important TSS but also, as PLA and ESL will be aware, bisected the area of general navigation identified by the PLA/ ESL. As such the Applicant considers the comparison to be appropriate. For the avoidance of doubt the indicative cable routes

Document submitted by the Applicant	IP	IP Commentary:	Applicant's response:
		The interaction between vessels travelling along different routes, different kinds of vessels, and vessels on manoeuvre in the inshore route is a much more complex picture. This is an area of general navigation, where pilot boarding and landing operations take place in conjunction with vessels on passage, fishing and recreational vessels. The protection provided for navigation under the Application is insufficient and is a navigational and safety concern for ESL and the PLA.	BritNed, and for other cables already installed in the area is illustrated below (taken from the ES chapter for other marine users (6.2.11))  

4 Applicant's response to ExQ3

9 As noted in paragraph 5 of this document, this section includes the Applicant's responses to the EXQ3 which were to be addressed by the Applicant, i.e. not assigned to any IPs , as such the Applicant has provided no additional commentary to these questions as part of their Deadline 7 Submission These have been included for the aid of the reader and to enable easier cross referencing between responses. These responses are as they provided by the Applicant as part of their Deadline 6 Submission.

Table 3: ExQ3 addressed to the Applicant

ExQ3 PINS Question number:	Question is addressed to:	Question:	Applicant's Response:
3.12.	Not Applicable	**Navigation: Maritime and Air** The Applicant has proposed and the ExA has supported consultation on a material change request to enable the inclusion of a Structures Exclusion Zone (SEZ) within the proposed wind turbine generator array area. Consultation on this change process is ongoing, with a Consultation Report, responses from IPs and Other Persons (and any related requests to become an IP or Other Person) due at Deadline 6. In this respect, it is important to be clear that this set of questions is seeking to maximise clarity around the existing evidence in support of the Application plus the material change request, in order to support the ExA's recommendation to the SoS. These questions do not seek additional material changes to the Application and (in that respect), advice in the Planning Inspectorate's Advice Note 16, that there comes a point in an Examination where a material change is unlikely to be accepted by the ExA, should be noted.	The Applicant notes this over-arching comment and that the questions are not seeking additional material changes to the Application.
3.12.1.	The Applicant	**Applicant's shipping and navigation expert credentials: curricula vitae** In [REP5-012] D5 Appendix 7 point 4, the credentials of the Applicant's experts are elaborated. Would the Applicant please clarify: a) Para 11: between what dates and for what geographical area was Capt. Moore a Class One unrestricted pilot? b) Para 11: what in more detail is Capt. Moore's experience of undertaking navigation risk assessment referred to in this para.? c) Para 21: between what dates was Capt. Moore employed as a Class 4 pilot by the PLA restricted to ships of 120m length, and were there any offshore windfarms in the sea area in which he operated at that time? d) Para 24: is the 'project area' referred to the general area of the Thanet windfarm and how does Capt. Moore's current role as Senior Master on a Dover to Calais ferry give "strong and current knowledge of the project area"? e) Para 30: between what dates and where was Commander Brown a Class 1 pilot? f) Para 31: Has Commander Brown managed, commissioned or directed navigational risk assessments or navigational risk workshops? g) Para 44: did Commander Brown's experience of sailing up the river Thames in	a) Captain Simon Moore was a Class One Senior Pilot at the Port of Dover between November 2006 & March 2009 and then again between September 2010 and March 2014. The Competent Harbour Authority area was the Port of Dover itself is a 1nm radius from the port. However, the pilot boarding and landing took place up to 5nm from the port, to provide sufficient time for an effective master pilot exchange when large vessels were boarded. b) The Dover Harbour Board is the competent harbour authority which operates the Port of Dover. In 2010/11 the Board decided to devise its own Corporate Risk Assessments. These covered all areas of the business and Captain Moore was the maritime lead on all the marine based risks. Once these had been determined these risks would form the basis of the Navigation Risk Assessment for the port. This was a comprehensive look at all the risks and is still in use by the port today. The latest version can be seen at the bottom of the page on the following link: https://www.doverport.co.uk/operations/podomsc/ Captain Moore was also the maritime lead for fully revising the port's Port Marine Safety Code which is the safety management system for marine port operations. Once this was completed it was peer reviewed by the Harbour Master who had responsibility for safety management systems at the Port of London Authority.

ExQ3 PINS Question number:	Question is addressed to:	Question:	Applicant's Response:
		military vessels involve boarding or landing a pilot and/or navigating in close proximity to a windfarm? h) Has Commander Brown piloted, navigated or commanded commercial vessels in the vicinity of windfarms in the Thames Estuary and approaches and if so, of what types and sizes?	c) Captain Moore was employed at the PLA as a Class 4 Pilot between February and December 2006. During this time the Kentish Flats windfarm was in operation and was passed on a regular basis transiting the Princes Channel and Oaze Precautionary Area. d) The general area refers to the Dover Straits and South East area inclusive of the project area and approaches to Thames estuary. Captain Moore's understanding of the general area draws on his prior and existing practitioner knowledge and experience, his over-arching maritime lead role for (including navigation) risk assessments at Dover and in the Dover Strait and adjacent areas. The Dover Strait, and the complexity of navigation management within it, should not be considered in isolation to the wider south east area (inclusive of the project area and the approaches to the Thames estuary) because the navigation management of these areas are an overall and integrated system. Captain Moore therefore understands the broader region from both a mariner and navigation risk assessment perspective. The skills are transferable and the combination of existing experience of the area and a lengthy career of the region more widely gives a strong and current knowledge of not only the area but the region more broadly and the challenges associated with the busy areas of shipping and fixed obstructions. Furthermore, it is noted that Master Mariners and Pilots undergo comprehensive training throughout careers. The skills and experiences gained over many years can be applied to other situations and sea areas. As mariners are trained to take anywhere in the world not just Dover to Calais or operating in and around the NE Spit, including as a pilot in the project area, e) Commander Paul Brown was a Class 1 pilot at the Port of Dover from 2012- 2017. He has been a pilot for the Taw and Torridge Pilotage District and for the Torbay Pilotage District since 2017. f) Commander Brown has managed two NRAs with Marico Marine for the proposed Rotherhithe to Canary Wharf Bridge for Transport for London (notably this is within the PLA statutory area on the River Thames) and one for Red Funnel for the introduction of a new ferry on the Southampton to Cowes route. As Harbour Master and General Manager Operations for the Port of Dover, Commander Brown commissioned and ran his own annual navigational risk workshops as a part of the normal management of the port under the auspices of the Port Marine Safety Code. g) Yes. A pilot was embarked and disembarked in every ship sailing up the river Thames and each time it was at the North East Spit or the Tongue Pilot stations. In addition, Commander Brown has routinely navigated and commanded military vessels conducting boat transfers for pilots and other personnel in significantly more demanding conditions and very much more close proximity to navigational hazards (including windfarms) than is being considered here in the Thames, in a sea going career that spanned over 25 years on operations throughout the world.

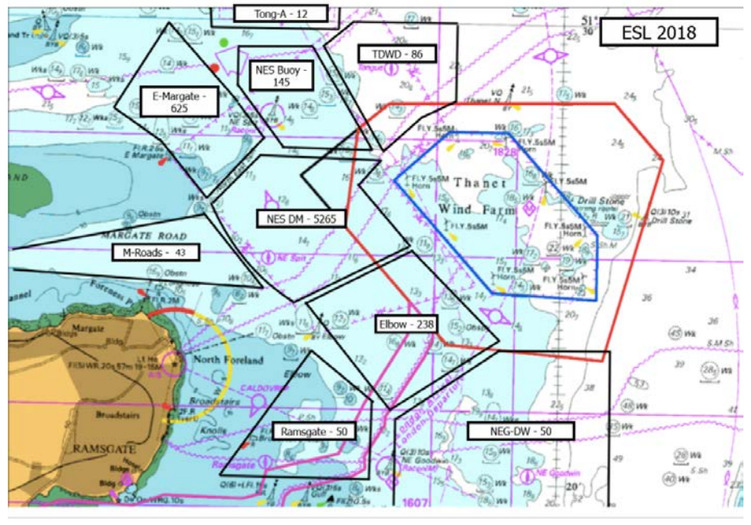
ExQ3 PINS Question number:	Question is addressed to:	Question:	Applicant's Response:
			h). Commander Brown has not navigated or commanded commercial vessels in the vicinity of wind farms in the Thames Estuary and approaches. Commander Brown has however routinely handled commercial vessels of varying dimensions in navigationally confined waters for over 7 years (whether through other estuary type regions and or with other navigational hazards and obstructions). This has included cruise ships of up to 320m in Dover and smaller bulk cargo ships of up to 140 m in the tidally confined waters of the river Torridge. Commander Brown is intimately familiar with the handling characteristics of commercial vessels both on passage and when manoeuvring, in a range of met-ocean conditions and constrained waters.
3.12.2.	The Applicant	**Applicant's shipping and navigation expert** credentials: quality assurance processes Can the Applicant clarify whether and if so by what means Marico carries out a quality assurance (QA) audit process on NRAs prepared by it for clients? Has Marico carried out a QA on this NRA and NRAA?	The Applicant can confirm that Marico Marine completes a quality assurance (QA) review on all reporting and risk assessments prepared by them and for their clients before submission to them. This forms part of their Quality Management System (QMS), which is audited and certified as compliant with the ISO 9001:2015 quality standard. Marico's accreditation in this regard is supplied and audited on an annual basis by BSI. Marico was last audited by BSI in December 2018. As laid out in Marico's Consultancy Procedure (PR-CN-01; part of their QMS), once a report is considered ready for submission as 'Draft A' to a client, the Project Manager passes it to an appropriate senior staff member – either Principal Consultant/Head of Consultancy/Operations Director (as appropriate) – for their review for: • Technical content; • Language/legibility; and • Formatting. They are required to carry out a QA review of the report and pass it back to the Project Manager for remedial work if so required. A report is not permitted for issue to a client unless it has been reviewed and subsequently approved for release as 'Draft A' by the Project Director. Once 'Draft A' has been supplied to a client, they have an opportunity to review the report and request any changes, corrections or amendments they require. Such changes are at Marico's discretion and where appropriate, lead to the finalisation of 'Issue 01' of the report for supply to the client. Following completion of a project, Marico also undertakes a final 'End of Project Audit' and seeks feedback from their clients with a view to aiding business improvement. The QA check and review for Issue 01 of the NRA in May 2018 was conducted by Dr Ed Rogers and Captain Paul Fuller and the document authorised for release by Jamie Holmes. The Marico QA review of the NRAA was conducted by John Riding, Senior Partner Marico

ExQ3 PINS Question number:	Question is addressed to:	Question:	Applicant's Response:
			Marine, and Commander Paul Brown in April 2019, with independent review undertaken by Captain Simon Moore following involvement at the HAZID workshop.
3.12.3.	The Applicant	**Applicant's shipping and navigation expert credentials: accountability and supervision** Can the Applicant please clarify the current status of the following expert witnesses' relationship with Marico [REP4C-003]: a) Since October 2018, Dr Ed Rogers now runs his own consultancy. Does Dr Rogers' role as Project and Technical Director mean that he is the lead provider of the NRA and NRAA and if so: i. Is he now employed as a consultant representing Marico; or ii. Is he providing advice on his own account (and if so, by what means does he carry out a quality assurance (QA) audit process on NRAs prepared by him for clients)? b) Mr Jamie Holmes is characterised as an Associate Consultant of Marico. i. Is Mr Holmes employed by Marico? ii. Is Mr Holmes working to Dr Rogers and if so, how does that relationship operate within any QA process used by Marico?	Response to a) i) Dr Ed Rogers ceased employment with Marico Marine on 3rd October 2018 and founded Nash Maritime Ltd on 30th October 2018. During his employment by Marico Marine as Operations Director, Dr Rogers was the company's Project Director for the TEOW NRA from commencement of the project. Since leaving Marico Marine, Dr Rogers has been contracted on a "Sub-Consultant Agreement" by Marico Marine to continue providing technical input into TEOW examination and representing Marico Marine. Overarching governance is now provided by the new Marico Marine Operations Director Andre Cocuccio (ex-Assistant Director of Navigation Safety for the Maritime and Coastguard Agency) with support, as noted, for QA/QC from John Riding for matters relating to project specifics. Dr Rogers was therefore the Project Director for the NRA (during his employment bv Marico Marine) and has been the lead technical consultant of the NRAA which has been QA/QC'd in line with Marico Marine ISO 9001:2015 approved Quality Management System audit processes, which for the NRAA included review by master mariners (Commander Paul Brown for Marico Marine and Captain Simon Moore as independent) and John Riding as Senior Partner of Marico Marine. John Riding manages the Marico Marine Group and has notable experience, including time spent at MCA from 1993 to 1996 as FSA development lead, during which time he was responsible for the development of the Top Down Method used for New Regulations for SOLAS Vessels by the International Maritime Organization (IMO), and oversaw the application of the methodology to Bulk Carriers, which resulted in changes to Chapter VII of the SOLAS Convention. Response to ii) As outlined above Dr Rogers therefore provides advice and work content as a Sub-consultant to Marico Marine, who are responsible for direction and management including quality assurance and audit of any work package delivered by Dr Rogers, in line with the Marico Marine ISO 9001:2015 approved Quality Management System which sits under the overall direction of John Riding as Senior Partner/owner of Marico Marine. Response to b) i) Mr Jamie Holmes ceased employment with Marico Marine on 10th October 2018, and has since joined Nash Maritime Ltd working with Dr Rogers. During his employment by Marico

ExQ3 PINS Question number:	Question is addressed to:	Question:	Applicant's Response:
			Marine as Associate Director, Mr Holmes was the company's Project Manager for the TEOW NRA. Since leaving Marico Marine, Mr Holmes has also been contracted by Marico Marine on a "Sub-Consultant Agreement" to continue providing technical input into TEOW examination as required and under the direction and management of Marico Marine Operations Director Andre Cocuccio. Response to ii) Mr Holmes works to Marico Marine Operations Director Andre Cocuccio, and QA is undertaken in the same manner as Dr Rogers, in line with the Marico Marine ISO 9001:2015 Quality Management System which sits under the overall direction of John Riding as Senior Partner/owner of Marico Marine.
3.12.4.	The Applicant	**Reduction of sea room for pilot boarding and landing at NE Spit** In [REP1-017] Applicant's Response to [RR-051] SUNK VTS User group SUG-2 it is stated that *"The assessments presented within the NRA and ES chapter do not* [sic] *conclude there is sufficient sea room at North East Spit for continuation of pilot transfer operations."* • Would the Applicant please review and clarify this statement?	The Applicant has reviewed this response and clarifies that this is a typographical error. For clarity the corrected Applicant's response is provided below with the word 'sufficient' replaced with 'insufficient' and shown in bold/underline. The assessments presented within the NRA and ES chapter do not conclude there is **<u>in</u>**sufficient sea room at North East Spit for continuation of pilot transfer operations. The section specifically addressing these in detail is Section 7.2 of the NRA (PINS Ref APP-089/ Application Ref 6.4.10.1), and the Pilot Transfer Bridge Simulation exercise presented in Annex 10-2 of the application (PINS Ref APP-090/ Application Ref 6.4.10.2). The Applicant apologises for any confusion in this regard.
3.12.9.	The Applicant	**Implications of pilot station relocation if needed** In [REP3-004] response to point 4 of [REP2-048] from Sunk User Group the Applicant refers back to [REP2-011] Appendix 4 to D2 responses which states "*The Applicant, at the Pilotage Study Report undertook analysis of the time, distance and cost involved for launches servicing the various stations and this should be used in understanding the commercial impact*". Would the Applicant please clarify with additional detail how this answer and the Pilotage Study report addresses the [REP2-048] point 4?	The Applicant notes that REP3-004 relates to "*Deadline 3 Submission -Annex B to Appendix 1: MCZ Chart illustrating Goodwin Sands with relevant projects"* which the applicant considers may be an incorrect reference and therefore the applicant is unsure of the appropriate reference. The Applicant notes the reference to the Sunk Users Group – which does not have operational oversight of the NE Spit Study area, that at point 4 of [REP2-048] noted: *"4) If the NE spit pilot station had to be relocated further seaward, this will unfortunately result in extra costs, not just financially, but also in time, to pilots, and pilot launch transiting times. Being exposed further out to sea, may also have the result of more probable likelihood*

ExQ3 PINS Question number:	Question is addressed to:	Question:	Applicant's Response:
			of unfavourable sea and swell conditions. This could result in more vessels not being served and having to wait considerable time for wind conditions to be in their favour." The Sunk User group are simply pointing out that if a pilot station were relocated, then additional cost and operational impacts could occur. The Applicant notes that REP2-011 relates to *"Deadline 2 Submission –Appendix 19: Revised Application Document. Doc 2.3 Land Plans (Onshore)–Revision D",* however it is believed that the ExA is referring to the Pilotage Study [ES Volume 4, Annex 10-1] at "Section 3.3 Alternative Pilot Arrangements", in which analysis is presented on the increase transit time for the pilot launch if pilot boarding were to take place at either the: • Option 1: Board pilots to the south of the wind farm, between Ramsgate and North East Goodwin • Option 2: Board pilots near to North East Spit east cardinal, to the west of the wind farm and the Tongue station. The analysis presented notes that there is no difference in distance if the pilot launch transits to Option 1 and that the launch would have to travel an additional 2.9nm were to travel to Option 2, an additional 7.25 minutes per transfer. It is important to note that the context of the Pilotage Report relates to the PEIR RLB, which was reduced at the western extent for the ES submission to the current RLB, and further reduced as a result of implementing the SEZ. As such comments on "*constrained fairways*" no longer apply. Further it is the Applicants firm view that there is no need for pilot transfer locations to change as the 2nm plus 1nm has been met for the NE Spit Pilot Diamond, with the SEZ in place, and that most other operational areas for pilot boarding are unaffected by the TEOW. However, and despite the Applicants firm view on this matter, specific analysis is presented in response to ExQ 3.12.7. on commercial impact of moving the Tongue pilot diamond, and within ExQ 3.12.10 on relocation of any transfers that could be impacted at Elbow as a result of the TEOW with the SEZ in place.
3.12.10.	The Applicant	**Unadopted risk control: NE Spit pilot boarding operations** In [REP5-039] the NRAA (revised) at para 172 the Applicant states: '*A risk control, identified within the original NRA (Table 22, unadopted risk control No.2) which has not been adopted, is the relocation of the NE Spit Pilot Boarding operations. The Applicant does not consider that the scheme would require any such relocation, as*	The Applicant notes the following responses to the ExA Questions: a) The Applicant notes that "*NE Spit pilot boarding operations*" relates to the whole of the operation NE Spit pilot boarding area noted by ESL (as presented below and at Fig 14, Fig 15 [also below] and Table 5 of REP5-039):

ExQ3 PINS Question number:	Question is addressed to:	Question:	Applicant's Response:
		the hazard risk scores assessed in this Addendum NRA demonstrate navigation risk to be acceptable… The Applicant considers that this is confirmed by the introduction of the SEZ, which ensures that the required sea room for pilot transfer would be available. However, if IPs consider that there is a residual concern with pilotage operations, specifically in relation to large vessels dipping the full distance from the north to the NE Spit pilot diamond, it would be feasible for vessels to be the subject of pilot transfers further to the north of that pilot diamond, within the current area of pilot operations.' a) The Applicant is asked to confirm that there are no circumstances in which it considers that a relocation of NE Spit pilot boarding operations might be argued as a relevant mitigation in respect of the provision of adequate sea room and navigation safety in the NE Spit area. b) If such a confirmation cannot be provided: i. to the extent that this is known, to where would relocation occur; ii. what if any capital costs are incurred; iii. what if any additional running costs (revenue costs) are incurred by pilot services; iv. who will meet these costs; v. is there any basis for a commercial agreement or other secured provision for contribution by the Applicant to these costs; and vi. have the navigation effects of any relocation been taken sufficient account of in the NRA/NRAA? If b) and specifically b) v are responded to, a form of security should be outlined at Deadline 6 and final drafts / confirmation provided at Deadline 7.	<table><tr><td>ESL NE Spit Operational Area</td><td>2017</td><td>2018</td></tr><tr><td>Tongue Anchorage</td><td>16</td><td>12</td></tr><tr><td>Tongue Pilot Diamond*</td><td>93</td><td>86</td></tr><tr><td>NE Spit Buoy</td><td>225</td><td>145</td></tr><tr><td>E-Margate</td><td>690</td><td>625</td></tr><tr><td>Margate Road</td><td>137</td><td>43</td></tr><tr><td>Ramsgate</td><td>34</td><td>50</td></tr><tr><td>NE Spit Pilot Diamond</td><td>5199</td><td>5265</td></tr><tr><td>Elbow*</td><td>157</td><td>238</td></tr><tr><td>NE Goodwin Pilot Diamond</td><td>28</td><td>50</td></tr><tr><td>**Total**</td><td>**6579**</td><td>**6514**</td></tr></table> With regards the relocation of the NE Spit pilot diamond it is not considered necessary, under any circumstances, that the diamond would require relocation, with adequate searoom existing. The Applicant would also note from this data that there has been a reduction in pilotage operations at NE Spit between 2017 and 2018, and that when related to data presented in *Response to further information requested by the ExA (Responses to Action Points from ISH2) submitted on behalf of the Port of London Authority and Estuary Services Limited*, in which it is noted at item Action 10 Marine Guidance Note (MGN) 543 Compliance, that the total pilotage numbers at NE Spit were 6691 in 2016, which demonstrates a further reduction in pilotage transfer at NE Spit. The Applicant also notes that there is a disparity in these datasets (which the Applicant has assumed to be related to the difference in vessels served compared to the actual numbers of pilot's transfers) for 2017 which are different, however it is clearly evident that over the last 3 years there has been clear decline in pilotage operations at NE Spit in general terms. Any recent increase in Q4 2018/Q1 2019 would therefore equate to a broadly static position in the context of this decline. The Applicant has noted that as the required sea room has been provided for at the NE Spit Pilot Diamond with the SEZ in place that there is no requirement for the relocation of pilot boarding from this area. In the context of the above information the NE Spit Pilot Diamond has the highest frequency of pilotage transfers of any area of the NE Spit Pilot Boarding operations areas at 81%. Further the Applicant notes that the following ESL defined pilot boarding areas are not affected by the TEOW development: • Tongue Anchorage • E-Margate • Margate Roads • Ramsgate • NE Goodwin

ExQ3 PINS Question number:	Question is addressed to:	Question:	Applicant's Response:
			Which together with the NE Spit Diamond, made up 92.8% of all pilotage transfers occurring within the ESL NE Spit area of operations in 2018. There is therefore demonstrably no effect on >90% of ESL's operations. As noted above in response to 3.12.7, in terms of Tongue Pilot Diamond, which in 2018 accounted for 1.3% of transfers in the ESL NE Spit Operational area, then the applicant notes that it may be necessary relocate the Tongue Pilot Diamond by up to 0.7nm if a WTG were placed at the closest point of the TEOW to the Tongue Pilot Diamond. The Applicant notes representations from PLA / ESL that if relocation of the Tongue Pilot Diamond was necessary it would need to be located 2.4nm to the north to ensure the diamond is not located in a high vessel transit area. However, the Applicant does not agree with this statement as: • The Tongue pilot diamond at the moment is in an area of high vessel transits; • If relocated slightly to the north, by approximately 0.7nm (as to maintain the same distance from the existing boundary as the SEZ boundary of 1.9nm), there would be no material difference in through traffic interaction, compared with its current position and compared to other pilot boarding stations, such as the NE Spit Pilot Diamond (which has a higher density of traffic), the Sunk Pilot Diamond or the Oaze pilot diamond. The Applicant has noted that transfers do take place in an area to the north of the existing NE Spit Pilot Diamond, referred to by ESL as the NE Spit Buoy area, but that this area, with the SEZ in place, has a very small boundary to the proposed TEOW windfarm, and that in 2018 only 2.2% of transfers occurred in this area. Therefore, the Applicant would note that there would be negligible if any effect on pilot transfers within this area from the TEOW.  In 2018 the Elbow area accounted for 3.7% of pilot transfer operations. The Applicants position is that under normal operating circumstances (i.e. when there are no restrictions to pilotage services) then the Elbow area will remain viable to pilot transfer operations, and that in any event additional sea room is available to the south and south west, and indeed to the north for pilot transfers when restrictions are not in place. The Applicant notes that to the extent that pilot boarding operations maybe delayed during "limit" state conditions

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			within the Elbow area is not considered to be significant (as detailed in the Applicants response to Deadline 5 submissions (Appendix 26 of this Deadline 6 submission) being a small percentage of transfers and occurring only a small percentage of time: but were it to occur, additional pilot boarding areas are available, and even if boarding were not possible, the very worst impact would be one of a very minor weather delay to a vessel – a risk that is taken by vessels every day. b) i). The relocation of the Tongue Pilot Diamond would be a maximum of 0.7nm to the north or north east. For reasons stated in answer to part a) of this ExA question, the Applicant does not consider that any other relocation of pilot boarding diamonds is necessary, and that no other pilot boarding operational areas, which by their virtue cover sea areas as opposed to precise locations, require relocation.
3.12.11.	The Applicant	**Trend for larger vessels accessing Thames and Medway ports** In [REP5-012] D5 Appendix 7 para 95 the Applicant presents evidence of a trend towards larger vessels carrying more cargo. POTL/LGPL and other IPs presented evidence including at ISH 5 and ISH8 to the effect that larger vessels up to and including 333m LOA are already using the NE Spit PBD and that this use is likely to continue (particularly for outbound unladen vessels) due to the volume of vessel traffic at the Sunk pilot station and in northerly channels of the Thames. Would the Applicant please clarify: a) What does the Applicant consider to be the threshold for "larger vessels" in regard to draught, LOA and/or handling characteristics in restricted amounts of sea space; and b) para 94: how and to what extent the 10% growth in larger vessels in particular of Class 1 and 2 vessels has been reflected in the NRA Addendum amendments to the application NRA in the assessment of likelihood and consequence of hazard occurrence involving large commercial vessels in the vicinity of the proposed TEOW?	a) The determination of an absolute threshold definitions of larger vessels has been the subject of extensive discussion through examination and reference has variously been made by IP's to factors including vessel types/class (e.g. class 1 or 2 as well as cargo type), length, draught, beam and manoeuvring characteristics. The relationship between these factors means caution should be given to defining an absolute overarching threshold of larger vessel by any one factor in isolation. Further information is provided on this in REP4-018. For the purposes of the SEZ the Applicant has considered a threshold of draught to be the key factor as it reflects the existing limitations by draught to vessels using the NESP PBS (specifically in the distance between the NE Spit Racon Buoy and the wind farm boundary and the sea bed bathymetry levels in this width and also through the Thames approaches via Princes Channel). The largest vessel seen to navigate this area is a 333m LOA vessel of 11.3m draught representing the Applicant's consideration of the 'larger vessel' by length and draught and also representing the more challenging spectrum of handling characteristics (due to general size in combination with cross sectional area and windage factors). It should be noted, with reference to LPC submissions, that the risk assessment reported to have been undertaken by LPC/PLA for vessels of this length places draught restrictions of potentially 9m to 10m. It is further noted that specific restrictions in terms of wind speed limits are understood to also be in place for these vessels (in the existing sea space) arising from that risk assessment. Thus (and as per the Applicant's submission at Action Point 9) the Applicant does not consider that specific restrictions in terms of wind speed limits are understood to high windage vessels) the handling characteristics of vessels currently using the area will not preclude them still using the area. b). Hazard likelihood scores for the baseline and inherent risk profile were determined for hazards 1-4 of the NRA A from the Hazard Workshop which was attended by IPs, with the remaining hazards scored by the Applicant. The likelihood scores for hazards associated with commercial vessels were uplifted by a further 10% to allow for future traffic growth, such

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			that, for example a hazard assessed by IP's to have a 1 in 30 year occurrence for the most likely outcome to occur, was increased to a likelihood of 1 in 27 years. This was applied to the following vessel hazard categories: • Commercial vessels – PLA Pilotage Class 1 and 2 vessels (including LNG) • Commercial vessels – PLA Pilotage Class 3 and 4 vessels (including DG) • Commercial vessels less than 90m Within the original NRA, the uplift to account for vessel traffic growth was included in the assessment of hazard likelihood for the baseline, inherent and residual risk profiles.
3.12.12.	The Applicant	**Allowances for traffic growth in collision risk modelling** In [REP5-071] POTL/LGPL submission, the HR Wallingford report asserts that collision modelling (on which the NRA relies) is deficient due to inadequate predictions of traffic growth. The Applicant has defended the figure of 10% traffic growth used for risk assessment generally, but would the Applicant also confirm in what way the collision risk modelling: a) allowed for overall growth of traffic; and b) allowed for predicted relatively larger growth of larger vessel traffic as accepted in other evidence.	a). The Applicant notes that the CRM modelling was undertaken on Baseline AIS data and sought to characterise the ratio of collision likelihood between baseline risk profile (without TEOW) and inherent risk profile (with TEOW, but no additional risk controls). The CRM, which is based on real life AIS data for the baseline conditions, did not seek to assess the risk with a 10% allowance for future vessel growth. This was included within the original NRA Formal Safety Assessment hazard risk scoring, and applied separately within the NRA Addendum, both of which were informed by the change in collision likelihood assessed between the baseline and inherent outputs of the CRM. Further to this the CRM also included a sensitivity analysis for additional growth in Wind Farm Service Vessels. Notwithstanding the results of the original CRM, that relate to the application RLB and which do not take into account the SEZ, the Applicant has commissioned and further CRM study, independent of the original CRM study, to investigate the reduction in risk brought about by the SEZ. This was undertaken by Anatec Ltd, who have undertaken many such assessments and the study report is at Appendix 42 of this Deadline 6 submission. The results from the independent Anatec CRM demonstrate that baseline modelled collision return rate of 1 in 48 years is comparable to the 1 in 6 years return rate computed as part of the original NRA when it is considered that: • The Anatec study area is approximately a quarter the size of the original study area of the original NRA CRM. • Collisions involving anchored vessels are omitted from the Anatec CRM, which were included in the original CRM. • Collisions that only result in material damage are considered, whereas all collisions were considered in the original NRA CRM. The Anatec CRM showed that there was around a 4% increase in collision risk in the smaller study area assessed, attributable to the TEOW with SEZ in place, which is lower than the difference seen in the original CRM. This difference is associated with:

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			• The substantial reduction in in RLB between the PIER, on which the original study was conducted, and the application RLB, and then further reduced with the introduction of the SEZ, such that the extent of the TEOW in the Anatec study area is considerably reduced compared to the original NRA CRM. • Inclusion within the Anatec CRM results of embedded mitigation measures not considered within the original NRA CRM. The Anatec SEZ CRM did include allowance for 10% traffic growth, and showed that the 10% traffic growth results in a greater increase in risk, than that generated by the construction of the TEOW. b). The Applicant has presented evidence of a trend in the growth in vessel size, as demonstrated in the NRAA, based on a decline in ship arrivals at London Ports, whilst an increase in trade volumes is evident. The Applicant notes that as vessels increase in size they are more likely to utilise the SUNK pilot boarding station, and as such a decline may be seen at the NE Spit (possibly already seen in the pilotage transfer data presented in ExAQ3: 3.12.10 which shows a decline in transfers at NE Spit over the last 3 years). Further to this, evidence provided by the PLA, POTLL/DPWLG, demonstrates that whilst 333m vessels transited the inshore route, within the data provided this seems to have occurred for a limited period around winter 2017/18, and as evidenced from the PLA Gate 1 Data it can be seen that vessels over 300m transited the inshore channel only between the 3rd January 2018 and 19th March, which only totalled seven transits by six individual vessels, and at no other time in the years' worth of data provided. Therefore within the context of the data provided and the basis that larger and deeper draught vessels would use the SUNK, no allowance has been considered necessary within the CRM, either provided as part of the original NRA, or in the subsequent CRM update undertaken independently by Anatec.
3.12.13	The Applicant (the engagement of other IPs and Other Persons in the subject matter of this question is noted and comments on the Applicant's response at Deadline 6 can be provided at Deadline 7)	**Allowances for traffic growth in collision risk modelling: NPS Ports policy compatibility** The Thames Estuary contains existing ports that meet the NSIP scale criteria for ports set out in s24 PA2008. NPS Ports envisages the location of new ports being determined by the market, but the fact that the Thames Estuary is a current and prospective location for future NSIP scale port development is demonstrated by the relatively recent development of London Gateway Port (which NPS Ports at paragraph 3.4.8 identifies as the largest capacity addition to UK container handling capacity in a single consent between 2005 and 2012) and more recently by the granting of development consent for the Tilbury 2 NSIP (which is now beyond its judicial challenge period and can be considered a concrete addition to consented capacity). London Gateway Port has been developed to support the potential addition of 4 further berths (a greater than doubling of current capacity). It is also	a) The Applicant notes this and can confirm that rather than historic trends the Applicant has sought to benchmark future growth against the PLA's Thames Vision which provides for considered growth. Further to this the Applicant has considered other forecasts including those put forward by the MMO as part of the South East marine spatial planning process which not only consider an increase in trade, but also assume that Thanet Extension is consented. These combined forecasts consider there to be a likely increase in cargo vessels, and a likely shift towards larger vessels to accommodate this. As confirmed during ISH8 by LGL/POTL where there is a shift to larger vessels these are unlikely to use the inshore route. The Applicant concurs with this observation and has noted in response to other ExQ3 that larger vessels are likely to utilise the SUNK for pilotage, as is currently the case. Whilst the Applicant notes this shift it also notes that overall volumes of smaller vessels may continue to grow and as such an overall uplift of 10% is considered to reflect future visions identified

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		possible to envisage additional NSIP-scale port development in the Thames beyond these two locations. NPS Ports paragraph 3.4.11 identifies that port '[c]apacity must be in the right place if it is to effectively and efficiently serve the needs of import and export markets. The location of ports in England and Wales has changed over time, in response to changes in global markets, in the size and nature of ships, and in the transport networks which support them. Currently, the largest container and ro–ro terminals are in the South East…'. Paragraph 3.4.12 identifies that it is in the national interest for there to be competition between ports, which drives efficiency and lowers costs. This means that port development 'requires sufficient spare capacity to ensure real choices for port users. It also requires ports to operate at efficient levels, which is not the same as operating at full physical capacity.' Spare ports capacity is viewed as a desirable contribution towards the decongestion of land transport routes through coastal shipping (paragraph 3.4.14) and the provision of national logistics resilience (3.4.16). Drawing these factors together, NPS Ports (paragraph 3.4.16) concludes as follows: '[e]xcluding the possibility of providing additional capacity for the movement of goods and commodities through new port development would be to accept limits on economic growth and on the price, choice and availability of goods imported into the UK and available to consumers. It would also limit the local and regional economic benefits that new developments might bring. Such an outcome would be strongly against the public interest.' Paragraph 3.5 urges NSIP decision-makers to accept what amounts to an urgent need for new ports capacity and normally to presume in favour of its development. The port capacity demand forecast used in NPS Ports (paragraph 3.4.3) (MDS Transmodal central forecast for Great Britain 2007: 2005 to 2030) is acknowledged not to have factored in the growth effects of the post-2008 economic downturn. Equally however, it is acknowledged not to take into account other new drivers for additional port capacity, including offshore wind farm development and servicing. NPS Ports suggests that the net effect of the economic downturn on this forecast should be considered to be a delay but not ultimately a reduction in the eventual levels of demand for port capacity, in particular for unitised goods (paragraphs 3.4.4, 3.4.5). Summarising the implications of the NPS Ports forecast for growth by main cargo type and breaking these figures down into linear annualized growth with no allowance for economic cycles suggests the following: **Forecast ports capacity growth by cargo type to 2030**	by local stakeholders as well as a change in the overall vessel mix likely to access the Thames estuary. b) The Applicant can confirm that the NPS Ports policy assumptions about port and traffic growth rates (NPS growth rates) are relevant insofar as they recognise an overall growth rate in trade by growth in for example container vessels. The Applicant has considered this, and as identified in response to a) has considered that whilst the overall trend to support the NPS growth rates is a transition to larger vessels, and therefore an overall reduction in vessel numbers, other vessel types are likely to increase. The growth rates identified in the MMO marine spatial plans also identify both a growth in trade and a shift towards larger vessels to service this growth. In view of this the Applicant remains of the view that for the study area in question, i.e. the inshore route in particular, a 10% growth is realistic and adequately accounts for the NPS growth rates of relevance to the study area. The wider region, in particular other approaches such as the SUNK, will likely increase in usage as vessel size trends require deeper water approaches, noting that the SUNK is inherently a narrower approach that requires traffic flow management. i) In light of the above it is the Applicant's view that the 10% traffic growth assumption used to inform the future baseline of the NRAA in this application sufficiently address the growth assumptions underpinning the NPS Ports growth rates. It is also of note that whilst the Applicant accepts the NPS identifies that it may not always be sound to refer to historic trends, the Applicant considers it would also not be appropriate to overlook historic trends to give context and understanding to a future trend analysis. In this context the Applicant notes that the most recent quarterly trend note for ports, published by the Department for Transport (PORT0502: UK major port traffic, total tonnage and units, by port: quarterly from 2009) highlights that the overall % change in trade (reference to tonnage) between 2009 and 2018 is 7% for London; but that the change between Q4 2017 and Q4 2018 is 11%. The growth between 2009 and 2018 should also be considered in the context of the depression of 2008/9, the recovery from which would be expected to be shown as a greater increase between these years than may otherwise be expected. The decline in tonnage for major ports associated with the depression is clearly shown in the Figure 43 of the NRA. The Applicant therefore acknowledges that there has been a recent spike in trade tonnage, but benchmarks this against a decade of data to give an overall 10% predicted increase (noting that increases in tonnage does not directly correlate with increases in vessel numbers). This is also important to contextualise regionally through reference to Felixstowe, which has seen a reduction in 12% overall and a spiked decline of 15% between Q4 2017-and Q4 2018. This is important to note as London Gateway in particular have identified during examination that there has been a recent significant shift in trade from Felixstowe to London Gateway as a result of Gateway winning a suite of clients from Felixstowe. This therefore highlights a shift in shipping as a result of competition, but does not indicate an overall 10% increase in vessel traffic to the region. The Applicant has therefore sought to identify a balance between future trends as a result of increased port capacity and vessel movements against future trends in inter port competition. In this context the Applicant considers the 10% future baseline to be appropriate.

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		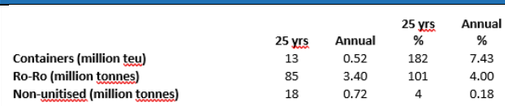 25 yrs Annual 25 yrs % Annual % Containers (million teu) 13 0.52 182 7.43 Ro-Ro (million tonnes) 85 3.40 101 4.00 Non-unitised (million tonnes) 18 0.72 4 0.18 a) NPS Ports implies that the combination of a geographic shift in demand for port capacity towards the south east together with forecast GB growth rates for ports capacity when taken together suggest that trends extrapolated from historic traffic on the Thames Estuary may not provide a sound basis for forward planning for ports capacity and effects of ports going forward. Please set out your observations on this. b) Are the NPS Ports policy assumptions about port and traffic growth rates (NPS growth rates) relevant to the adoption of growth assumptions for the NRA and NRAA for this Application and if not, why not? c) If the NPS growth rates are relevant, in the policy context around the need for ports development set by NPS Ports, acknowledging the Thames Estuary to be an existing and a prospective location for NSIP scale port development: i. does the 10% traffic growth assumption used for NRA purposes in this application sufficiently address the growth assumptions underpinning NPS Ports as summarized above; ii. if it does not, could it reasonably be concluded that waters around the development would experience higher traffic levels than those included in the NRA and NRAA; and iii.if (ii) is the case, do the NRA and NRAA provide a sound basis on which to assess the effects on navigation risk of the proposed development in a context where NPS Ports compliant use and development continues to occur? d) Are there circumstances in which the proposed development could form a constraint on shipping traffic capacity that would limit the ability of existing and/ or prospective NSIP scale ports to contribute effectively to meeting the national need for port capacity assessed in NPS Ports?	ii) and iii) in light of the response to i) the Applicant has no response to questions ii) and iii) at this stage but will respond where necessary to IP submissions. d) The Applicant has undertaken an assessment of future traffic profiles that are based on IP visions for the region. Further to this the Applicant has undertaken a detailed quantitative and qualitative analysis of the required searoom to ensure not only existing activities can continue, with any predicted impact minimised, but by virtue of providing for consecutive transit of the largest vessels (4*333m vessels, noting only 1 has passed the inshore route in 21 months as evidence in Appendix 27 of the Applicant's D4C submission) the Applicant has provided for a future baseline which comprises concurrent passage of larger vessels than currently regularly transit the inshore routes. In light of this the Applicant's evidenced position is that the proposed development will not form a constraint on shipping traffic capacity that would limit the ability of existing and consented NSIP scale ports scale ports to contribute effectively to meeting the national need for port capacity assessed in NPS Ports. The Applicant is unaware of any other prospective NSIP scale ports that would be material to the proposed Thanet Extension project either with regards cumulative effects, or the ability of the region to meet trade forecasts.
3.12.17.	The Applicant	**Effectiveness of stakeholder consultation on risk assessment** The D5 submission by MCA [REP5-063], as independent observer at the workshop held on 29 March 2019, notes the very tight time period available for the revised risk assessment and that: a) risk control measures were not discussed at this workshop; b) during the teleconference on 2 April none of the scores were discussed but IPs raised concerns on the suitability of the hazard list;	a) The Applicant Notes the MCA response, but would point out that, whilst risk controls were not discussed in detail, the NRA risk controls were highlighted in the Hazard Workshop Presentation (slide extract presented below, the workshop presentation was also emailed to all IP's following the workshop), and that the risk control measures were identified at the outset of the workshop with a direct question put to IPs requesting confirmation if there were any concerns or addition risk control measures that should be considered. The response provided is recorded within the published minutes (Annex C to Appendix 1 of the Applicants D4B submission) which confirm that there were no matters arising from the risk controls agenda item. The progress of the hazard scoring was slow, due to the extensive discussion on each

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		c) IPs had only 3 working days after receiving the NRA Addendum to review the document and provide comments; d) Risk scores deemed by the Applicant to be tolerable with mitigation have not been agreed between the Applicant and IPs. Would the Applicant comment on these points?	individual hazard score, along with repeated discussion on risk assessment methodology (which was not unusual given that not all attendees have statutory requirements to conduct such risk assessments. It is of note that other hazard workshops, such as Tilbury2 have not achieved any scores at workshops despite taking a similar grouping approach (i.e. a large vessel with *any* other vessel) and being attended solely by technical experts inclusive of the PoT harbour master and PLA harbour master. As such the presence of non experts is expected to inherently and understandably take longer and result in a more detailed discussion., In light of this whilst the assessment workshop did not progress sufficiently swiftly in order to make an assessment of the residual risk score – which is that risk score with the additional adopted risk controls in place it should be considered not uncommon for basic parameters to be agreed at a workshop before then circulating the scores and outputs, indeed this was approach undertaken for the Tilbury2 NRA. The slide provided to the IPs, further to the inclusion of the 'Hazard workshop pack' at Annex D to Appendix 1 of the Applicants D4C submission. Methodology: Step 3 Identify Controls • Identify Need for Controls Based on: • Existing Controls b) At the close of the Hazard Workshop, the Applicant offered to provide draft risk scores for the remaining hazards for the baseline and inherent risk profiles, and stated that individual IP's could also draft up their own scores (the Applicant provided blank scoring sheets to all IPs at the hazard workshop for such a purpose). This is not uncommon, and indeed was the approach adopted for Tilbury2 at which PLA, PoT were present but no other stakeholders, such as other Thames Estuary operators including London Gateway, or fishermen were present. The Applicant, between the end of the hazard workshop conducted on Friday 29th May and Monday 1st April, scored the remaining 14 hazards (in line with the theme of scoring for hazards 1-4) , and issued them as drafts at 13:47 on 1st April in advance of the teleconference scheduled for 15:00 on the 2nd April. The Applicant requested that any updates to hazard scores be sent back to the Applicant in the provided excel template (which was sent out with the draft hazard scores entered to all IP's) – no draft scores were received by the Applicant.

Risk Number	Risk
0 to 1.9	Negligible
2 to 3.9	Low Risk
4 to 6.9	As Low as Reasonably Practical
7 to 8.9	Significant Risk
9 to 10.0	High Risk

#	Risk Control	NRA Definition
1	Training	Embedded Risk Controls
2	ERCOP	Embedded Risk Controls
3	Promulgation/Ntm	Embedded Risk Controls
4	Reduction in RLB at PIER stage	Embedded Risk Controls
5	Aids to Navigation Plan	Embedded Risk Controls
6	Blade Clearance	Embedded Risk Controls
7	Continuous Monitoring	Embedded Risk Controls
8	Sufficient Cable/Burial Protection	Embedded Risk Controls
9	Cable Exclusion Area	Embedded Risk Controls
10	Coordination with Leisure/Fishing	Additional - Recommended
11	Maintain Lines of Orientation	Additional - Recommended
12	Relocation of Buoyage	Additional - Recommended
13	Construction and Post-Construction Monitoring	Additional Not Recommended
14	Relocation of Pilot Boarding Area	Additional Not Recommended
15	Inc. Co-ordination & Sit. Awareness	Additional Not Recommended
16	Training Pilots, ESL & VTS	Additional Not Recommended

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			The purpose of the teleconference was to give the IP's an opportunity to talk through the draft hazard scores. However, at the outset of the call PLA / ESL and LPC, stated that they needed time to review the agreed scores as generated at the Hazard Workshop (with all IP's in attendance), and were not in a position to address the draft scores entered for Hazards 5-18. No other stakeholder volunteered to provide any risk scoring for the remaining 5-18 hazards. As such no other IP's provided any feedback to individual hazard scores provided by the client, though some general statements were provided, and most IPS stated that they would rely on PLA / ESL and LPC for the hazards scoring. Also some comments were provided by POTLL / DWPLG on the consequence score for most likely commercial vessel hazards which were addressed in the NRA A. Subsequently to the teleconference, the PLA / ESL and LPC, issued a risk assessment at Deadline 4C, scored for all hazards, which showed very close correlation to the Applicant NRA Addendum hazard scoring, and demonstrated hazards were scored in an ALARP zone – though it is noted that risk scoring criteria were changed by the PLA compared to their standard approach as available on the PLA website at https://www.pla.co.uk/assets/fm197plariskassessmenttemplate.xlsx and at Annex B to this Deadline 6 submission, noting that the accompanying web page was changed post the 19th May 2019 to remove refence to the standard approach and recommended template. It is the Applicants understanding that the above risk assessment template is the alternative reduced algorithm assessment methodology referred to by the PLA at ISH8, although it is unclear why the methodology and definitions of ALARP have been altered as this appears to directly contravene PLA's risk assessment guidelines which requests operators utilise similar assessment methodologies to allow a seamless connect with the wider PLA SMS. This approach is evidenced in the Tilbury2 NRA which aligns with the above risk assessment template and concludes "it may be considered that a hazard categorised as Moderate, Minor, or Slight is already As Low As Reasonably Practicable (ALARP)". The need for a directly comparable and seamless approach to NRA is also highlighted in the Tilbury2 NRA which confirms: . "*This NRA is limited to the hazards and risks associated with the design and operation of the T2 berths only – not the hazards and risks associated with the transit of T2 ships in the Thames Estuary as they transit between open sea and Tilbury. This is because these hazards and risks have already been subject to a robust NRA by the PLA as part of their wider responsibilities as a Statutory Harbour Authority (SHA) and, by virtue of being the pilotage service, the Competent Harbour Authority (CHA) for these waters.*" The methodology adopted was therefore familiar to the majority of technical attendees, though the Applicant accepts that this may not have been the case for all parties and tried to accommodate this through detailed discussion.

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			c) The Applicant notes the limited time available, protracted discussions at the hazard workshop, and changes in agreed hazard scoring by IP's. However, the Applicant did issue an interim NRA Addendum on Wednesday 3rd April and sought to provide as much time as practical to IPs. d) The Applicants notes that the tolerability of risk has not been agreed with all IP's, however it notes that, • Risk scores are consistence with: o Other assessments undertaken within IP's jurisdictions, which were considered tolerable – e.g. Tilbury 2. o The PLS 2015 NE Spit NRA which was considered tolerable. o The Hazman II risk assessment system has been used by the PLA since early 2000's and the same tolerability levels have been embedded within the PLA since its adoption as were used by the Applicant in both the NRA and NRAA. o The PLA re-scoring of the hazards undertaken following the hazard workshop .
3.12.22.	The Applicant	**Risk scoring detail (NRA ID12 example)** In [REP1-008] Applicant's supplementary note on NRA process, in the Property category of this Hazard ID12 "Collision between two large commercial vessels", with the "Most Likely" outcome of this hazard *("low speed collision, likely to be glancing blow, with limited consequence values...")* the HAZMAN algorithm produces a score of 5.24 apparently with a 1 in 15 year return rate likelihood compared with a score of 5.92 when the return rate drops to 1 in 10 years. • Would the Applicant please explain how and why this rise in return rate of 50% (10 years instead of 15 years) produces via the algorithm an increase of 12.9% in risk rating.	The reasons that a risk score may be lower than may be intuitively anticipated is associated with the matrix, which due to the need to account for all hazard likelihoods (up to greater than a 1 in 1000 year event), uses a logarithmic scale for the categories. The following provides further context with regards the specific matrices used to inform maritime risk assessments. The generation of risk scores is related to the risk matrix, and within the context of the question, it does not matter which specific matrix is used, in that all have common principles, which account for the explanation the ExA are seeking as to why when likelihood is changed, to a level which may be perceived to be significant, this does not appear to significantly change the risk scores. The reason is that risk matrices need to be able to provide for any combination of hazard likelihood and hazard consequence, and when related to maritime navigation risk assessment risk matrices need to be able to accommodate a range of hazards. The range may be from lower severity hazards that may occur more frequently (typically associated with most likely hazards outcomes), to catastrophic severity hazards which occur less frequently (typically associated with worst credible hazard) outcomes. Risk matrices need therefore to be able to accommodate these polar ranges of hazards on the same risk matrix and do so based on combining of two factors:

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			1. The likelihood of a hazard occurring. 2. The consequences of a hazard occurring. For the sake of clarity, it does not matter within the context of generating a hazard score whether it refers to a Baseline, Inherent or Residual assessment of risk, or whether a final score is generated by aggregating individual consequence category (e.g. People, Property, Environment or Stakeholder / Business categories) risk score – it is the matrix that combines the two factors to generate a risk scores. The matrixed used for the NRA and the NRA A, is presented below and in terms of being a 5 by 5 matrix, is standard within the industry, and is as used by the PLA for their detailed port wide risk assessment – not as used in the PLA Risk Assessment Proforma (found at https://www.pla.co.uk/assets/fm197plariskassessmenttemplate.xlsx) which is identified as a simple risk assessment proforma. The matrix has been annotated with two symbols showing where on the risk matrix (the baseline and inherent likelihood score would fall for) a 1 in 10 year event and a 1 in 15 year hazard with a category 3 – moderate level consequence would geometrically be plotted. It can be seen that in the context of the risk matrix this difference is actually minimal, when considering the full range of likelihoods the matrix needs to accommodate.  **Hazman II matrix with hazard scoring 1 in 10 years at category 3 consequence and 1 in 15 year with category 3 consequence (shown as the two black circles with triangles inside them) from Hazman II.** As the change in likelihood relates only to a change in one the two factors (likelihood and consequence) that are needed to determine a risk score, it only has a proportionate effect of the final risk score generated. As noted above, this is not limited to the Hazman II software, and all risk matrices to varying degrees and extents utilises a similar logarithmic principle. To demonstrate this, the same

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			risk score is assessed using the PLA Risk Assessment Proforma (available at https://www.pla.co.uk/assets/fm197plariskassessmenttemplate.xlsx), and presented below. It shows that for a 1 in 10 year event with a category 3 consequence the hazard risk score would be 9/25 and for a 1 in 15 year hazard with a category 3 consequence the risk score would be 8.46 / 25. When taking into account the PLA Risk Assessment Proforma scale is from 0-25, this equate to a total risk score change of 0.534. If the same analysis is presented in the Hazman II scores, which generated risk scores of 5.92 and 5.24, a difference of 0.68 is evident on a total scale of 0 - 10, not 1 - 25 as used by the PLA Risk Assessment Proforma. Thus the PLA Risk Assessment Proforma shows a smaller increase in risk for the same calculation, and when the relative scales are considered a likely for like comparison out of 10 would show that the PLA Risk Assessment Proforma shows a much reduced change in risk score for a 50% increase in likelihood. This phenomenon is a nuanced feature of the Hazman II risk matrix, which demonstrates it is sensitive to changes of more frequent likelihood scores compared to the PLA Risk Assessment Proforma, which uses a simplistic 5 by 5 matrix. This is a designed feature (common amongst more advanced risk matrices), which was specifically developed into the matrix by Marico Marine founder John Riding, and whilst is creates more complexity compared to having a simple multiplicative matrix, it provides for better correlation to societal concern for risk. Further to this then the Hazman II matrix also accommodates for the general societal principle that the greater the magnitude the greater the societal concern.

RISK ASSESSMENT MATRIX: RISK CRITERIA		FREQUENCY				
		Level 1	Level 2	Level 3	Level 4	Level 5
		Rare	Unlikely	Possible	Likely	Almost Certain
		One or more times greater than 100	One or more times 100 year	One or more times in 10 years	One or more times per year	Ten or more times per year
Consequence	5 –Loss of vessel or severe damage to vessel. Multiple fatalities International news coverage. Serious long term impact on environment and/or permanent damage.	Moderate (5)	High (10)	Extreme (15)	Extreme (20)	Extreme (25)
	4 –Major damage to vessel. Single Fatality. National news coverage. Significant impact on environment with medium to long term effects	Minor (4)	Moderate (8)	High (12)	Extreme (16)	Extreme (20)
	3 –Moderate damage to vessel. Moderate / major injury Regional news coverage. Limited impact on environment with short term or long term effects	Minor (3)	Moderate (6)	Moderate (9)	High (12)	Extreme (15)
	2 - Minor or superficial damage to vessel. Minor injuries and local news coverage. Minor impact on environment with no lasting effects	Slight (2)	Minor (4)	Moderate (6)	Moderate (8)	High (10)
	1 - Insignificant or no damage to vessel / equipment. No injuries. Insignificant impact on environment	Slight (1)	Slight (2)	Minor (3)	Minor (4)	Moderate (5)

ACTION KEY	
Slight (1 – 2)	No Action is required
Minor (3 – 4)	No additional controls are required, monitoring is required to ensure no changes in circumstances
Moderate (5 – 9)	Efforts should be made to reduce risk to 'As low as reasonably practicable' (ALARP), but activity may be undertaken
High (10 –14)	Efforts should be made to reduce risk to 'As low as reasonably practicable' (ALARP). Activity can only be undertaken with further additional controls.
Extreme (15 – 25)	Intolerable risk. Activity not authorised

PLA Risk Assessment Proforma matrix with hazard scoring 1 in 10 years at category 3 consequence and 1 in 15 year with category 3 consequence.

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3.12.24.	The Applicant	**Transit past NE Spit of hazardous goods including gas to London and Sheerness ports** In [REP5-012] D5 Appendix 7 para 101 the Applicant appears to confirm that Port of Sheerness (Peel Ports) were not consulted in regard to the 29 April Hazard workshop (HAZID workshop) or the development of the NRA Addendum. • Would the Applicant confirm if and in what way shipping and navigation hazards involving hazardous goods vessels including petroleum or gas carriers have been specifically assessed?	The Applicant notes that the Addendum NRA through consultation primarily with LPC assigned hazardous goods to the following hazard categories: • Liquid Natural Gas (LNG) Carriers were assigned to the Commercial Class 1 and Class 2 Vessel category • Dangerous Goods Vessels were assigned to the Commercial Class 1 and Class 2 Vessel category Tankers are included by reference to PLA Pilotages Classes based on their size and draught. The same is the case for Container vessels, which often carry dangerous goods in containers. Some Ro-Ro vessels, typically those engaged on regular freight services, also handle dangerous goods and are considered inline with the pilot classes derived from the PLA Pilotage directions. The assessment of navigational hazards (e.g. collision, contact, grounding, etc.) of these vessels is contained within the FSA risk assessment, and also within the historical incident and vessel traffic analysis. Whilst vessel such as LNG vessels cause concern to the wider public, they are amongst the most heavily managed vessels and therefore can be considered in many respects to be amongst the safest vessels.
3.12.25.	The Applicant	**Hazards involving car carrier vessels** Would the Applicant confirm the details of assessment of risk consequence for hazards involving car carriers, as evidence presented by IPs at D5 indicate that due to windage and instability they are vulnerable to capsize in a collision, even glancing.	The Applicant notes the representations made, but does not agree with their context, as Car Carriers, like all vessels transiting through the TEOW study area meet stringent international and national requirements for design and stability. As with all vessel types, individual issues and concerns occur based on the type and arrangement of cargo and vessel design: For car carriers, this is due to their extensive covered cargo lanes above the main deck, each of which extends over a large area, such that any water ingress will rapidly affect the transverse stability. However, the Applicant does not agree that a glancing blow will result in a catastrophic outcome. Recent catastrophic collisions with car carriers in the Southern North Sea and English Channel include: • 5th Dec 2012 - *Baltic Ace* (car carrier) was involved with in a crossing collision with the *Corvus J* (ice strengthen container vessel) at speeds of 15.1knts and 9.2knots respectively – resulting in 11 fatalities

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			• 14th Dec 2002 - *Kariba* container was ship was in an overtaking collision with the *Tricolour* (Car carrier) in the English Channel at speeds of 16knts and 17.9knts respectively – resulting in zero fatalities. Neither of these incidents can be considered to be a glancing blow with vessel speed and collision angles being considerable. Further, a recent head on collision, that occurred on 3 December 2015, that did not have catastrophic outcomes, but that would also not be considered a glancing blow, occurred between the *City of Rotterdam* and the *Primular Seaways* in the Humber Estuary, with closing speeds of 12knts and 14.3knts respectively, that resulted in no fatalities or minimal pollution but did result in significant damage. A link to the MAIB report and accompanying analysis of this incidents is available at: https://www.gov.uk/maib-reports/collision-between-pure-car-carrier-city-of-rotterdam-and-ro-ro-freight-ferry-primula-seaways The Applicant therefore disputes the claims that glancing blows would cause catastrophic accident outcomes for car carriers as this is not evidenced in historical incidents either specifically in the study area or nationally, this remains true in the context of all available metocean conditions at study area and national scales. However, and within this context, it is important to note that in the NRA and NRA A car carriers are included within the hazard vessel type categories Commercial Vessel Class 1 and 2, and Commercial Vessel Class 3 and 4. The incident data used to characterise return rates for these hazards (which incidentally were markedly increased in the NRA A for these hazards likelihoods based on IP's qualitative judgement – both for the most likely outcome and the worst credible outcome of an individual hazard) included all vessel types that transit the area, and which have done, in relation to incident data, since the data commenced in 1997, and as such includes car carriers. The Hazard risk scores for likelihood are therefore precautionary, both in the most likely and worst credible assessment, heavily reflective of IP consultation and qualitative experience in addition to quantitative incident analysis, and directly related to the full range of vessels that transit the area both in the baseline and under future baseline scenarios. Further to this, in the assessment of consequence, it is important to note that when identifying consequence magnitude, it relates to either the "most likely" or "worst credible" outcome or realisation of a hazard. Capsizing of a commercial vessel would be considered to fall within the "worst credible" category and have a correspondingly rare likelihood value. This further shows that a glancing blow, if it did result in a capsize of a car carrier, which the Applicant does not agree with, has been assessed within the worst credible outcome in which consequence scores are high. The Applicant therefore considers that car carriers, as with all other vessels transiting the area, have been adequately considered with the NRA A, and indeed were the focus of the

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			PTBS study conducted on the PIER RLB, which demonstrated the feasible nature of pilot transfers with the PEIR RLB insitu and raised no specific concerns with regards to car carriers.
3.12.26.	The Applicant	**Effects on stakeholders of possible additional risk controls** With specific discussion of possible additional risk controls during the operational phase as well as construction and decommissioning phases (considered in the NRA but not put forward at this time), would the Applicant expand on the answer given at [REP1-017] to the RR [SUG-5] from SUNK VTS User Group in respect to concerns (also raised in Minutes of meeting MCA/THLS 23 August 2018 submitted at [REP1-082]) about the effects of the TOWF extension needing changes in operation *"putting extra pressure on coordination on the movement of ships and efficiency of operation, which could impact safety..."*.	The Applicant notes that the comments made by both the SUNK VTS User Group and the MCA / THLS are predicated on perceived requirements to change current pilot transfer operations for ESL and PLA. The Applicant, does not for reasons set out at ExA 3.12.7, 3.12.8, 3.12.9 and 3.12.10 and throughout the Examination, foresee the requirement for any material change to pilotage operations, as it has met and indeed exceeded the requirement for 2nm clear sea room plus 1nm buffer at NE Pilot Boarding Station, and that sufficient sea room remains in other operational areas for continued pilotage transfers to take place. The Applicant therefore does not foreshadow the requirement for ESL or PLA to materially change their operations at NE Spit and, in relation to Additional Control measures, then outwith the need to attend the Shipping and Navigation Liaison Group, which in part has been recommended to ameliorate PLA / ESL concerns, then there are no proposed risk controls that would necessitate "*putting extra pressure on coordination on the movement of ships and efficiency of operation, which could impact safety...*".
3.12.27.	The Applicant	**Use of space south of NESP diamond in extreme conditions:** In [REP5-069] D5 submission commenting on Applicant's D4C submission of Statement of Evidence paras 117-123, PLA/ESL provides evidence that: • on five occasions during the surveyed period when SUNK pilot station was off-station due to adverse MetOcean conditions, NE Spit served in the sea space south of the NE Spit diamond vessels that could only use the inshore route to the Thames and would not have been able to pass around the windfarm to board pilot at Tongue or dip-down to board a pilot north of the NE Spit diamond. • in the year between Dec 2017 and Nov 2018 the NE Spit station was "off station on 17 separate days". PLA/ESL D5 submission [REP5-070] ISH 8 Action Points item 17 provides evidence that, on days when Sunk was off-station, operations at or south of NE Spit diamond served container ships for DPWLG and PoT and tankers for Grays, Shell, Navigator, West Thurrock and Oikos oil terminals. Would the Applicant comment on: a) whether or how the risk assessment has considered and scored the hazard to property, health and safety of pilots and launch crews, stakeholder or commercial interests of pilot boarding or landing operations at or south of the NE Spit diamond in such adverse Met Ocean conditions as the five instances described in the PLA/ESL submission noted above; and	a) The Applicant would first note that 5 transits out of a total of over 6000 at NE Spit pilot boarding station over the course of a years' worth of operation, only accounts for less than 0.1% transfers and as such is a very small proportion of vessels that transfer pilots at NE Spit. The Applicant conducted a baseline assessment of risk within the study, for the NRA A that assessed the navigational hazards of contact, collision, and grounding. Within this assessment a cause of these was noted to include pilot transfer difficulties – and which was entered following representation from the PLA and presentation of incident data showing pilot transfer incidents relating to property, health and safety of pilots and launch crews, and causes such as pilot ladders not being rigged correctly. Another cause of these navigational hazards was noted to be adverse met ocean conditions. In essence, as the NRA A FSA definition of hazards relates to a unsafe situation that if it occurs produces detrimental outcome, problems with pilot boarding and adverse met ocean conditions are considered as causes of hazard occurrence and not hazards themselves. This approach is where the IMO FSA assessment of maritime risk is different to that commonly adopted by bodies such as the UK Health and Safety Executive. The Applicant notes that historical incident data, includes incidents which occur due to adverse weather and pilot transfer difficulties were used to inform the risk scoring assessment process, and further the purpose of the hazard workshop was to specifically ensure such qualitative input was included in hazard scores. Therefore, the Applicant can confirm that these causes have been addressed in the assessment of navigation risk and brought through in terms of hazard scoring for

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		b) what effect the proposed reduction to 2.1nm sea space between Elbow buoy and the proposed TEOW would have on the embedded risk and the ability of pilot services to provide continued service to inbound vessels; and c) what commercial effect might result from the inability to provide any pilot service to vessels seeking to enter the Thames in extreme MetOcean conditions such as the five noted in the PLA/ESL evidence above.	consequences to People, Property, Environment and Stakeholders / Business. In this context it is important to note that with regard to the assessment of risk to people/stakeholders, two measures are considered, namely: Individual risk; and Societal risk. When assessing societal risk this study focuses on taking into account the number of people likely to be involved in an incident (which is higher for passenger ferries, for example), and assesses the significance of the change in risk compared to background risk levels for the UK. *b)* The Applicant has demonstrated that at its narrowest point the sea room width for the inshore route is 2.1nm which occurs between the Elbow buoy and the proposed TEOW, and although based on MSP guidance, put forward by POTLL / DPWLG, this distance is amble for transit for through vessels [Ref SEZ paper], and indeed significantly exceed MSP requirements. Therefore, the Applicant does not consider that any material change to will occur to "embedded risk" as a result. In terms of pilotage operations at Elbow then it is identified based ESL data that only 3.7% of pilotage operations occur in the vicinity of the Elbow buoy and that the majority of these would be undertaken in favourable met ocean conditions. The Applicant notes that in response to ExA Q 3.12.10 that there would be little if any change to pilot transfers in the vicinity of the Elbow Buoy with the TEOW in place. In terms of the restricted operation for the NE Spit pilot Boarding area, the Applicant has in response to Deadline 5 Written Presentations (Appendix 26 to this Deadline 6 submission), reviewed the pilot transfer frequency and compared it to the time when only the Elbow area was available for pilot boarding for a restricted number and type of vessels. This represents a minimal number of occasions which the Applicant maintains will remain feasible given the searoom provided. It is also important to put the limit states in the context of pilotage operations. The metocean conditions identified are limit states for pilotage, rather than what may be considered extreme metocean conditions. During such limit states there are two important factors to consider, one is the remaining searoom, which has been identified through a combination of quantitative and qualitative analysis as being adequate. The second is vessel density and complexity. The searoom required has been defined by IPs as being necessary due to the complexity of this area of general navigation. Whilst the Applicant maintains that the routes are of notably lesser vessel density than other areas which formed the case studies which informed the quantitative component of the searoom calculations, it is of note that the complexity will inherently reduce during limit states as the numbers and types of vessels reduce. Therefore whilst it is accepted that limit states may be more challenging in and of themselves, the complexity of surrounding vessel traffic reduces proportionally and as such the resilience of the Elbow Buoy pilotage operations will be maintained. *c)* Whilst the applicant notes that it does not consider this to be realistic scenario as noted above due to sufficient sea room being available within the vicinity of Elbow to both the north and south, were pilot operations suspended for these 5 occurrences, then it would be the same situation as when all pilot stations are closed, which is a regular occurrence and is noted in the ESL provided logs Annex F to this Deadline 6 submission. The impact would be

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			that vessels would need to go to anchor or wait for the weather to abate. As many container vessels stop at multiple ports, and the terminus to many liner services is western Europe where vessels have multiple port calls, some container vessel operators may redirect their vessels to the next port on their schedule (if open) and stop at London ports on their return. It may also be the case that a pilot is boarded at an alternative port (e.g. Dover) if conditions allow. Often however, the limiting state, certainly for larger vessels is not necessarily at the pilot boarding location, but other aspects of a vessels transit and berthing into a port, such as wind restriction on specific channel transits or wind restrictions on berthing or cargo handling. Therefore, vessels may not choose to enter the port and board a pilot during these conditions due to other limitations, the proposed project is not considered to compound or exacerbate any such limitation and the NRAA considered the most likely and worst credible incidents in the context of all metocean conditions identified by the IPs. Further to this, then the Applicant would note that if conditions were such that all other outer Thames Estuary pilot boarding areas were closed (e.g. SUNK, Tongue, NE Spit, NE Goodwin, etc), then it is expected that a prudent mariner would be wary about boarding a pilot at all, and the safest action would be to wait until the weather abated sufficiently for a safe transfer to take place. It is also understood from the 2015 PLA NE Spit NRA, and as noted in the PLA response to ISH Actions [REP5-070] that *"Planning of critical/high risk vessels with ESL/Pilot/VTS"* is a control measure that is currently in place and that the PLA would particularly apply this control during times of adverse MetOcean conditions necessitating restricted pilotage services. In summary the Applicant notes that adverse weather, which is a common occurrence, is currently managed by ports and shipping lines on a day to day basis with sufficient contingency in schedules already. The failure to board a pilot at a particular time, at worst incurs a delay to the ship as it waits for condition to improve, which is considered in operational planning.
3.12.28.	The Applicant	**Risk Assessment for conflicting vessel encounters between NE Spit Racon buoy and the proposed extension** In [REP5-012] D5 Appendix 7 par 65 the Applicant maintains that there would be "*…no significant interference with visibility…as a result of the extension*." It continues to state that • there would be "*ample sea room*" for vessels to take a wider turn around the NW corner of the extension than at present and that	The Applicant notes the implication raised by ExA in this action point and makes the observation that, in general, vessels which are transiting to the north of the existing wind farm naturally separate themselves by vessels inbound vessels keeping to the north and outbound vessels keeping to the south. This is evidenced through Gate C (Figure 33 of APP-089). It is further noted that there is no requirement for a vessel to keep to starboard in general navigation terms in this area (it is not a [narrow] channel) and therefore vessels can continue with their chosen course or speed unless directed otherwise or a overtaking situation (COLREG Part B Section II Rule 13), head on situation (COLREG Part B Section II Rule 14) or crossing situation (COLREG Part B Section II Rule 15) arises and a risk of collision exists.

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		• the sea room required between NE Spit Racon buoy and the array is determined on a precautionary basis by guidance on spatial needs of "*concurrent transits of four 333m LOA vessels and allowing for vessels turning*"; and that • a clear line of sight is "*desirable but not essential*". The Applicant has also presented evidence that their calculation of sea space requirement in this location is based on the parallel passage of 4 concurrent vessels plus a buffer "*…to allow for other maritime considerations, including crossing vessels…*" [REP5-018 para 25]. At [REP5-071] POTL/LGPL contends that guidelines for theoretical channel width based on ship beam are not relevant in the locations west of the WF and '*do not allow for ships encountering operations such as pilot transfers'.* In [REP5-061] evidence at D5 Fig 4 LPC has clarified that they strongly recommend 2nm sea room plus 1nm safety buffer between the proposed extension and the NE Spit Racon buoy whereas the sea space allowed by the SEZ proposal is 2.5nm as clarified in Table 2 of Applicant's D5 Appendix 7. The [REP5-067] D5 PLA/ESL submission of oral evidence at ISH8 point 4.8.1 explains danger to navigation as an effect of "*reduction in sea room means the same amount of traffic in the smaller area".* Vessel Traffic Plots submitted by the Applicant as D4B Appendix 1 Annex D HazInfoPack [REP4B-006] indicates that vessels approaching from the east turn to the south-east at a consistent position north of the TOWF in order to dip down towards NE Spit pilot boarding diamond. If the turn position for these vessels is relocated west as a consequence of the proposed extension, the turn would have to take place closer to the NE Spit Racon buoy, where the use of the sea space appears to be characterised by vessels crossing on multiple headings, evidenced by the Vessel Traffic Plots in [REP4B-006]. At para 68 of [REP5-012] D5 Appendix 7 the Applicant refers to the "second ship" (understood to be that passing on a course towards the north-east) and its clearance relationship to the NE Spit buoy. However, this appears to be inconsistent because (as it is understood from other evidence) vessels outbound from London and Sheerness should be taking the starboard side (i.e. southerly part of the sea space) in this location and if encountering vessels approaching from the ENE the outbound vessel would be required to take evasive action by turning to starboard towards the wind farm. Would the Applicant clarify:	The Applicant wishes to clarify that Para 68 of REP5-012 refers to vessels passing between the wind farm and the NESP Racon Buoy. Furthermore, the Applicant confirms that the sea space provided in this area (in accordance with having been designed to satisfy MGN and MSP guidance and as illustrated in Para 68 of REP5-012) allows for the ongoing navigation of vessels in accordance with COLREGS and does not consider that the geometry fundamentally changes to the extent that the general existing practices of transits of vessels through this area will change from present (and with regards to the situation as described by the ExA). If there is a risk of collision in the area between the wind farm and the NESP Racon Buoy then it needs to be determined if the situation is a head on situation (COLREG Part B Section II Rule 14) or a crossing situation (COLREG Part B Section II Rule 15). A head on situation requires both vessels to alter their course to starboard. Whereas, in a crossing situation, the onus is on the vessel which has the other on her starboard side to give way. This can be done by either altering course to starboard or slowing down. Putting this into context in the area between the SEZ and NE Spit buoy, vessels will meet on reciprocal or near reciprocal courses (NE /SW) when they are dipping down to the NE Spit pilot diamond. The sea area here is adequate in size for both vessels to alter course to starboard and safely pass one another. The ExA describe that the outbound vessel would take evasive action by turning towards the windfarm giving way to vessels approaching from the ENE. The Applicant wishes to note that this would be a crossing situation as per the COLREGS and the onus is on the vessels approaching from the ENE to give way to the outbound vessel as the outbound vessel would be on their starboard side. *a)* The NRA A included allowance for increase in hazard occurrence for a number of different factors, which were generated by the IPs attending the Hazard Workshop – this is as documented in the NRA A Para 128 where in some cases hazard likelihood scores (e.g. for collision of Class 1 or 2 vessels) were doubled to represent a number of factors. It is noted in response to EXAQ3.12.14 that any reduced visibility, brought about by the TEOW, is not expected in itself to materially make any difference to navigation. *b)* The Applicant refers to REP4-018 (Structures Exclusion Zone Para 37 and Table 11) which collates and summarises submissions made by IP's and with reference to the MGN543 guidance, MSP guidance and other submissions on determining the sea room and spatial allowance for turning vessels. With reference to the 333m LOA vessels - the sea space for turning a vessel of this size is 1.7nm and this includes an allowance for the vessel transiting for 6 minutes on a constant heading at 6 knots (which is a precautionary approach and

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		a) what additional factor of hazard likelihood has been attributed in the NRA to any reduced visibility (by eye or by instruments) across the corner of the WF as a result of the extension; and b) what is the amount of spatial allowance made in this specific assessment for turning vessel movements north-west of the Windfarm in the immediate vicinity of the NE Spit Racon buoy (such spatial allowance having been referred to in the Applicant's submission [REP5- 018] para 25 noted above as supplementary to the MGN543 space for four 333m LOA vessels in concurrent parallel transit); and c) how has that allowance been calculated, taking into account the extension to the north-west of pilot transfer operations if constrained or extended by non-standard circumstances; and d) how has that allowance been calculated taking into account the requirement for outbound vessels to turn to starboard to take (Colregs compliant) evasive action in case of encountering other vessels as or after they make their turn to the east past the northern extremity of the proposed TEOW; and e) what allowance should be made in this location for clearance from the NE Spit Racon buoy itself as the tracks presented in evidence [eg REP4B-006] show that vessels leave clear water clearance from the buoy; and f) to what extent is the hazard scoring altered in construction phase by the reduction of sea space at this pinch point between NE Spit Racon buoy and proposed structures and construction activity that would be subject to a 500m exclusion zone taking up part of the safety margin or buffer?	allowing for a pilot transfer and/or other contingency in the turn). This leaves 0.8nm of distance at the absolute narrowest point between the wind farm SEZ boundary and the NE Spit Racon. It should be noted that, notwithstanding the conclusive evidence (from AIS and ESL submissions) that pilot transfers and turning of vessels (regardless of size) in this narrowest point are extremely rare, the volume of traffic in the study area (see Appendix 41 to Deadline 6: AIS Animations Note) and particularly of this size does not support the requirement to allow for concurrent transits and transfers. In the rare event that concurrent activities might occur, vessels would be able to deconflict temporally (and would do so through good practice in accordance with COLREGS) through minor adjustment to their time on arrival in the area and in communication with each other/PLA VTS and ESL (the latter if engaged in transfer operations). Finally, the guidance does not require the addition of sea room for turning with sea room for transit and the Applicant concludes that sufficient sea room is provided for transiting and turning vessels notwithstanding that this is unlikely and that the calculations are precautionary in their basis due to vessel sizes and frequency. *c)* See response to question b. d)The Applicant has provided a fuller contextual response to this question at the beginning of it's response to this ExAQ (above). The Applicant can confirm that allowance is therefore inherent within the provision of searoom for concurrent vessel sizes greater than has ever been recorded within the nearshore route, i.e. 4 x 333m vessels. The allowance provided by the MSP calculations, whilst not directly required as the turning area relates primarily to traffic separation schemes there remains adequate searoom for vessels to slow and turn as required. *e)* The MSP guidance advises that clearance to the edge of a channel should be approximately equal a vessel length, and therefore a vessel length is considered to be the required minimum distance to pass a buoy if sufficient sea room allows, although in much of the PLA channels and fairways such distances are not available. The Applicant notes that the Sea Room calculation based on MSP have been allowed for, to meet this requirement and that as these calculations are precautionary, and further sea room is available, vessel masters would use the full sea room available to them and make a judge on transit distance from a buoy accordingly. *f)* It is important to note that under UNCLOS, coastal states can establish a safety zone of up to 500m around an offshore installation or structure within its EEZ. Safety Zones are not mandatory within UK waters and the need to apply for a safety zone will be balanced with

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			the requirements of stakeholders. Applications are made to BIES, and in order to minimise impact to stakeholders any safety zones that are applied for will be rolling in nature such that they cover only the area of the site where works necessitate it, only for the duration of those works and only of a size that is needed. Therefore, as this concern only relates only to the NW corner of the TEOW in the vicinity of the NE Spit RACON buoy, the Applicant does not consider safety zones in this area to have a material effect on pilot boarding at the NE Spit as: 1. Any safety zone would be temporary in nature – accounting for a very small proportion of the TEOW construction period. 2. That only 2.2% of pilot transfers take place in the whole of the NES Buoy operational area of the NE Spit Pilot boarding operational area and that most likely take place some distance from the proposed TEOW to the NW, N and NE of the Buoy and therefore would not be affected by any the Safety Zone. 3. Sufficient sea room has been allowed for based on PLA / ESL requirements of 2nm sea room plus 1nm buffer, at the NE Spit Dimond for pilot transfers to take place. 4. Additional control measures including the use of guard vessels (if required), promulgation of construction progress information and marine coordination of construction vessels would be in place.
3.12.29.	The Applicant	**Effects of additional risk to navigation in the vicinity of TOWF** Would the Applicant re-submit their assessment of the environmental, commercial and economic effects of additional distance travelled due to re- routing around the proposed TEOW of vessels over the size assessed in the PTB Simulation.	The Applicant maintains that re-routing is not necessary as adequate searoom remains to allow safe passage through the inshore route. All other approaches to the Thames Estuary are narrower than the inshore route post-installation of the proposed project and as such passage planning will be made that accounts for more limited areas of searoom, and the inshore route will be a comparatively lesser concern. Given the Applicant maintains that no diversion is necessary for vessels in the range 240-333m, beyond deviations that would be undertaken under normal circumstances, there will be no significant environmental, commercial or economic effect associated with it.
3.12.30.	The Applicant	**Economic consequence of hazards** In regard to the economic consequence of risk the POTL/LGPL D5 submission [REP5-071] argues that based on the NRA Addendum if the economic consequence of a hazard is over £100,000 it is a Category 3 risk and if the likelihood is more than yearly occurrence then it is above ALARP and therefore not tolerable. If well over a hundred vessels are diverted as a consequence of risk assessed, then an economic consequence of over £100,000 is 'highly likely' and the risk of economic consequence unacceptable. Would the Applicant confirm if and in what way traffic congestion and delay to port operations was considered as a potential consequence of collision involving a large commercial vessel and how it was assessed in the NRA or NRA Addendum?	For reasons laid out in the Applicants response to POTLL/DPWLG D5 submission at Appendix 26 of this Deadline 6 submission, the Applicant does not consider the analysis and commentary presented by POTLL/DPWLG to accurately reflect FSA standard methodologies. However, the potential consequence was considered in the context of the HAZID workshop, as is commonplace within such workshops to inform NRA. In this context, the following information is salient: In terms of a "worst credible hazard" (e.g. collision contact or grounding) being realised, then the impact to stakeholders was considered to relate to all aspects, some of which would be knock effects to 3rd party vessels, such as vessel delays / congestion. Such effects would be temporary in nature and not dissimilar to effects of closure of the port due to adverse weather conditions.

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			The difference with congestion being caused by a navigation accident, is that there are a number of different options for the boarding of pilots for vessels entering London ports - even within the NE Spit operational area there are three defined pilot boarding stations – NE Spit, Tongue and NE Goodwin. If a worst credible hazard were to be realised and a catastrophic accident were to occur, then at least one if not two other charted pilot boarding stations, in the NE Spit operational area would be available for pilot transfer and also it would be possible for vessels to take a pilot at the SUNK pilot boarding area as well. It is noted that whilst this could have an increased cost to ESL and the PLA pilot, as a result of additional transit time to / from the further pilot diamonds and time on a vessel for a pilot, it is very unlikely that any incident in the area would close any London port even for a very short period of time. Fundamentally there are a number of access channel and routes that vessels that were going to use the NE spit pilot boarding operational areas could use as alternatives. The same is not the case for the SUNK and the Black Deep route into the London Ports, which if a catastrophic hazard were to occur, would close London ports to deep draught vessels. However, for the TEOW study area there are no conceivable hazards, that could be influenced by the TEOW that could cause significant "knock-on" consequences to 3rd party vessels.
3.12.31.	The Applicant	**Potential effects of congestion of approach routes to ports** [REP1-148] Written Representation within Deadline 1 submission by LGPL/PoTLL section 3.1 states: "The Ports NPS also discusses the need for … UK ports to be competitive (Para 3.4.13). It also cites the need for resilience to account for '*short term demand peaks, the impact of adverse weather conditions, accidents, deliberate disruptive acts and other operational difficulties without causing economic disruption…*'" The POTL/LGPL REP5-071 D5 submission argues that inbound vessels over 240m length (above the size range tested in the PTB Simulation) would opt not to use the NESP diamond boarding location due to the proposed TEOW extension westwards and that approximately 113 vessels above this length inbound to DPWLG annually currently using the inshore route, not accounting for '*growth in vessel traffic over the reasonable planning horizon*' would '*be required to re-route*' around the WF. The IP argues that effects would include potential delay for time-critical passages depending on a number of circumstances and may include the effect of deterring shipping from using the Thames ports. Would the Applicant comment on what assessment has been made in the NRA and the ES for the effects of congestion of commercial navigation routes into the Thames estuary that might ensue from diversion of ships larger than 240m LOA around the proposed TEOW, taking into account time constraints of tidal height	Firstly, the Applicant has made detailed comments in Appendix 26 to Deadline 6: Response to Deadline 5 Submissions by Interested Parties – Shipping and Navigation to the LGPL and PoTLL submission and particularly with regards to the basis of the projected inshore route vessel forecast calculations stated – which are contested by the Applicant. Secondly, the Applicant does not accept the proposition that vessels over 240m length will normally elect or 'be required' to re-route around the inshore route. This is because in determining the SEZ the Applicant has considered and incorporated the sea room requirements for these vessels and with particular reference to the vessel survey datasets, methodological guidance and extensive discussion with IP's including the marine specialist, HR Wallingford, who have been employed by POTL and LGLP for matters of navigation. The basis of the sea room created by the SEZ, which was based on MSP guidance, allows for the concurrent transit of four 333m LOA vessels through the inshore route (and pilot transfer at the NESP diamond) and in consideration of all weather conditions and general operational considerations. Thirdly, with regards to overall considerations of congestion, the existing traffic profiles show that only 1% of the transits through the inshore route are undertaken by vessels of 240m and greater (it is noteworthy that a significantly greater proportion of vessels of this size transit to the north and east in the present case). Whilst the Applicant has provided for a future baseline that accounts for a general trend towards larger vessels it is important to

ExQ3 PINS Question number:	Question is addressed to:	Question:	Applicant's Response:
		and potential congestion of routes and pilot transfer operations due to displacement of traffic?	contextualise the POTL/LGPL proposition in the existing data comprising 21 months of AIS, a larger dataset than has been used to inform any previous marine NSIP project. During this period, from an annual vessel count in excess of 4000 transits, a single vessel of 333m was recorded transiting the inshore route; this represents 0.03% of vessel transits. The proposition therefore that growth forecasts of vessels of >240m LOA using the inshore route will exist and exceed the capacity as created by the allowance for four concurrent 333m LOA vessels does not have the evidential basis to be considered a credible reasonable planning horizon. Therefore, and in specific response to the ExA question, the Applicant has considered congestion aspects created by the project in the overall assessment (and in the provision of sea room in the SEZ) and the proposed development does not adversely impact this because adequate sea room is provided for the present case and future scenarios (and exceeded through allowing spatial capacity for four x 333m LOA vessels), there is no evidence provided by IP's to suggest existing or future traffic forecasts will utilise all this capacity (existing or otherwise) and, furthermore, congestion and capacity limitations relate to already existing limiting features rather than due to sea room. These factors include aspects such as the depth limitations of the Princes Channel and routes in/out the estuary, number and depth of available berths and limitations of pilotage provision (e.g that ESL only currently operate a one boat service at North East Spit). Notwithstanding this position, the Applicant notes that alternative pilot boarding stations and access routes across the wider estuary and approaches provide contingency to the Port that handle traffic that does not transit the inshore route and accidents and other deliberative acts as suggested.
3.12.32.	The Applicant	**Effects of proposed development on navigation passage planning and financial or economic consequences** In [REP5-012] D5 Appendix 7 the Applicant clarifies at paras 84 and 85 that the bulk of the 11 transits of the inshore route west of the WF take place within a 4.8 hour period and that this is partly to do with tidal "windows" and scheduling of pilot launch operations; and at para 87 that other tidal constraints such as berthing depths at the ports "*should be considered relevant*". In REP5-071 POTL/LGPL asserts that: • [page 5/6]: "…the lack of regard to economic loss to the shipping and navigation industries is contrary to national policy…"; and • [page 10/11] argues that additional steaming time from diversion around the WF would be in the range 47 to 60 minutes not 20 to 40 mins as suggested by the Applicant; and • [page 11] the basis for scoring of consequence at the workshop of 29 March 2019 was not clearly understood by participants and that "…it was agreed that any collision between a Class 1 or 2 vessel and a fishing vessel (including a glancing blow) would result in the sinking of that vessel…" and that the consequence might also result in the detention of the vessel involved pending incident investigation.	a) The applicant would direct the ExA to Appendix 26 to Deadline 6: Response to Deadline 5 Submissions by Interested Parties – Shipping and Navigation, and associated Annexes of this submission where a written response to the POTL/LGPL assertion that the application lacks regard to economic loss to the shipping and navigation industry is provided. The Applicant specifically notes inconsistencies in POTL/LGPL use of assumptions and presentation of analysis. b) As noted above, at Appendix 26 to Deadline 6, the Applicant does not accept that there is a need for vessels to deviate around the windfarm. The Applicant has provided clarification at Appendix 26 on deviation distances and steaming speeds and times and agrees with the estimated speeds provided by POTL and DPWLG. It is important to put this length of possible delay in context, and as noted within the Applicant Statement of Evidence at Deadline 4C, vessels, even large container vessels often wait in the approaches to the Thames Estuary for their berth to become available , a pilot to board, or sufficient water depth, and as such even if a 46-60

ExQ3 PINS Question number:	Question is addressed to:	Question:	Applicant's Response:
		Would the Applicant comment in detail on: a) the POTL/LGPL assertion that the application lacks regard to economic loss to the shipping and navigation industry; and b) whether it accepts the POTL/LGPL argument for the steaming speed range that relevant vessels would be making during such a diversion; and c) the POTL/LGPL case that that "*…the effect (of risk assessment) on vessels required to seek alternative pilot boarding locations…*" i. would be such as to give rise to a consequence of hazard of Category 3 or above (£100k plus); and ii. at the likelihood assessed would "*…give rise to a score above ALARP…*" (i.e. in the "intolerable" range) and/or iii. that "*…economic impacts can be seen to be at an unacceptable level*"; and d) how this tidal effect of traffic compression has been taken into consideration in assessing risk and effects of development in relation to economic and commercial aspects of shipping and port activities, (with reference to the [REP5-071] D5 submission by POTL/LGPL); and e) how in detail the NRA Addendum takes account of potential financial or economic loss to stakeholders or property interests as a consequence of glancing collision causing sinking of a fishing vessel and any resulting delay to shipping and port operations.	minute diversion were taken, it would have a negligible effect on the majority of vessels that visit London Ports. c) i), ii) & iii). As noted in Appendix 26 to Deadline 6 (written response to the POTL/LGPL) the Applicant does not consider the FSA Navigation Risk Assessment methodology suitable to assess economic impact as it does not relate to a navigation safety hazard. 'ALARP' is a definition of risk, not a definition for financial impact, and as such ALARP can only be applied in conjunction with a defined navigation safety hazard, the realisation of which must result in negative consequences such as a collision, contact or grounding, and not merely economic impact as a result of congestion or diversion where no navigation hazard has been realised. d) The Applicant notes the analysis contained within Section 7.1.3 of the NRA and represented in Figure 47, and that the accompanying text notes "*The average height of tide per one, two etc. concurrent transits was calculated. The results show that between none and three concurrent transits, the average height of tide changes very little. On the six occasions in December 2016 when there were four or more concurrent transits, the height of tide was shown to be much greater however givenhat this accounts for less than 1% of the month its impact is not considered significant."* This analysis demonstrates that there is actually little correlation between tidal time and congestion for the inshore route. Further to this, then analysis presented in association with the video vessel traffic animations at Appendix 41 to Deadline 6: AIS Animations Note, do not show a discernible difference in vessel transit time / frequency and HW. As no evidence was presented by IPs this issue, no additional analysis was undertaken at the time of the NRA. e) The Applicant notes that the NRA Addendum did not assess the hazards in which a glancing collision (which the Applicant would determine was a Most Likely outcome of a collision hazard), resulted in the sinking of a fishing vessel, and that this scenario would be considered a worst credible outcome of a fishing vessel collision hazard. In terms of how the realised hazard cost is split, the damage cost of a hazard occurring is assigned to the property consequence and other costs (such as delay to shipping and port operations) would be considered within the consequence to Stakeholders / Business category.
3.12.33.	The Applicant	**Assessment of economic effects** [REP1-148] by LGPL/PoTLL section 4 maintains that:	The Applicant maintains that given the negligible impact on vessel routing, and that it is not considered necessary as a result of the introduction of the SEZ any economic impact will also

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		"proposals are likely to result in significant impacts on commercial shipping, with resulting impacts on the efficient operation and thus competitiveness of their respective port and logistics facilities, contrary to the objectives of the Ports NPS and EN-3. Such impacts comprise the following components: • Increased journey distance and duration for certain types of vessels, and during certain sea conditions, resulting from a reduction in navigable width of the 'inshore channel' • Reduced accessibility to the NE Spit pilot boarding station as a result of the reduction in navigable width of the inshore channel, and thus reliance on alternate routes/pilot boarding stations which may give rise to additional congestion and journey distance/duration (for ships and pilots) • Reduced resilience to adverse weather conditions and sea states as a result of the inability to utilise safely the NE Spit pilot boarding station by certain types of vessels." The Written Representation goes on to maintain that "the IPs contend that it is of critical importance that the NRA and PTBSR provide a robust assessment of the potential implications of the proposed development on shipping and that such assessment informs further assessment of economic impacts on shipping and port activities. It is the IPs' view that such an economic assessment should be submitted by the Applicant as additional information to inform the application." In [REP5-071] D5 submission POTL/LGPL notes that the Applicant has not produced a quantitative assessment of potential economic effects of the TEOW proposals on port activity in its application documents, arguing that 'the lack of regard to economic loss to the shipping and navigation industries is contrary to national policy'. The submission continues to argue that "…unforeseen delays such as those which may occur as a result of loss of resilience of pilot boarding operations …have the potential to affect the commercial decision-making of suppliers regarding the choice of ports etc." and that the "…Thurrock, and indeed the wider South Essex, economy … may be highly sensitive to proposals which have a detrimental effect on the efficient operations of ports and shipping." POTL/LGPL make specific representation about time-sensitive shipping such as cruise passenger shipping and perishable cargo shipping. Is the Applicant willing and able to submit such an economic assessment to the Examination at D6?	be of a negligible magnitude. Notwithstanding this the Applicant has undertaken an illustrative assessment through reference to material submitted by IPs during the examination process. This illustrative assessment is presented at Annex C to Appendix 26 of this Deadline 6 submission.
3.12.34.	The Applicant	**"Normal" or "Limit" states** The answers given at ISH8 and recorded by the Applicant in REP5-018 paras 82 *et seq* do not specifically address the question of how and to what extent the risk assessment has taken into account "limit-state" qualitative scenarios combining	Please see Annex C of this Appendix for supplementary note.

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		worst MetOcean conditions in which pilot transfer operations can take place at NE Spit, including: • poor visibility; and • encounters involving vessels most restricted in ability to manoeuvre by reason of draught, windage, fishing, towing, etc.; and • ship's master unfamiliar with the local waters; and • technical or communications problems encountered with pilot transfer. The notes of the 29 March 2019 Hazard Workshop appear to be silent on assessment of such combination of circumstances in connection with defined hazards. Would the Applicant please provide: a) written workings (not merely tabulated numbers) of assessment of the most likely consequence of a limit state combination of effects for the top 4 hazards with the proposed TEOW in place subject to SEZ as proposed; b) a reasoned assessment of frequency of occurrence in construction phase in each case 1-4 above; c) clarification of the specific risk controls applied in assessing the inherent and residual risk in each case 1-4 in construction phase; d) explanation for the differential between most likely and worst credible scores for these top 4 hazards 1-4; e) justification why the doubling of likelihood for a class 1 or 2 collision hazard has resulted in a small percentage change in the risk score calculated by the software; f) examples in the top 4 hazard assessments 1-4 where the likelihood and consequence scores are close to the threshold for the next category e.g. category L2 to L3 or C2 to C3; and g) examples in the workshop where a "what-if" feedback loop or iteration took place to test the sensitivity (and thereby robustness) of assessment.	
3.12.35.	The Applicant	**Tolerability of Risk with catastrophic consequence** In REP1-024 Response to ExQ1.12.10 the Applicant states that '*a catastrophic consequence hazard which occurred more than once in 100 years would be regarded as intolerable, and the lowest risk score a catastrophic consequence hazard could achieve (at a frequency of greater than 1 in 1000 years) would be 5.1/10 and would have to be assessed as ALARP to be acceptable. This is*	a) comment on this [REP5-012] comment on consequence of NRAA Hazard #1; and In terms of a most likely occurrence to NRA A Haz #1 then the hazard outcomes were determined and agreed as:

<table>
<tr><th>ExQ3 PINS Question number:</th><th>Question is addressed to:</th><th>Question:</th><th>Applicant’s Response:</th></tr>
<tr><td></td><td></td><td>considered to represent an appropriate calibration of the assessment as regards “acceptability” of risks.’
POTL/LGPL contend [in REP5-071] that the basis for scoring of consequence was not clearly understood during the Hazard workshop on 29 March 2019; although at the workshop it was agreed that a ‘glancing blow’ collision of a Class 1 or 2 vessel with a fishing vessel would result in a sinking, the consequences for stakeholders/Business or Property were not discussed, expanded in the [REP5-071 Appendix F] email from LGPL to Applicant on 5 Apr 2019) as for example the Class 1 or 2 vessel being held pending incident investigation and loss of value of perishable goods cargo etc.
Would the Applicant please:

a) comment on this [REP5-012] comment on consequence of NRAA Hazard #1; and

b) re-explain the answer to ExQ1.1.10 in different terms, giving particular clarity to the meaning used respectively for the terms Tolerability and Acceptability, using the example of Hazard ID #1 from the NRA Addendum assuming collision involving a commercial vessel and a fishing vessel with
i. sinking as the consequence; and
ii. crew fatality as the consequence.</td><td>
<table>
<tr><td></td><td>Haz Workshop</td><td>Post Hazard Workshop</td></tr>
<tr><td>Narrative</td><td>Glancing Blow</td><td></td></tr>
<tr><td>People</td><td>Minor-Single minor injury</td><td>Minor-Single minor injury</td></tr>
<tr><td>Property</td><td>Minor damage</td><td>Minor damage</td></tr>
<tr><td>Environment</td><td>Negligible-Very Small Spill</td><td>Minor -Tier 1</td></tr>
<tr><td>Stakeholders</td><td>Negligible-No significant effects</td><td>Minor - Bad local publicity and/or possible short-term loss of revenue</td></tr>
</table>
The Applicant does not consider the sinking of a vessel to relate to a “most likely” occurrence, but following the workshop and representation from POTLL / DPWLG then hazard consequence scores for the most likely consequence for Environment and Stakeholders / Business were increased to accommodate for the possibility for delay to a vessel involved in an incident due to investigation requirements.

b)
The Applicant notes refence to ExQ1.1.10, which relates to Natural England and Ornithological Issues, and assume the reference is as noted in the question preamble at ExQ1.12.10.

The Applicant notes that the parameters provided in this question by the ExA, relate to consequences to a fishing boat, and as such would be considered in terms of fishing boat collision in Haz ID #4, and not Haz ID #1. The approach of assessing a hazard of one vessel in collision with any other vessel is a valid and standard approach to risk assessment and does not underscore the resulting hazard score.</td></tr>
</table>

This approach for collision hazards was discussed at pre-hazard workshop meetings, provided in the pre-workshop information pack and agreed at the start of the workshop, is used by the PLA, and by POTLL in the Tilbury 2 DCO NRA. It's use facilitated the IP request to have more vessel type categories, whilst maintaining total hazard numbers to manageable levels (noting that it was only possible within the hazards workshop to address 4 hazards with the IP's in attendance).

This methodology scores consequence specifically for the vessel that the hazard relates to – so cannot be said to underscore the consequence. And further, as a collision between two vessels is now considered as two hazards instead of one hazard there is a corresponding increase in the likelihood component of the risk – which is not halved as it relates only to one vessel.

Haz ID 4 shows that for Fishing Vessels and Recreational Craft it can be seen from the tables below, which are extract from the NRAA Hazard log, that the worst credible hazard outcome is forecast to occur approximately once in 500 years and that this has hazard consequences of multiple fatalities and sinking / floundering / capsize of the fishing vessel.

Haz Id	Hazard Detail	Most Likely Likelihood 1 in x yrs			Worst Credible Likelihood 1 in x yrs		
		Base line Risk	Inherent Risk	Resi dual Risk	Base line Risk	Inherent Risk	Resi dual Risk
4	Collision Fishing Vessel or recreational craft with another navigating vessel	10	8	9	500	400	435

Narrative	Small vessels colliding	Collides with larger vessel (WSV, Cargo, etc.)
	Glancing Blow / Loss of gear	Crossing / Head on Collision
	Lighting of WTG - displace fishing vessels	Sinking / Foundering / Capsize
	Mostly - potting / netting (less likely trawling) (LOA 8-10m)	
	Wake / Wash Impacts	* assumes lights as per Kentish Flats
People	Minor-Single minor injury	Catastrophic-Multiple fatalities
Property	Minor damage-Costs £10k – £100k	Moderate damage-Costs £100k - £1M
Environment	Negligible-Very Small Spill	Minor-Tier 1
Stakeholders	Minor-Bad local publicity and/or possible short-term loss of revenue	Major-National adverse media publicity and/or medium-term loss of revenue

ExQ3 PINS Question number:	Question is addressed to:	Question:	Applicant's Response:
			The rationale regarding these scores is as per the notes section of the Hazard Log which states that: *"Agreement on likelihood of WC outcome was not reached at the workshop. A review of literature published by the Marine Accident Investigation Branch - Analysis of UK Fishing Vessel Safety 1992 to 2006 , shows that for fishing vessels under 12m vessels (typical of those operating in the study area) there were 10 collision/contacts between 1992-2006 that results in vessel loss. The UK under 12m fishing fleet at 2006 was 6119, and therefore the likelihood of vessel loss (note that most vessels lost did not result in multiple fatalities) was 10 losses for 6119 vessels over 14 years. This gives an incident rate for loss of a fishing vessel from collision/contact of 1 in 12,238 per vessel years. The fleet operating in the study area is around 10 vessels, who also operate in other areas, and as such based on national incidents, it would be expected that the area would have a WC likelihood value at most 1 in 2000 years. Based on the complexity of traffic profile this could be increased to 1 in 1000 years, and when added to recreational craft incidents which show a similar return rate, then a conservative estimate would be around 1 in 500 year likelihood for the WC assessment.* *Based on continued navigation (and fishing) of fishing vessels and recreational craft through the windfarm then the workshop agreed that an increase in likelihood for the inherent assessment would be expected of around 20%."* The resultant risk score for the hazard has been generated for the Baseline, Inherent and Residual profile of risk using the risk matrix provided and the Hazman II Algorithm, which results in risk scores of 4.1, 4.26 and 4.22 respectively. This particular hazard has the following additional risk controls applied to it which include: 1. Enhanced Promulgation of Information 2. Shipping and Navigation Liaison Group 3. Post Consent Monitoring for Operational Phase 4. Enhanced Optimisation of TEOW line of orientation and symmetry As the hazard risk scores are at the low end of the ALARP range, and additional risk controls have been implemented, and no other reasonable controls have been identified and agreed with fishermen or other IP's, the hazard is classified as ALARP and Tolerable, and therefore is deemed acceptable in risk terms.
3.12.36.	The Applicant	**Societal Concerns and tolerability of societal risk** When questioned at ISH8 about the consequential implications of the top 4 hazards and how the NRA Addendum deals with combination risks, the Applicant's expert witness Dr Rogers answered that the NRA had already "*considered the issue*" [see REP5-018 Applicant's written confirmation of oral representations at ISH8 para 30].	As identified by the ExA, guidance such as MGN 543 (M+F) does not specify the methodology for aggregate assessment of risk, and as noted by the Applicant, it sort to address aggregate risk by reference to fatality calculations by vessel type presented in Section 8.6.3. of the original NRA, which are well defined in terms of ALARP boundaries (1×10^{-3} to 1×10^{-4} etc.)

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		In [REP1-024] Response to ExQ1.12.9 the Applicant notes MCA/DECC 2013 Guidance section 6.2: • advises that a (Formal Safety) Assessment "should consider societal risk through two mechanisms: an aggregate of all entries in the risk register; and for Major risks such as collision, contact, grounding and stranding"; and • notes that 6.2 does not "give a specific methodology for considering aggregate risk"? In regard to Tolerability, the Applicant goes on to state in [REP1-024] that the NRA "*sought to address this question through Section 8.6.3 as a means of considering overall levels of risk*." In section 8.6.3 of the NRA [APP-089] the Applicant states: • "No defined threshold exists for what constitutes an acceptable level of risk in the maritime domain or for wind farm developments." • "*Consideration of what is deemed as an acceptable risk have been discussed by …HSE (see HSE 1999- Reducing Risk, Protecting People)… when the risk relates to the loss of life*." • "*Typical values are given for the threshold of acceptability to individuals as 1 x 10-3, approximately a 1 in 1000 chance per year per crew person…*". • "*…a collision between a fishing vessel and a commercial ship would pose a threat to the fishing boats crew only...*" • "*The figures do however demonstrate that the risk does increase above the baseline scenario as a result of the development*". It can be seen from the HSE 1999 document, submitted as [REP5-009], that the definition of societal concerns and societal risk is not limited to loss of life. Para 25 to 27 states: • "Societal concerns or the risks or threats from hazards which impact on society and which, if realized, could have adverse repercussions for the institutions responsible for putting in place the provisions and arrangements for protecting people…Societal risk is therefore a subset of societal concerns." • *"Hazards giving rise to societal concerns share a number of common features. They often give rise to risks which could cause multiple fatalities; where it is difficult for people to estimate intuitively the actual threat; where exposure involves vulnerable groups…; where the risks and benefits tend to be unevenly distributed, for example….so that less risk may be borne now and by some future generation. People are more averse to those risks and in such cases are therefore more likely to insist on stringent Government regulation."* • *"In addition…there is also, and importantly, a concern that, in the wake of an event giving rise to such concerns, confidence in the …institutions responsible for*	The Applicant notes that it was possible to provide this aggregate assessment of risk as fatality rates could be calculated, (as identified above) but whilst the MCA/DECC 2013 Guidance section 6.2: advises that aggregate risk should be provided for "all entries into a risk register", no details on methodology or tolerability of any resulting score is proved, such that were scores aggregated it would not be possible to reference the resultant scores with anything. If this were necessary then the specific methodology, including risk matrices, risk definitions, consequence classifications, frequency classifications, risk score tolerability and calculation of risk control effectiveness, including risk control definitions and baseline / inherent / residual risk profiles would need to be standardised and defined for all projects – which they have not been, either in the primary guidance – MGN 543 (M+F), which doesn't provide recommendations on risk assessment methodologies, or the 2013 MCA/DECC Guidance which is an update to document to the original 2005 DTI guidance.. In essence the guidance requests consideration of societal concerns but does not direct the methodology, that should be used or how any results should be interpreted. Though out with this the Applicant has provided such an assessment as relates to fatality rates. b) The original NRA addressed societal concern in relation to fatality rates by ship type as specified in Section 8.6.3 by following a HSE methodology. Within the Appendix 12 to Deadline 6 Submission: Statement of Common Ground – Maritime & Coastguard Agency it was accepted by the MCA under "Tolerability definition and assessment" –that they did not provide guidance in this area and that the HSE standards (related to fatality rates) was appropriate. The original NRA did not assess societal concern against other consequences e.g. property, environment or business from a navigational hazards occurring, as no such methodology is provided either by the MCA, or the HSE guidance [REP5-009] which focuses on realisation of multiple fatalities for societal concern. The NRA A therefore relies on the assessment carried out in the original NRA, as being a worst case assessment, as in the original NRA the SEZ was not in place, however in terms of other consequence categories theses have been considered within the NRA A hazard log by individual hazards. The HSE guidance document refers to societal concerns in an overview section on risk and risk management issues which seeks to distinguish individual risks and those affecting many persons. There is description (in paragraphs 25, 27) of how the occurrence of a hazard may have repercussions for the confidence placed in regulatory institutions, but it advises generally that this is an "intensely political" issue. The rest of the guidance document, which explains how the HSE will take its decisions, does not purport to set out any discrete or particular approach which should be applied to account for this issue, particularly in cases such as this one involving navigation risk where MGN543 and the MCA/DECC 2013 Guidance is applied (in respect of which the Applicant has commented previously, as the ExA notes). When advising on criteria which can be adopted for reaching decisions (p. 40 et seq) the HSE guidance focusses on the consideration of societal risk based on annual fatality rates; and has been taken into account through the approach adopted in the project NRA as explained previously. The Applicant does not consider that other issues relating to confidence in regulatory institutions should have any further material effect on the conclusions it asks to be drawn from the NRA and NRAA, including its scoring for identified consequence categories or its approach to aggregate risk

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		setting out an enforcing (these) provisions and arrangements, would be undermined." Would the Applicant please advise: a) how they consider aggregate risk should be considered; and b) whether and how the NRA or NRA Addendum has considered societal concerns as defined by HSE and quoted above, including but not limited to loss of life; and c) whether recreational sea users and fishing boat crews or any other users of the sea space around the Thanet windfarm may be considered as "vulnerable groups"; and d) In the example of collision between fishing vessel and commercial ship, what the assessed inherent risk is of loss of life in relation to occurrence per year per crew person. e) whether and how an incident involving any combination of sinking, grounding, spillage of cargo or fuel, injury or fatality, delay or consequential reputational impact on for London or Sheerness ports has been assessed.	c) The Applicant does not consider recreational sea users or fishing boat crews as vulnerable groups as both groups do not meet the definition which within [REP5-009] defining vulnerable groups within the context of "… the young or the elderly or particularly susceptible individuals." Recreational sea users and fishing vessel crews are active participants and actively choose to partake in either water sports for personal pleasure, or fishing for economic reward, and therefore cannot be considered as vulnerable groups. d) As noted by the TFA single manned fishing boats are common in the Thanet Area, and as such the assessed fatality rate for fishing vessel is simply the worst credible hazard likelihood score presented in the hazard log for Haz 4 – namely 1 in 400 years, which was defined in relation to the study are based on reference to national incident rates, which were uplifted to reflect local conditions as follows (which is noted in the hazard log) *"Agreement on likelihood of WC outcome was not reached at the workshop. A review of literature published by the Marine Accident Investigation Branch - Analysis of UK Fishing Vessel Safety 1992 to 2006 , shows that for fishing vessels under 12m vessels (typical of those operating in the study area) there were 10 collision/contacts between 1992-2006 that results in vessel loss. The UK under 12m fishing fleet at 2006 was 6119, and therefore the likelihood of vessel loss (note that most vessels lost did not result in multiple fatalities) was 10 losses for 6119 vessels over 14 years. This gives an incident rate for loss of a fishing vessel from collision/contact of 1 in 12,238 per vessel years. The fleet operating in the study area is around 10 vessels, who also operate in other areas, and as such based on national incidents, it would be expected that the area would have a WC likelihood value at most 1 in 2000 years. Based on the complexity of traffic profile this could be increased to 1 in 1000 years, and when added to recreational craft incidents which show a similar return rate, then a conservative estimate would be around 1 in 500 year likelihood for the WC assessment.* *Based on continued navigation (and fishing) of fishing vessels and recreational craft through the windfarm then the workshop agreed that an increase in likelihood for the inherent assessment would be expected of around 20%."* e) The Applicant notes that the ExA is referring to an "incident" of sinking or grounding that results in outcomes of cargo or fuel loss, injury or fatality, delay or consequential reputational impact for London or Sheerness ports. Hazards of grounding are considered in Haz ID 13-18. In navigation terms sinking is a result of hazard occurring, whether that be collision, contact, or grounding and is therefore covered in the consequence classifications of these incidents. Other consequence classification of cargo or fuel loss, injury or fatality, delay

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			or consequential reputational impact for London and Sheerness Ports were fully considered in the consequence categories of People, Property, Environment or Stakeholder / Business.
3.12.37.	The Applicant	**Meaning and threshold of 'significance' in regard to impacts on shipping and navigation** In REP5-018 at para 50 the Applicant argues in relation to impacts to "*less strategically important shipping routes*" that they do not accept that there would be negative impacts but "*if there were, they have been minimized and could not be described as significant*. Would the Applicant please explain what they mean by the term "significant" in this example and specify the threshold of significance in this context. (The term 'significant' has been used in the Application and during the Examination in multiple ways in multiple contexts.)	The reference to "less strategically important shipping routes" is taken from NPS EN-3 paragraph 2.6.163, which emphasises the need for a "pragmatic" approach which seeks negative impacts to be "minimised" to as low as reasonably practicable. Policy does not require negative impacts to be avoided; and indeed recognises that there "may be some situations where reorganisation of traffic activity might be both possible and desirable when considered against the benefits of the wind farm application". The Applicant has consistently explained that it does not consider that the project would have any negative impacts given the remaining sea room that would be available to allow the maintenance both of ship passage and pilotage operations. It has, however, given further consideration to the nature of the impacts which the IPs allege would occur and has explained in the Shipping Commercial Assessment at Appendix 26 Annex C the reasons why it does not consider any such effects could be judged to be significant
3.12.38.	The Applicant	**Definition of the ALARP range** The definition of the ALARP range given in [APP-089] NRA Annex B Methodology is the band of risk scores between "intolerable" and "acceptable" as explained at page B-3: '*Every effort should be made to mitigate all risks such that they lie in the "acceptable" range. Where this is not possible, they should be reduced to the level where further reduction is not practicable. This region…is described as the ALARP region…where they can be tolerated, albeit efforts should be made when opportunity presents itself to further reduce their risk score*.' Would the Applicant please clarify and confirm: a) that the purpose of the hazard workshop held on 29 March 2019 was "*to understand whether the project would remain within the ALARP range*" as stated at para 53 of [REP5-018] is intended to mean that no risks would exceed the ALARP range (i.e. no risks would be in the 'intolerable' range) after risk controls/mitigation have been applied; and b) that 'ALARP' as a term used throughout the Applicant's representations describes a risk or set of risks, tolerable only if mitigated as far as is reasonably practicable; and c) that if an inherent risk is assessed to lie within the ALARP range, every effort should be made to find further mitigation to reduce the risk where reasonably practicable to the "acceptable" range below the "ALARP" range; and	The applicant has defined "hazards" and not "risks", as mandated by the IMO FSA, though in relation to the ExA question it is understood these are one and the same – albeit that the Applicant would note the common use of "risks" within HSE assessment have a different definition to the IMO FSA methodology for the characterisation of "hazards" / "risks", which is an important difference. This is carried through the Applicants answers to the following questions. a) This particular statement at Para 53 of [REP5-18] is made in reference to the findings of the original NRA that determined all hazards to be at ALARP or lower. From the Applicant's perspective it would be expected that the risks for following the introduction of the SEZ would only go down from those assessed in the NRA, however as this was an opportunity for IPs to directly input into the scores, and noting that the methodology varied slightly from that adopted in the NRA, the primary goal was determine that once stakeholder views were incorporated , and considering the SEZ, could the project still be considered in the ALARP range. This was conclusively determined through that process. b) that 'ALARP' as a term used throughout the Applicant's representations describes a risk or set of risks, tolerable only if mitigated as far as is reasonably practicable; and The Applicant confirms that ALARP applies to a range of risk scores identified with the NRA and NRA to hazards resulting in a risk score of between 4 – 6.9. The ALARP Range is broken down further within the IMO FSA methodology, as identified in "Guidance On The Assessment Of The Impact Of Offshore Wind Farms: Methodology for Assessing the Marine Navigational Safety Risks of Offshore Wind Farms", which at 18 gives an example Risk Tolerability Matrix (presented below), in which the "ALARP" range is termed – Tolerable with

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		d) that mitigating a risk to fall within the ALARP range is necessary but not sufficient if the risk can be further reduced by application of additional reasonably practicable controls/mitigation; and e) in this context of understanding the definition of ALARP as an objective to mitigate risk as low as reasonably practicable rather than as a range of tolerability subject to applied mitigation, what is meant by the Applicant's expert Dr Rogers [in REP5-018 para 113] that "*the project was ALARP prior to the introduction of the SEZ*"?	modification, Tolerable with Additional Control and Tolerable with Monitoring. This indicates that when hazards are at the low end of the ALARP zone, as is noted for the NRA A, that hazards can be tolerable with monitoring, though towards the higher end of the ALARP range more restrictive risk controls (termed here as modifications) are required. This approach, which is adopted in MCA guidance, clearly mandates that ALARP levels hazards can be tolerable with monitoring in place. c) If an inherent hazard ("Risk") lies within an ALARP range, and if it is demonstrated that Embedded risk controls have been applied that have reduced the hazard risk scores this particular hazard, then an inherent hazard risk score can be said to fall within the ALARP range. d) As noted above, ALARP level hazards can be considered Tolerable with Monitoring in place, with a condition in place that a "commitment to risk monitoring and reduction during operations - Risk must be mitigated with engineering and/or administrative controls. Must verify that procedures and controls cited are in place and periodically checked". The Applicant notes this and has committed to an additional risk control that seeks to provide this level of control – the "Shipping and Navigation Liaison Group". It is therefore demonstrated that it is sufficient to reduce risks to ALARP, with embedded and additional risk controls in place, so long as additional control are not practical. e) The Applicant notes that within the context of the NRA and NRA A the SEZ is not considered a risk control measures but is a change to the baseline condition of the TEOW. The original NRA findings were that all hazards were assessed to be at ALARP or lower, and that this assessment remains valid whether the SEZ was put in place or not, and out with of

Risk Criticality		Condition	Explanation
7	Unacceptable		Risk must be mitigated with design modification and/or engineering control to a Risk Class of 5 or lower before consent
6	Unacceptable		Risk must be mitigated with design modification and/or engineering control to a Risk Class of 5 or lower before consent
5	Tolerable with Modifications	with a commitment to further risk reduction before construction	Risk should be mitigated with design modification, engineering and/or administrative control to a Risk Class of 4 or below before construction
4	Tolerable with Additional Controls	with a commitment to further risk reduction before operation	Risk should be mitigated with design modification, engineering and/or administrative control to a Risk Class 3 or below before operation
3	Tolerable with Monitoring	with a commitment to risk monitoring and reduction during operation	Risk must be mitigated with engineering and/or administrative controls. Must verify that procedures and controls cited are in place and periodically checked
2	Broadly Acceptable		Technical review is required to confirm the risk assessment is reasonable. No further action is required
1	Broadly Acceptable		Technical review is required to confirm the risk assessment is reasonable. No further action is required

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			this, and without further detailed analysis, it is Applicants view that the cost the SEZ is disproportionate to the reduction in risk generated by it and therefore it would not pass the ALARP criteria as an effective risk reduction measures.
3.12.39.	The Applicant	**Pilot transfer bridge simulation** In the [REP5-071] D5 submission by POTL/LGPL the HR Wallingford report makes the case that a new simulation should be carried out as an essential prerequisite of a revised NRA, and that report includes an outline content for such a simulation. The ExA notes that in section D1 "Appropriate Assessment" in the MCA/DECC 2013 NRA methodology guidelines that are referred to in MGN543, (which includes simulation if justified by the perceived risk profile of proposals) para D1.2 advises that the purpose of such assessment being (in addition to proving feasibility of navigation activities) to • quantify risk ("Produce a quantitative or qualitative value, acceptable to Government, of the change in risk caused by the development…"); • to "determine the sensitivity of the risk to the conditions and the risk factors…"; • "to identify, evaluate and decide on appropriate risk controls"; and • to close the hazard log and to develop the Risk control log. Para D1.5 discusses the use of scenario to set up assessment and D1.6 sets out a hierarchy of appropriate assessment including Traffic Simulation at 2b and Traffic Bridge Control Simulation at 3 out of 4 potential steps. MGN 543 subsection 2d (xvi) refers to assessment of the cumulative and individual effects of multiple factors including "Researched opinion using appropriate computer simulation techniques with respect to the displacement of traffic and, in particular, the creation of 'choke points' in areas of high traffic density…" Would the Applicant please comment specifically on: a) the MGN 543 and MCA DECC 2013 requirements for simulation; and b) the content proposed by POTL/LGPL for such a simulation to validate the Risk control proposed by introduction of an SEZ?	a) the MGN 543 and MCA DECC 2013 requirements for simulation; and The Applicants notes the ExA comments on the MGN, and that where referenced to subsection 2d is made, this is referring to computer simulation (such as is undertaken in Collision Risk Modelling) and not Full Bridge Simulation – which the applicant has provided within the original NRA and which is also provided, in relation to the SEZ, as an updated assessment for Deadline 6 Appendix 42. The Applicant is cognisant of the fact that Full Bridge Simulation does not appear to be referenced within the MCA MGN 543 (M+F), despite it being specifically called out it the MCA/DECC 2013 NRA methodology guidelines, and also the older, but clearer 2005 DTI guidance. As such the latest guidance MCA MGN 543 does not mandate the need for full bridge simulation at all, however the Applicant undertook such an assessment, which proved feasibly of pilot transfers at NE Spit with the PIER RLB, which was subsequently reduced in the application RLB, and further reduced with the implementation of the SEZ. The Applicant also notes that there may be further confusion with regards to the hierarchy of appropriate assessment in the MCA/DECC 2013 guidance, in which Full Bridge Simulation is level 3 out of 4 but termed a "Specific Traffic Bridge Control Simulation". b) the content proposed by POTL/LGPL for such a simulation to validate the Risk control proposed by introduction of an SEZ? The Applicant has responded to the simulation content proposed by POTLL / DWPLG, and noted that POTLL / DPWLG have omitted to provide responses on navigation safety matter, preferring to rely on representations from PLA / ESL and LPC, except that they advise a further full bridge simulation be carried out to assess navigation safety – a view the Applicant does not agree with. The Applicant has provided a detailed response to the ExA Action for specification of any additional Full Bridge Simulation requirements at [REF#] to this Deadline 6 submission.

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