INFRASTRUCTURE PLANNING

THE INFRASTRUCTURE PLANNING (EXAMINATIONS PROCEDURE) RULES 2010

THE THANET EXTENSION OFFSHORE WIND FARM ORDER

Responses to First Written Questions

Submitted on behalf of the Port of London Authority and Estuary Services Limited

(Rule 8 letter 18 December 2018)

Unique Reference Number	EN010084
Rule No.	8(1)(b)
Document Ref.	PLA 6 / ESL 6
Author	Winckworth Sherwood LLP
Date	15 January 2019

Minerva House
5 Montague Close
London
SE1 9BB
DX: 156810 London Bridge 6

T 020 7593 5000
F 020 7593 5099
www.wslaw.co.uk

Winckworth Sherwood

Solicitors and Parliamentary Agents

ExQ1	Question to	Question	PLA and ESL response
1.12	**Navigation: Maritime and Air**		
1.12.1.	The Applicant, Port of London Authority, Estuary Services Ltd, London Pilots, London Gateway Port Ltd, Port of Tilbury London Ltd, Trinity House and the Maritime and Coastguard Agency	**Navigability of the inshore approach to NE Spit pilot station** Several Interested Parties and Other Persons at Issue Specific Hearing 2 (ISH2) raised concerns about continued prudent navigation by deep draught vessels "north-south/south-north" inshore of the proposed Thanet Extension Offshore Wind Farm. Evidence on use of the "inshore route" by large commercial vessels restricted in ability to manoeuvre ("RiAM") by reason of length, type or draught (i.e. on passage between the Dover Strait and the Princes Channel or the Fishermans Gat; to take refuge anchorage at Margate Roads or Tonge anchorages; or to transfer pilots at North East Spit or on passage between the Dover Strait and the northerly extent of the deep-water channels into the Thames at Sunk) as follows: a) what would be a reasonable maximum size of vessel by length, type or draught that is able to prudently use the inshore route at present in moderate MetOcean conditions? b) What is an estimated existing annualised use of the inshore route by "RiAM" vessels in baseline conditions of sea-room without the Thanet Offshore Wind Farm Extension (TEOWF); c) What would be a reasonably foreseeable annualised future use of the inshore route by "RiAM" vessels based on trend for change of vessel size using the Thames ports and anchorages as a whole	a) The inshore route is currently routinely used by vessels of up to 9m draught and up to 175m length in moderate MetOcean conditions. It is occasionally used by vessels up to 250m and 12m draught; this represents the reasonably maximum size of vessel that can be prudently served in moderate MetOcean conditions on the inshore route. The inshore route is more likely to be used by larger vessels when the outer boarding position, the Tongue, is not in use due to adverse weather conditions. b)-d) From a boarding and landing pilots perspective, RiAM would be heavily affected by operational sea room as well as draft, because of the potentially large deviation in heading that may be required to make a lee. Depth of water is not the only factor that can restrict a vessel: for example, a tug and tow can display RiAM signals when engaged in towing operations that restricts their ability to deviate from their course. With this in consideration, a substantial number of the current vessels could be considered RiAM if there is a reduction in existing sea room (this reduction is greater when incorporating a 500m safety zone). Due to this variation and the time constraints, the PLA and ESL do not have sufficient data available in order

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		in baseline conditions of sea-room without TEOWF; d) What would be a reasonably foreseeable annualised future use of the inshore route by "RiAM" vessels as a consequence of the reduction in sea room due to the pinch-point presented between the NE Spit bank and the proposed TEOWF Red Line Boundary plus 500m. proposed safety zone during construction and maintenance, with vessel size mix and volume of traffic using the Thames ports and anchorages as a whole as per baseline; e) What would be a reasonably foreseeable annualised future use of the inshore route by "RiAM" vessels as a consequence of the reduction in sea room due to the pinch-point presented between the NE Spit bank and the proposed TEOWF Red Line Boundary plus 500m. proposed safety zone during construction and maintenance with reasonable predictions of change of traffic mix based on trend for change in vessel size and number of vessels using the Thames ports and anchorages as a whole. In responding to this question, please have regard to Annex 3 of MGN:543 – "Shipping Route" Template Notes and indicate whether continued use of the "inshore" channel by "RiAM" vessels is likely to be intolerable, tolerable on the basis of being ALARP (identifying the risk assessment and mitigation measures that control risk to ALARP) or broadly acceptable.	to produce more precise estimates prior to Deadline 1, but will continue to seek to establish what information can be provided concerning the use of the inshore route by RiAM vessels. The TEOWF would substantially reduce the sea room to the south-west and north-west of the existing wind farm on the inshore route. The reduction is such that the continued use of the inshore route by RiAM vessels is likely to be intolerable in most MetOcean conditions. It is likely to result in RiAM vessels being unable or unwilling to use the inshore route during construction and operation of the TEOWF. Further, the PLA and ESL consider that with the increased risk to vessels, it would not be safe to continue to undertake boarding and landing operations in the area of the NE Spit diamond; this position would become redundant. Those vessels that currently board and land pilots at the NE Spit via the inshore route would be forced to use the Tongue boarding and landing position, which will itself need to be re-located further to the north of its existing position to accommodate the TEOWF. Only vessels that currently transit the area via the inshore route, but do not need to board or land a pilot, could continue to use the inshore route – provided the Master was content to do so – as these vessels would no longer be in conflict with boarding and landing operations due to the redundancy of the NE Spit. The decision to bring deeper drafted vessels to the inner boarding ground would be primarily driven by the

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			DPC (duty port controller for PLA) or Medway duty pilot, the ships master, MetOcean conditions and the pilot and then finally agreed with ESL. These are assessed on a case by case basis. Frequently vessels with a draft over 10m are served to the East of the inner boarding ground towards the deeper water area. The usage of the Margate Roads anchorage is unlikely to decrease due to the TEOWF because of the shelter it affords smaller ships. This potential through traffic into the anchorage through a reduced 'sea lane' is likely to create additional restrictions for boarding and landing pilots.
1.12.2.	The Applicant	**Traffic along the NW façade of the proposed RLB** Responding to concerns raised at ISH2 about the survey data presented in the NRA, please present a gate analysis of the surveyed traffic passing SW-NE/NE-SW past the North West façade of the proposed RLB.	N/A
1.12.3.	The Applicant, Port of London Authority, Estuary Services Ltd, London Pilots, London Gateway Port Ltd, Port of Tilbury London Ltd, Trinity	**Conditions for pilot transfer simulation** Responding to concerns raised at ISH2 about the continued ability to board pilots in adverse MetOcean and draught-constrained vessel manoeuvering conditions at the existing NE Spit pilot station, please identify whether the Bridge Simulation of feasibility of pilot transfer was adequate or not, covering the following points: a) to what extent can the ExA rely on the conclusions of the Simulation carried out?	a) In the PLA's and ESL's view, the ExA cannot rely on the conclusions of the Bridge Simulation to determine if pilot boarding and landing operations could safely continue in the area of the NE Spit boarding and landing diamond with the proposed extension in place. Bridge simulations are an accepted process when investigating the possible impact of a development such as the TEOWF. However, in this instance the PLA and ESL have concerns about the planning and technical restraints of the

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	House and the Maritime and Coastguard Agency		simulator study and the rigour with which it was carried out, which make the conclusions drawn from it unreliable.
		b) how many simulated runs in different MetOcean conditions would provide a reasonably robust test of feasibility and operating risk?	b) Any future simulation study would have to have a greatly increased number of simulations in order to provide a robust test of feasibility and operating risk, based on a more thorough and representative set of runs. The runs would need to represent the extent of environmental conditions and traffic situations that may be encountered, which the runs carried out for the Bridge Simulation do not. A range of emergency scenarios would need to be simulated and more realistic traffic situations, including those where ships / bridge crews do what they are expected to. The PLA simulator is not necessarily the best tool to use to quantify the operational risk, as it cannot realistically simulate the sea conditions and other environmental factors, or on-board situations. Annex 1 of MGN 543 notes that the use of the MCA's Methodology for Assessing the Marine Navigational Safety & Emergency Response Risks of Offshore Renewable Energy Installations (OREI) should be closely followed. This methodology document states that 'Where appropriate the algorithms should include the results of Rule violations, mistakes, lapses or slips, these categories being transparent and variable amongst the simulation algorithms' (section B. 1. 3 – Design Traffic and Types: Human Element). However, no emergency situations or rule violations were tested during the Bridge Simulation. The purpose and extent of any future simulation discussed

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			and agreed upon with relevant stakeholders, including the PLA and ESL, in advance of runs being carried out, in order to achieve a thorough bridge simulator design and specify an appropriate number of runs to provide a robust test of feasibility and operating risk.
		c) what variables in MetOcean conditions would be reasonably representative of baseline normal operating conditions which would enable the NE Spit pilot station to remain "on station" without the proposed Thanet Extension?	The conditions below should serve as a basic guide to baseline MetOcean conditions worked by ESL. Other conditions that can further influence this baseline are the strength, state (height) and direction of tide, and historical wind conditions (wind history in hours and direction). **West-North-West to South:** 0 - 40 knots: With a wind direction starting at west-north-west through to southerly ESL can work all boarding positions with no restrictions. 40 /45 knots: The use of the Tongue would mostly likely become restricted and any shipping needing to be served at this location would be assessed on a case by case basis (it maybe that the area can be worked at low water for example). 45 knots and above: this would mostly likely result in the Tongue and NE Goodwin being suspended (depending on the size of vessel being served, vessels over 10m draft and 200m length overall (**loa**) would be considered on a case by case basis). The inner boarding position is particularly sheltered and can be worked fully in 45+ knots. It is very rare for the inner boarding ground to be off service with this wind direction.

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			South to South-East: 0 - 40 knots: would not cause a disruption to the service at any of the boarding areas. 40 – 45 knots: The NE Goodwin and Tongue boarding areas would possibly see a restriction put in place and vessels/runs would be assessed on a case by case basis. 45 knots and above: Most likely to result in a suspended service at NE Goodwin and the Tongue (depending on the size of vessel being served, vessels over 10m draft and 200m loa would be considered on a case by case basis). ESL would still expect to operate a full service at the inner boarding position, winds would have to consistently exceed 50 knots before it considered any restrictions or full suspension, again very rare when the wind is in this direction. **South-East to East:** 0 – 35 knots – Full service at inner boarding position, the Tongue likely to be in service but would possibly see the introduction of restrictions at NE Goodwin. Larger vessels would be assessed case by case. 35 – 40 knots – NE Goodwin and Tongue would very likely be restricted and possibly fully suspended. Also likely that a restricted service would introduced at the inner boarding ground. As a guide this would usually mean no vessels under 6m draft and no freeboards under 1.5m but vessels will be assessed on a case by case basis.

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			40+ knots: Highly likely NE Goodwin and Tongue boarding positions would be suspended and a restriction would be in place at the area around the NE Spit (the "inner boarding" area). **East to North:** 0 – 25 knots: Full service at inner boarding ground, and Tongue and NE Goodwin would be on full service for larger vessels (over 10m draft). Where possible all traffic would be brought to the inner boarding ground. 25 – 30 knots: Full service at inner boarding ground but possibly a restricted service at Tongue/NE Goodwin, drafts over 10m may still be considered but conditions would be difficult and boarding would be a case by case assessment. 30 – 40 knots: Inner boarding ground could see restrictions put in place, as a guide this would usually mean no vessels under 6m draft and no freeboards under 1.5m. Highly likely to see a restricted service at both the Tongue and NE Goodwin, very large vessels would possibly be considered (over 200m and possibly 12m draft and above) but this would require extensive planning with the ports and pilots. 40 – 45 knots: Highly likely to result in a restricted service at the inner boarding ground, tidal conditions would become a major factor (low water offering the best opportunity to work but that window could only last for a couple of hours). The Tongue would likely be suspended and NE Goodwin would be

ExQ1	Question to	Question	PLA and ESL response
			restricted or potentially suspended. 45 knots and above: Both The Tongue and NE Goodwin would be suspended. Inner boarding area would also very likely be suspended. **North to West-North-West:** 0 - 30 knots: Full service at inner boarding ground and the Tongue and NE Goodwin would be on full service for larger vessels (over 10m draft). Where possible all traffic would be brought to the inner boarding ground. 30 – 40 knots: Inner boarding ground could see restrictions put in place, which would usually mean no vessels under 6m draft and no freeboards under 1.5m. Highly likely to see a restricted service at the Tongue, very large vessels would possibly be considered (over 200m and possibly 12m draft and above) but this would require extensive planning with the ports/pilots. NE Goodwin likely to be restricted but would become the preferential position for larger traffic (over 10m draft). 40 – 45 knots: Highly likely to result in a restricted service at the inner boarding ground, tidal conditions would become a major factor (low water offering the best opportunity to work but that window could only last for a couple of hours). The Tongue would likely be suspended, NE Goodwin would be restricted or potentially suspended.

		d) to what extent the exercise represented "real world" conditions in respect to local knowledge and communications ability in English of the actors in the simulation and their learning gained by performing multiple runs during the simulation?	The extent to which the exercise represented real world conditions was very limited. The simulator presented an unrealistic and sterile version of shipping and landing at the NE Spit pilot station, and favourable conditions to those that are experienced in 'real world' scenarios. In particular: i) Communication between pilot launch and all vessels served was good with no language/communication 'barrier' tested. There was no provision made for the potential lack of understanding of the cutter's requirements in the case of any restricted ability to communicate in English. ii) All vessels were 'manned' by participants with extensive local knowledge as either a pilot or launch coxswain, which would not be the case in real conditions. The simulations did not fully take into account the lack of local knowledge of a Master bringing his vessel to the NE Spit for the first time. iii) MetOcean Conditions: • The extent to which the PLA simulator can re-create true environmental conditions is limited. It does not represent true darkness and does not give a true impression of the weather that may be being experienced. The simulation runs undertaken did not represent the full range of environmental conditions, e.g. wind strength and direction in which the pilot cutters are able to operate, using a maximum of 25 knots. • It was agreed between the Applicant and ESL that 25 knots could represent 'challenging operational conditions', particularly from the direction of north west through to east but ESL expressed concern that the simulator did not realistically represent 25 knots. In ESL's experience winds of 25 knots from the

			northwest through to east would generate a minimum wave height of 1.5m (and above), which would be further influenced and increased by tidal conditions (height, strength and direction), historical weather conditions (wind history in hours and direction) and charted depth of water. These effects were not apparent during the simulation. Height of tide during the simulation was represented by two states of tide (being either high water or low water (+3)) which is not an exhaustive representation of the scope of tidal heights, and in particular does not represent low water conditions. Vessels of a deeper draft (approx 10m) can be served closer to low water, this would be factored into the launch programme typically after consultation with the coxswain/DPC and pilot. A larger (10m draft) vessel being served closer to low water would have to remain to the east of the boarding ground, at least 1nm depending on other traffic. • Visibility issues, although factored in, cannot be adequately accounted for in the simulation. Night conditions under the simulation are closer to a representation of summer/dusk conditions. Pilot launches are heavily reliant upon radar in reduced visibility but the tug simulator did not have a radar which, in real world conditions, would have been essential for 5 of the simulated runs. • Met-ocean conditions in the simulator did not reflect the reality of launch/ship interaction. iv) Pilot Launch: • The simulator does not have a model of a pilot cutter so the pilot cutter was substituted with a tug, which reacts very differently. This raised obvious issues in terms of a 'true' launch representation. The tug's

			handling alongside the ship and interaction with MetOcean conditions were very limited. The tug simulator, as explained in iii) above (MetOcean conditions), was also without a radar facility which is an essential navigational tool used on pilot launches, particularly in reduced visibility; ESL standing orders are that they cannot proceed to sea without a fully operational radar. v) No emergency scenarios were simulated vi) Other craft • Overall, representation of leisure/'other' craft was too simplistic, particularly as all traffic outside of pilotage behaved in full compliance with the rules of the road which is not always the case in real world conditions.
		e) to what extent did the exercise incorporate impinging factors such as small vessels without AIS and crossing traffic?	The representation of crossing traffic and small vessels without AIS, such as leisure craft, was overly simplistic. Mostly notably, all traffic outside of pilotage behaved in full compliance with the rules of the road which, as previously stated, does not accurately represent the real world experience. The simulations involved up to four vessels, coming to or from the pilot station, at any one time. A couple of runs included an additional vessel passing through the area, but the simulations did not include the range of small vessels such as recreational vessels and crossing traffic, such as windfarm support vessels, that may be found in the area. Unlike in real world conditions, there was no radar available to

			track 'unknown' small craft. Instead their presence was tracked on a 'chart plotter' display, which ESL would not in real world conditions be able to rely upon.
		f) are there any other relevant factors or considerations that should have been taken into account?	Due to the high volume of traffic that can be served at the NE Spit there are often be scheduling issues. Typically these occur when multiple vessels are travelling both inward and outward consistently over a period of several hours. Whilst the boat programme tries to account for this there can often be spontaneous adjustments made to the run programme by the launch coxswain. Unforeseen delays – for example due to deteriorating weather, incorrect ladder preparation, or traffic congestion – means vessels may need to be 'pushed back' to the following run to accommodate other shipping. This 'pushed back' vessel will have to remain in the vicinity of the boarding ground while avoiding conflict with other traffic. During the simulator process every run was individual and isolated with no consideration given to intensive multiple run workload periods. In ESL's view, the 'failure criteria' (1-6) seem unlikely to occur with the types of scenario being tested (section 4.2, Simulation Run Grading of the Bridge Simulation Report). Apart from point 1 (Ship lost control and was unable to manoeuvre safely), which was not factored into any of the simulations, each of the 'failure criteria' points would be very hard to meet when looking at the limitations of the simulator (limited number of vessels being simulated at any one time for example) combined with the experience of the participants in the study. All non-pilotage vessels in the study were operated by a pilot or pilots and fully adhered to the rules of the road, which was combined with good communication and all participants being aware of the structure of each run. The conditions were therefore favourable to what would be

			experienced as a whole in practice. Further, the successful/marginal/failure criteria for the study should have been discussed with all stakeholders, and reviewed based on the feedback received.
1.12.4.	The Applicant	**Consideration of effects of relocation of NE Spit pilot station:** Responding to concerns raised at ISH2, please comment on the opinion recorded in minutes of Dec 2017 meeting with ESL (appended to the NRA [APP-089]) that moving the NE Spit pilot station from its current location would be sub-optimal because it had been carefully located as a consequence of the Thanet Offshore Wind Farm project to be "*2nm from all hazards and therefore makes maximum use of the space*": a) to what extent the proposed Thanet Extension Red Line Boundary plus safety zone during construction and maintenance would encroach within that zone of 2nm radius from the NE Spit pilot station diamond? b) to what coordinates the NE Spit boarding station diamond could be relocated in order to maintain an operating zone of "2nm from all hazards"? c) what hazards or obstacles whether geographic, physical or based on use of the sea space should be considered as bounds for this operating zone? d) What account has been taken of the consultation with Estuary Services Ltd in regard to the effects to pilot operations, to navigational safety and the operating efficiency of commercial shipping, fishing and ports of relocating the NE Spit boarding station. Ref: minutes of Dec 2017 meeting with ESL appended to Section 4 of the [APP-089] NRA.	a) The proposed Thanet Extension Red Line Boundary (**RLB**) plus 500m safety zone would encroach on the 2nm radius by 0.5nm; the RLB to the boarding ground is 1.7nm (3148meters) less 500m (safety zone) = 2648m (1.43nm). The existing TOWF boundary is approximately 3.2nm from the pilot boarding ground. ESL would consider 2nm to be a minimum 'working' area with a buffer of at least 1nm being required in additional to that working area. The current boarding area is unchanged from its pre-TOWF position because of 3.2nm distance between the pilot boarding ground and the existing TOWF boundary. The current Tongue location is as a result of a relocation necessitated by the construction of the existing TOWF. b) to d) N/A (for Applicant to respond)

1.12.5.	Maritime and Coastguard Agency	**Hierarchy of appropriate risk assessment:** This MCA/DECC 2013 methodology advises the development of a "hierarchy of assessment" (see Annex D1 p63 Table 1). With respect to this recommended hierarchy of Navigation Risk Assessment would MCA confirm to what extent it is satisfied that for the Thanet Extension Offshore Wind Farm application to date: a) "Site Specific Assessment" has been carried out; and b) This was carried out in compliance with Definition 4 on page 65. Ref.: MCA/DECC 2013 Methodology Annex D1 p63 Table 1	N/A
1.12.6.	The Applicant	**Cumulative effects of increased density of traffic:** Please provide further detail of to what extent the effects of increased congestion of traffic around the development have been assessed to increase the frequency of occurrence of the following risks in reasonable worst case MetOcean conditions in which the navigable water inshore of the proposed Thanet extension can be expected to be used: a) ship collision; b) ship grounding; c) ship stranding; and d) ship/WTG contact.	N/A
1.12.7.	The Applicant	**Additive effects of Wind Farm Service Vessels on collision risk:** Please clarify the statement in the NRA that the collision risk within 5nm is increased by 54% to one every 4 years plus "*a further 9% with the addition (of) WFSVs*…";	ESL has concerns over the methodology of assessing collision risk. Although WFSVs appear to be a 'high risk' user of the area, it is unclear from the ES and the NRA how many WFSVs will be in place during construction. It is also unclear if the ship domain/collision risk study in the

		□ does that translate by addition into an increase of risk of 54%+9% = 63%? [APP-089] NRA para 7.3.2	NRA fully accounts for MetOcean conditions, mechanical failure, vessel type and activity (i.e. fishing). These are all recommended factors to take into account in MGN 543 (Annex 3). The risk collision assessment only accounts for traffic that carries AIS, and this analysis is based on one month's AIS Data (December 2016), a typically quiet month for vessel activity. It would be helpful to understand if the 9% increase accounts for all windfarm vessels (which ESL believes to be 4 in total) or whether 9% represents 2 WFSVs.
1.12.8.	The Applicant	**Effects of reduced margin for error in pilotage operations** In regard to pilotage operations the NRA concludes that "*reduced margin for error would increase the risk of an incident.*" Would the applicant please explain: a) how has this increased risk of an incident (due to reduced margin for error) been addressed in the risk assessment? b) what change of frequency of occurrence of the relevant hazards has been applied as a consequence of this reduced margin for error? [APP-089] NRA p129 para 12	N/A
1.12.9.	The Applicant	**Tolerability of Societal Concerns:** In the light of concerns about risks to safe navigation inshore of the proposed Thanet Extension raised at ISH2, please review the Navigation Risk Assessment (NRA) in respect to the MCA/DECC 2013 Methodology on Tolerability of Societal Concerns which recommends "…*as a minimum, an overall assessment of societal risk…" as: "An aggregate of all*	N/A

		entries in the risk register"; including for "*Major risks such as collision, contact, grounding and stranding";* and please state a reasoned assessment of tolerability of societal concerns in regard to the aggregate of hazards of navigation in the following sea areas between the safety zone outside the proposed Red Line Boundary of the Thanet Extension and: a) NE Spit Bank and the transit between Elbow cardinal mark and E Margate channel mark to the west and north-west of the site; b) the transit between Elbow cardinal mark and NE Goodwin cardinal mark to the south-west and south of the site; c) South Falls bank to the east and south-east of the site; d) The transits between Falls Head cardinal mark and Thanet N cardinal mark and NE Spit cardinal mark; the boundaries described above define sea-room with unobstructed water depth no less than 10 metres below Ordnance Datum. Ref.: MCA/DECC 2013 Methodology p.25 6.2 Tolerability of Societal Concerns.	
1.12.10.	Maritime and Coastguard Agency and Marine Management Organisation	**Acceptability of pollution, loss of vessel, operational downtime:** Please advise what considerations in regard to acceptability of risk should be taken into account when the assessed risk has major or catastrophic consequences that are not necessarily loss of life (including Pollution, Loss of Vessel, Major	N/A

		Operational Downtime); and a) at what level of assessed frequency can hazards with major or catastrophic consequences be assessed to be acceptable risks? b) to what extent it is reasonable for acceptability of major risks in confined sea room to be assessed by separate analysis of component hazards as opposed to assessment of combination and interactive effects?	
1.12.11.	The Applicant, Port of London Authority, Estuary Services Ltd, London Pilots, London Gateway Port Ltd, Port of Tilbury London Ltd, Trinity House and the Maritime and Coastguard Agency	**Recommendation not to take forward additional risk control** Please comment on the concluding recommendation in the Navigation Risk Assessment (NRA) not to take forward additional risk control measures that had been considered in the NRA as further mitigation? [APP-089] NRA 8.5.3 Table 22 items 1, 2, 3 and 4 and Conclusions	NRA 8.5.3 Table 22 **Item 1 (Construction and Post-Construction Monitoring)** It is not clear where real time monitoring has been adopted across other risk controls. Some form of continuous monitoring could possibly highlight any potential issues as the project continues. It may assist in identifying further navigational/safety issues – particularly if there is engagement with affected stakeholders such as the MCA, ports, pilotage service and local fishermen – so that these could be mitigated. **Item 2 (Relocation of Pilot Boarding Station)** The PLA and ESL agree that the alteration of pilotage arrangements would incur additional costs and that it may not be feasible to continue the operation with one boat if the pilot station was relocated. It would result in a substantial rise in costs to the whole of the pilotage operation both in money and time. It also has to be considered that the displacement would not necessarily offer any increase in trade for ESL. However, we do not agree that the reduction of red line boundary that has been proposed provides sufficient mitigation to continue pilotage operations at their current location. As described above, the pilotage simulation study

			was very limited and does not reflect the true increase in risk. The proposed extension on the shore side of the windfarm would result in the likely removal of the NE Spit diamond and relocation of all boarding and landing operations to the Tongue, which would also have to be relocated further to the north east. We agree that splitting the operation of ESL into a two launch service (between NE Goodwin DWD and Tongue DWD) would not be possible with the current one launch service. It would result in a substantial rise in costs to the whole of the pilotage operation both in money and time. It also has to be considered that the displacement would not necessarily offer any increase in trade for ESL. We believe the current reduction to the RLB does not mean that safe operations can continue at the inner NE Spit boarding ground, we don't believe the simulation proves that pilotage is still feasible with the extension in place. **Item 3 (Increased Co-ordination and Situational Awareness of Movements and Pilotage and NE Spit)** Table 22 suggested there was a need for: • Early and refined planning, supported by enhanced shore support, to reduce pressurised decision making afloat; and • Improved situational awareness at ESL and on board the pilot vessels through the provision of higher definition and longer range presentation of vessel traffic data. Such an increase in co-ordination and situational awareness would require a substantial increase in resources. It would effectively require a dedicated Traffic Organisation Service (TOS) in order to provide the required level of service

			described. London VTS provides traffic information in this area and is not sufficiently manned to provide the additional services that would be required. The NE Spit diamond lies within the area currently monitored by London VTS, but is outside the PLA's port limits and therefore the PLA's powers to direct traffic are limited. The PLA disagrees that the reduction in red line boundary provides sufficient alternative mitigation. The existing schedule of shipping served at the NE Spit is already informed by Live AIS data, VHF contact (the range of which can vary depending on weather and quality of onboard equipment) and port communication. From ESL's perspective, it would be very difficult for a VTS service and ESL to formulate a prescriptive run plan when neither have full control of all variables that influence each run i.e. non-pilotage traffic, ship delays, weather, poor communication with the vessel which can occur due poor quality technology (VHF) or a language barrier. Table 22 suggested that the needs identified (see above) could be achieved by: i) "Enhancing the role of London VTS to provide early guidance, organisation or formalising the sequencing of arrivals and departures. This could take the form of "slots" at the Pilot Station published in advance in the form of a shipping list;" This is similar to how the operation is already run. ESL communicates with the ports who inform them of a 'pilot on board' time and the ship is advised accordingly. Shipping is already organised, from the Port's perspective, well in advance through the agents. Introducing a 'slots' principle begins to create rigidity in

			the pilotage process and makes it increasingly difficult for the service, in particular ESL, to adapt to any form of delay or other issues. ii) "Strategically co-ordinating the arrival and departure of vessels estuary wide including traffic to and from the Medway. It is suggested that as a precursor to gaining improved situational awareness estuary wide visibility of the ETA and ETD aspects of POLARIS as a planning tool would significantly aid the subsequent co-ordination of traffic;" Both ports already share their arrival and departure information, we would argue this level of coordination is already in place. iii) "Formalising the method by which the transfer courses and vessel positioning at the pilot station is decided, communicated and executed; at present, this is achieved using a transfer course planning diamond that is refined by the Coxswain afloat and only communicated to the ship immediately prior to transfer. Early promulgation of a likely transfer course and a rendezvous position might help maximise the sea room available for transfer. Aided by weather forecasting, it ought to be possible to plan transfers up to 6 -12 hours in advance and inform the ship when they make initial VHF contact 2 hours prior to transfer. For example; for a North-East wind, an Inbound vessel could be informed to arrive 2 miles to the south east of the pilot station ready for a port ladder transfer on a course of 330. This could be published earlier in advance by email, SMS or other means to VTS, Pilots and the ship itself;" This suggestion presents its own safety and practicality issues. The coxswain at sea will have the best

			situational awareness because he can physically see (supported by onboard radar/AIS and VHF) what needs to be factored in when considering a plan of action. A reliance on weather forecasts when making assumptions for future run plans would be very difficult, with the wind only being one factor considered when handling vessels. It is also important to consider that the coxswain who will be serving the vessel may not be part of the run organised 6 to 12 hours in advance. Such a high level of engagement and instruction between ESL/Ports and the vessel being served will, again, create rigidity in the service and make it more difficult for the coxswain to react to a situation. iv) "ESL could consider re-instating the role of "Station Officer" (a role removed in circa 2010) to provide a centralised and senior point of contact for planning and a real-time co-ordination of traffic and transfers outlined above": The station officer role has never been used to give specific transfer arrangements (which isn't possible 6 to12 hours in advance as suggested); this has always been the responsibility of the coxswain in-situ. **Item 4 (Improved Training and Integration of Pilots, ESL and PLA VTS)** The communication and understanding between ESL and the ports is already well established. Coxswains are well-trained, highly experienced and practised at operating in an already risky environment; further training will not mitigate the fact that they would be operating in a more congested area and therefore be facing greater risk.

1.12.12.	The Applicant	**Adequacy of consultation about the NRA:** In the light of concerns raised at ISH2about the adequacy of consultation on the preparation and drafting of the Navigation Risk Assessment (NRA), please provide a document equivalent to a consultation report in matrix form, clarifying who was consulted on method and draft content respectively and reporting on the regard had to consultation responses received.	The first meeting where a number of serious concerns were raised regarding the proposal was in January 2016, and the need to engage with the PLA, ESL, and other stakeholders was raised at that time. Meetings have taken place since that date. It is not clear what mitigation has been proposed by the Applicant to reflect the PLA and ESL's comments, save that the application for the TEOWF is slightly more limited at its western-most extent that was originally proposed. However, that does not address the PLA's or ESL's concerns regarding the inner route and the impacts of the TEOWF on the pilot boarding stations. ESL's concerns with regards to participating in the Bridge Simulation Study, (see Q1.12.3) were raised with Marico Marine on the 14 August 2017 and have not been addressed. The PLA and ESL were advised of the existence of a NRA at a meeting with Vattenfall on 31 August 2018. Neither party was advised of the NRA ahead of this meeting, and neither was engaged in its drafting or was invited to comment on a draft ahead of formal submission.
1.12.13	The Applicant	**Consultation with RYA** In APP-089 NRA 1.3 RYA (Royal Yachting Association) is specifically listed as a key stakeholder in MGN 543 guidance. Would the applicant please guide the ExA to where the RYA is referenced as a consultee in the [APP-028, 029, 030] list of non-statutory consultees and please provide a link to or copy of the most recent consultation communication with RYA.	**N/A**
1.12.14.	The Applicant	**Clarification of impact of the development:** Can the applicant please clarify the meaning of [APP-089] NRA p130 para. 19 "… *whilst the footprints [sic] of the developments [sic] would not cause an adverse*	N/A

		impact, the extension would impact the routeing and navigational safety of operational vessels."	
1.12.15	The Applicant	**Effect of control on traffic flow around the site:** The NRA para 7.3.2 states that the extension of the wind farm with revised RLB would increase the collision risk within 5nm by 54%. Would the applicant confirm if it is correct to understand that introducing control on traffic flow around the site would reduce the risk by 23%? a) Does this mean a reduction in the 54% increased collision risk by subtracting 23% resulting in a residual increased collision risk of 31% (instead of an increase of 54%), or does it mean the product of (54% times (1.00 minus 0.23))? b) What would be the form of such a control on traffic flow? [APP-089] NRA para 7.3.2	N/A
1.12.16	Maritime and Coastguard Agency, Trinity House.	**Effects of increased density of traffic inshore at high water:** Please comment on the assessment in NRA p70 that the effect of increased density of vessel traffic inshore as a displacement effect of the Thanet Extension would not be significant to the risk to navigational safety and identify whether this conclusion is conditional on state of tide and size of vessels only. Ref [APP-089] NRA p 70	N/A
1.12.17.	The Applicant	**Effects of displacement of traffic on risk in other locations:** Please confirm how the NRA has accounted for the effects of displacement of traffic as an effect of the Thanet Extension increasing risk to navigation in other locations? [APP-089] NRA para108."*cumulative impact of these*	N/A

		developments will result in….rerouted into other lanes, increasing the risk elsewhere."	
1.12.18	The Applicant	**Meaning of risk controls and mitigation:** Can the applicant please confirm if it is correct to understand that: "risk controls" referred to in the hazard logs in [APP-129] Navigation Risk Assessment (NRA) mean the same as "mitigation" referred to elsewhere in the ES.	N/A
1.12.19.	The Applicant	**Meaning of Acceptability and Tolerability:** Can the applicant please confirm if it is correct to understand that "Acceptability of Risk" referred to [APP-089] NRA 8.6.3 means the same as Tolerability of Risk as used in [APP-129] NTS para 170 and as used in [APP-051] Shipping and Navigation and elsewhere in the NRA?	N/A
1.12.20.	The Applicant	**Principle of ALARP related to acceptability of risk:** Would the applicant please explain how the principle of ALARP (As Low As (is) Reasonably Practicable) applies to subjective judgment of acceptability in relation to risks with major or potentially catastrophic consequence?	N/A
1.12.21	The Applicant	**Narrow band of computed numerical values for risk:** The NRA explains that the risk assessment scores were combined into single numerical values using special software. Would the applicant please clarify how the computed single numerical values for risk scores typically lie within a narrow band between 2 and 5 by reference to a specific example of Annex D Hazard 12, explaining in detail as a worked example explain how a value of 5.05 for Inherent Risk (and 4.93 Residual Risk) is computed from the product of: a) a "Most Likely Inherent Frequency rating" of 4.0 ("Likely") and	N/A

		b) a “Worst Credible Consequence” of 4 (“Major”) [APP-089] NRA Annex B Methodology page B-8 and [APP-089] NRA Annex D Hazard 12	
1.12.22	Maritime and Coastguard Agency	**Risk computed as addition of Frequency and Consequence ratings** Would MCA please explain why the “Formal Safety Assessment” approach to risk management used for NRA does not multiply numbers for Frequency by numbers for Consequence, as is done in other risk management approaches where Risk is computed as Probability (Frequency) multiplied by Impact (Consequence). [APP-089] Annex B Methodology page B-2 ”*Risk is the product of a combination of the consequence of an event and the frequency with which it might be expected to occur”*	N/A
1.12.23	The Applicant	**Clarification: Meaning of four indices:** Can the applicant please confirm if it is correct to understand that “…*a single numeric value representing each of the four indices..”* in [APP-089] NRA Annex B Methodology page B-8 refers to the scored columns People, Property, Environment and Stakeholders in [APP-089] NRA Hazard Logs Annexes	N/A
1.12.24	The Applicant	**Clarification: Meaning of Ranked Hazard List:** Please confirm if it is correct to understand that the evidence presented in section 8.6 of the [APP-089] NRA Annex B Methodology is the “hazard list sorted in order of the aggregate of the four indices to produce a Ranked Hazard List” referred to in page B-8 of [APP-089] NRA Annex B Methodology?	N/A

1.12.25	The Applicant	**Sources of evidence used for assessing Likelihood and Consequence of incidents:** Please guide the ExA to the sources of evidence used in assessing: a) Likelihood of incidents occurring in different scenarios? b) Potential Consequence of an incident? [APP-089] NRA 8.6.3 Acceptability of Risk: *"a significant amount of evidence has been collected, such as through simulation and collision risk modeling to support the assessments of the likelihood of an incident…".*	N/A
1.12.26	The Applicant	**Methodological source for numerical values given to risk criteria** Please confirm the evidential basis for the numerical values allocated to risk criteria in the Hazard Logs? [APP-089] NRA Annex B NRA Methodology	N/A
1.12.27	The Applicant	**Understanding Marico's Hazman software:** Would the applicant please provide or guide the ExA to the provenance and credentials of "…Marico HAZMAN software" used for computation of risk, and in particular help us to understand: a) How many NRAs has it been used for? b) Whether the algorithms get modified as a consequence of monitoring and learning from experience? [APP-089] NRA Annex B Methodology page B-2	N/A
1.12.28	The Applicant	**Mitigation of echoes on radar requiring users to reduce gain:** [APP-089] NRA Annex to Section 4 (minutes of Dec 2017 meeting with RYA and Chamber of Shipping)	It is the experience of the ESL's coxswains that their launches frequently suffer with interaction between their radar and the Wind Farm. When a pilot launch is operating between the

		refers to a consultation concern that "…*echoes on radar which requires users to reduce gain, thereby losing smaller targets (i.e. small boats)…".* a) Can the Applicant please confirm where in the NRA to find mitigation response.	Wind Farm and a ship, with the ship in close proximity, the radar becomes less effective. High sided vessels will often severely impede Very High Frequency (VHF) communication with the shore side operation (including Vessel Traffic Services (VTS)), the ship itself and other vessels on the side of the ship being served. In effect, the pilot boat can be blindsided. The coxswain will have to be confident that little or no deviation will be necessary during an act of pilotage. The reduction in sea room and, therefore, the potential increase in congestion present a significant planning issue for the coxswain with regards to a confident 'clear path' before he engages with the ship. The Applicant does not appear to have proposed any mitigation for this in the NRA.
1.12.29	The Applicant	**Record of navigation risk workshop** [APP-089] NRA Annex to Section 4 (minutes of Dec 2017 meeting with MCA) refers to a navigation risk workshop. Please confirm if this workshop has taken place and if it has where in the NRA to find the output and outcomes of this workshop.	The PLA and ESL can confirm that they were neither invited to attend nor did attend such a workshop.
1.12.30.	The Applicant	**Questions on Minutes of the Jan 2018 meeting with MCA and Trinity House appended to Section 4 of the NRA** Please confirm: a) Minute item 10.8: to whom "Incidents and near misses are reported…" b) Minute item 10.11: who will have the specific responsibility for maintaining "continuous watch of site by radar, AIS…." c) Minute items 10.21: Is there an agreement in	N/A

		existence specifying who will relocate buoyage and when?	
1.12.31.	The Applicant	**Moveable exclusion zone** Would the applicant please confirm its response to suggestions raised in minutes of Dec 2017 meeting with TFA appended to Section 4 of the [APP-089] NRA of "a 500m moveable exclusion zone around the actual construction vessel" rather than along the whole cable corridor.	N/A
1.12.32	UK Chamber of Shipping	**Effects to Vessel Traffic Routing** UK Chamber of Shipping Relevant Representation [RR-009] opposes the view that impact of TEOWF on Vessel Traffic Routing will be minor and believes that the NRA lacks sufficient detail. Would the UKCoS expand on their objections, ideally citing particular shortfall in detail?	N/A
1.12.33	The Applicant	**Mitigation of Echoes on Radar Requiring Users to Reduce Gain** [APP-089] NRA Annex to Section 4 (minutes of Dec 2017 meeting with RYA and Chamber of Shipping) refers to a consultation concern that "…*echoes on radar which requires users to reduce gain, thereby losing smaller targets (i.e. small boats)…".* Please confirm where in the NRA to find mitigation response to this point?	N/A