Vattenfall Wind Power Ltd

Thanet Extension Offshore Wind Farm

Annex B to Appendix 1 to Deadline 4B
Submission: PLA NRA narrative and matrix

Relevant Examination Deadline: 4B

Submitted by Vattenfall Wind Power Ltd

Date: April 2019

Revision A

Drafted By:	Vattenfall Wind Power Ltd
Approved By:	Daniel Bates
Date of Approval:	April 2019
Revision:	A

Revision A	Original document submitted to the Examining Authority

NAVIGATIONAL RISK ASSESSMENT WORKING GROUP

NRAWG Date:	3rd September 2015	Owner:	K Gregory – VTS Manager	NRAWG Ref:	55	NRAWG Title:	Safety of Navigation in the North East Spit Area

Group Members:

Name	Organisation	Name	Organisation	Name	Organisation
Kevin Gregory	VTSM - PLA	Darren Knight	DHM(SMS) - PLA	Muhammad Khan	MCA – Navigation Safety
Kelvin Arterton	DVTSM - PLA	Tony van Vliet	DPC - PLA	Kaimes Beasley	MCA – CNIS/Sunk VTS
Cathryn Spain	DHM(L) - PLA	Phil Dalton	VTSO - PLA	Andrew Thompson	ESL
Simon Phillips	DHM(L) - PLA	Kevin Beacon	AHM – Peel Ports Medway	Dick Todd	ESL
Cerwyn Phillips	Pilotage Ops Mgr - PLA	Tony Lyons	Pilot – Peel Ports Medway	Thomas Hassan	Marine Trainee - PLA

Detail / Terms of Reference	Observation/Recommendation
Considering the evolving nature of operations in the North East Spit Area, it is considered appropriate that this Navigational Risk Assessment Working Group (NRAWG) undertakes a formal risk assessment to: 1. Review navigational incidents and near misses recorded in the North East Spit Area during the last five years; 2. Using AIS track analysis to inform the NRAWG: a. Review the predominant traffic patterns for all users of the North East Spit Area; b. Review the utility of current routing measures in the North East Spit Area; c. Identify any new routing measures that may enhance the safety of navigation in the North East Spit Area. 3. With respect to VTS operations and the management of vessel traffic: a. Review the operational capabilities of London VTS in the management of traffic in the North East Spit Area;	**Introduction** Over time, a number of new risk control measures have been implemented in the North East Spit area either following incidents or near misses there, or elsewhere in the UK and overseas. These have consisted of: - Greater coordination between ESL and PLA/Peel ports in the coordination and planning of Pilot cutter operations, - Single VHF channel operations in the North East Spit through the introduction of the London Arrival and Departure Arc (LONAD) and the final communications between ship and Pilot cutter being undertaken on VHF Ch69, - The introduction of a prohibited anchorage area, - The re-naming of the existing Pilot diamonds, - The addition of the new North East Goodwin Pilot diamond. These new risk control measures have evolved over time and have been designed and implemented separately. This NRAWG did not review in detail each of these separate risk control measures, as this was undertaken comprehensively when each of the controls was originally deployed. The NRAWG did however make a formal assessment of the overall effectiveness of these control measures with respect to reducing the overall likelihood and consequence of a navigational incident.

b. Identify any requirement for modified or new VTS operational procedures to enhance the safety of navigation in the North East Spit Area, c. Review the technical capabilities (including any limitations) of London VTS in the North East Spit Area. 4. Review the utility, usage, location and operational constraints/procedures for the Tongue and Margate Roads anchorage areas; 5. Review the current powers available to the PLA in the North East Spit Area and consider whether they are sufficient and appropriate; 6. Identify any new VTS Rules or other guidance that may contribute to enhancing the safety of navigation in the North East Spit Area.	**<u>Collision during/preparing for Pilot boarding/landing operations</u>** The working group reviewed the effectiveness of nine additional risk controls four of which had been previously established on an individual basis. The joint procedures deployed between ESL, the PLA and Peel Ports Medway with respect to the Pilot cutter scheduling and management processes were reviewed with respect to all categories of vessel (including those constrained by the draught or being higher risk in nature). The NRAWG determined that the procedure remained fit for purpose subject to a review of the process for scheduling and determining the precise order of vessels to be served. The need for a greater awareness on the part of London VTS as to the general headings to be utilised for Pilot embarkation and disembarkation was also deemed to be a beneficial addition to the current process of sharing information. **Recommendation 1** – PLA and ESL to review the process for determining which order vessels should be served during consecutive acts of Pilot embarkation and disembarkation. **Recommendation 2** – ESL to consider amending their Pilot cutter scheduling website to provide general information on the likely boarding/landing headings for vessels. The coordination of Pilot cutter operations combined with the introduction of the London Arrival/Departure Arc served to ensure, as far as is possible, that all vessels were monitoring VHF Ch69 whilst in the North East Spit area. However, it was noted that due to the geographic diversity of the VHF Ch69 transmitters, there was a risk of London VTS and vessels over speaking one another – the observance of general radio discipline should help in this regard. The current informal practice of, wherever practicable, embarking Pilots on vessels before disembarking Pilots was discussed. This was considered to be a useful risk control measure through retaining a Pilot onboard for as long as is practicable in an area of traffic convergence. The provision of up to date information on the activities of the North East Spit Pilot cutter would be of use to Pilots as they proceed outbound. This would allow Pilots to plan their passages with a greater degree of accuracy and also allow them to anticipate the likely level of traffic and sequence of operations in good time. **Recommendation 3** – When communicating with the North East Spit, ESL should provide outbound Pilots with relevant information with respect to forthcoming operations at the North East Spit. **Recommendation 4** – Wherever practicable, ensure that when consecutive acts of Pilot embarkation and disembarkation take place, vessels embarking Pilots are given priority. The previous establishment of a prohibited anchorage area was reviewed. This was considered as being fit for purpose and useful in ensuring the availability of sufficient sea room. The availability of accurate weather information for the North East Spit area was reviewed. Currently, London VTS relies on a weather station situated at Foreness Point. This weather station is at a relatively high height and may therefore not provide an accurate representation of local conditions in the North East Spit area.

Recommendation 5 – Consider whether it would be practicable to install a weather monitoring station closer to the North East Spit area, possibly on an existing aid to navigation, to provide an increased awareness of local conditions.

Reviewing the AIS traffic analysis and the introduction of additional risk control measures in the past, it was considered appropriate to review the guidance contained within Admiralty products (charts, ALRS, Pilot Books) to ensure that sufficient current advice and guidance is provided.

Recommendation 6 – Review the guidance contained within Admiralty products (charts, ALRS, Pilot Books) to ensure that sufficient current advice and guidance is provided.

The provision of charted boarding areas as opposed to specific Pilot diamonds was discussed. It was considered that a modification to the locations used for Pilot embarkation could serve as a means to separate the flows of vessel traffic within the area. The working group saw merit in undertaking a further and more in depth study of the options with a view to taking the matter forward.

Recommendation 7 – Form a working group consisting of the PLA, ESL and Peel Ports Medway to undertake a study examining the options, benefits and risks of charted Pilot boarding areas as opposed to the existing single diamond.

Collision between vessels in transit

The working group reviewed the effectiveness of seven additional risk controls two of which had been previously established on an individual basis.

The working group reached similar conclusions to those reached in the previous hazard (collision during/preparing for Pilot boarding/landing operations) with respect to single VHF channel operations in the North East Spit area, the prohibition/management of anchoring, the prioritisation (wherever practicable) of shipping Pilots to embarking vessels and the review of guidance contained within Admiralty products. As such, Recommendations 4 and 6 are also applicable to this hazard.

Following the review of two incidents, specifically the Speciality/Victorine and the Yarra Embla/Reimerswaal near misses, the group concluded that these could have been avoided and that some navigational advice on avoiding the establishment of collision risk situations could be published. Additionally, the working group saw merit in the sharing of lessons identified to a wider audience to include Medway Pilots and PEC holders where useful.

Recommendation 8 – To provide relevant lessons identified to Medway Pilots and PEC holders as appropriate to the circumstances of the case.

Recommendation 9 – To provide general guidance to mariners, specifically Pilots and PEC holders, to avoid the establishment of collision risk situations.

The provision of additional charted features such as the establishment of a precautionary area or an exclamation mark was reviewed. Whilst the establishment of features would draw the attention of the mariner to the area it was considered unlikely that a precautionary area would be approved by the IMO and that the impact of an exclamation mark would not be of sufficient benefit in consequence or likelihood reduction to warrant its establishment.

Contact with anchored vessel

The working group reviewed the implications of two potential risk control measures (modification of the Tongue anchorage location and the formal charting of the Margate Roads anchorage). When considering the baseline risk and the lack of historic incidents it was determined that no additional controls are required at the present time but that monitoring is required to ensure no changes in circumstances.

Contact with windfarm or other fixed structure

The working group reviewed the implications of one potential risk control measure (VTS encounter prediction tool). When considering the baseline risk and the lack of incidents it was determined that no additional controls are required at the present time but that monitoring is required to ensure no changes in circumstances.

Grounding of a vessel not at anchor

The working group reviewed the effectiveness of three additional risk controls two of which had been previously established on an individual basis.

The working group reached similar conclusions to those reached in the previous hazard (collision during/preparing for Pilot boarding/landing operations) with respect to the joint PLA, ESL and Peel Ports Medway Pilot cutter scheduling and management process and the prioritisation (wherever practicable) of shipping Pilots to embarking vessels and the review of guidance contained within Admiralty products. As such, Recommendations 1, 2 and 4 are also applicable to this hazard.

The working group also discussed a possible move of the North East Spit buoy so that it is closer to the spit itself. Whilst there was some merit in this the working group considered that such a move could cause confusion and serve to further restrict sea room in the area.

Grounding of a vessel at anchor

The working group reviewed the implications of one potential risk control measure. When considering the baseline risk and the lack of incidents it was determined that no additional controls are required at the present time but that monitoring is required to ensure no changes in circumstances.

Consideration of an additional VTS Operator

The provision of an additional VTS Operator whose main purpose would be to oversee the North East Spit area was considered. Whilst the provision of such additional resource had a positive impact upon the residual risk, when considering the overall resultant effect of the other risk control measures (either implemented or proposed), it was not considered necessary at this stage to either alter the responsibilities of the existing VTS Operator or to consider the provision of an additional VTS Operator. However, this situation should be monitored to gauge for any change in circumstances which may necessitate a review of the VTS Operator resourcing in this area.

Panel Chairman:	Kevin Gregory	Signature:	[redacted]	Date:	9th September 2015

Hazard ID	Baseline Hazard Rank	Residual Hazard Rank	Hazard Area	Hazard Category	Hazard Title	Credible Hazard Outcome ID [Consequence]	Credible Hazard Outcome [Consequence]	Hazard Causes ID [Likelihood]	Hazard Causes [Likelihood]	Baseline Risk - with existing risk controls in place			Risk Reduction								Results	Control Actionee	Complete
										Likelihood	Consequence	Baseline Risk	Risk Control ID.	Additional Risk Control (RC) Measures	Cross-reference Consequence Likelihood	Include Risk Control	% Likelihood Reduction	% Consequence Reduction	Residual Risk Score with RC in place					
																			Likelihood Return Period [yr]	Consequence Cost [£]	Cumulative Risk Score			
							Damage to vessels		Inappropriate Pilot Cutter scheduling					Baseline with no additional risk controls					10.0	£1,000,000	12.0	Baseline Risk		
							Pollution (Tier 2)		Inadequate traffic managament				1	ESL/PLA/MPA Pilot cutter scheduling and monitoring process		Yes	60%	20%	25.0	£800,000	10.2	12.0		
							Minor to moderate injuries		Failure to apply COLREGS				2	Coordination of Pilot cutter operations on VHF Ch 69		Yes	60%	60%	62.4	£320,000	7.7			
							Reputational harm		Conflict with other vessels boarding/landing/transiting				3	Where practicable, prioritise embarking vessels		Yes	40%	20%	104.0	£256,000	6.8	Baseline Level		
							Corporate liability		Loss of situational awareness (including radar interference)				4	Planning of critical/high risk vessels with ESL/Pilot/VTS		Yes	10%	20%	115.6	£204,800	6.4	High		
							Disruption to port operations		Inadequate/insufficient passage planning				5	Additional met sensors closer to NES		Yes	5%	5%	121.7	£194,560	6.3			
									Use of inappropriate Pilot boarding/landing position				6	Provision of charted Pilot boarding grounds to enhance traffic separation		Yes	30%	20%	173.8	£155,648	5.6	Residual Risk		
									Mechanical failure				7	Prohibited anchorage area		Yes	10%	5%	193.1	£147,866	5.4			
									Onboard deficiency				8	Additional advice in Admiralty products		Yes	10%	0%	214.6	£147,866	5.3	5.3		
									Adverse weather conditions				9	Dedicated VTS Operator		No	70%	40%	214.6	£147,866	5.3			
													10			No	0%	0%	214.6	£147,866	5.3	Residual Level		
													11			No	0%	0%	214.6	£147,866	5.3			
													12			No	0%	0%	214.6	£147,866	5.3	Moderate		
													13			No	0%	0%	214.6	£147,866	5.3			
													14			No	0%	0%	214.6	£147,866	5.3	Risk Reduction		
													15			No	0%	0%	214.6	£147,866	5.3	6.7		
													16			No	0%	0%	214.6	£147,866	5.3			
													17			No	0%	0%	214.6	£147,866	5.3			
													18			No	0%	0%	214.6	£147,866	5.3			
													19			No	0%	0%	214.6	£147,866	5.3			
1	1	2			Collision during or preparing for Pilot boarding/landing operations					3	4	12.0	20			No	0%	0%	214.6	£147,866	5.3			
													21			No	0%	0%	214.6	£147,866	5.3			
													22			No	0%	0%	214.6	£147,866	5.3			
													23			No	0%	0%	214.6	£147,866	5.3			
													24			No	0%	0%	214.6	£147,866	5.3			
													25			No	0%	0%	214.6	£147,866	5.3			
													26			No	0%	0%	214.6	£147,866	5.3			
													27			No	0%	0%	214.6	£147,866	5.3			
													28			No	0%	0%	214.6	£147,866	5.3			
													29			No	0%	0%	214.6	£147,866	5.3			
													30			No	0%	0%	214.6	£147,866	5.3			
													31			No	0%	0%	214.6	£147,866	5.3			
													32			No	0%	0%	214.6	£147,866	5.3			
													33			No	0%	0%	214.6	£147,866	5.3			
													34			No	0%	0%	214.6	£147,866	5.3			
													35			No	0%	0%	214.6	£147,866	5.3			
													36			No	0%	0%	214.6	£147,866	5.3			
													37			No	0%	0%	214.6	£147,866	5.3			
													38			No	0%	0%	214.6	£147,866	5.3			
													39			No	0%	0%	214.6	£147,866	5.3			
													40			No	0%	0%	214.6	£147,866	5.3			

Hazard ID	Baseline Hazard Rank	Residual Hazard Rank	Hazard Area	Hazard Category	Hazard Title	Credible Hazard Outcome ID [Consequence]	Credible Hazard Outcome [Consequence]	Hazard Causes ID [Likelihood]	Hazard Causes [Likelihood]	Baseline Risk - with existing risk controls in place			Risk Reduction									Results	Control Actionee	Complete
										Likelihood	Consequence	Baseline Risk	Risk Control ID.	Additional Risk Control (RC) Measures	Cross-reference Consequence Likelihood	Include Risk Control	% Likelihood Reduction	% Consequence Reduction	Residual Risk Score with RC in place					
																			Likelihood Return Period [yr]	Consequence Cost [£]	Cumulative Risk Score			
							Damage to vessels		Failure to apply COLREGS					Baseline with no additional risk controls					100.0	£1,000,000	8.0	Baseline Risk		
							Pollution (Tier 2)		Inadequate traffic managament				1	Precautionary area/exclamation mark		No	20%	5%	100.0	£1,000,000	8.0	8.0		
							Minor to moderate injuries		Loss of situational awareness (including radar interference)				2	Enhanced Pilotage/PEC navigational guidance/lessons identified		Yes	10%	0%	111.1	£1,000,000	7.8			
							Reputational harm		Inadequate/insufficient passage planning				3	Additional advice in Admiralty products		Yes	10%	0%	123.5	£1,000,000	7.6	Baseline Level		
							Corporate liability		Conflict with other vessels boarding/landing/transiting				4	Single channel VHF operations		Yes	60%	30%	308.6	£700,000	5.8	Moderate		
							Disruption to port operations		Use of inappropriate Pilot boarding/landing position				5	Prohibited anchorage area/control of anchorage		Yes	5%	5%	324.9	£665,000	5.7			
									Mechanical failure				6	Where practicable, prioritise embarking vessels		Yes	10%	10%	361.0	£598,500	5.4	Residual Risk		
									Onboard deficiency				7	Ddedicated VTS Operator		No	50%	30%	361.0	£598,500	5.4			
									Adverse weather conditions				8			No	0%	0%	361.0	£598,500	5.4	5.4		
													9			No	0%	0%	361.0	£598,500	5.4			
													10			No	0%	0%	361.0	£598,500	5.4	Residual Level		
													11			No	0%	0%	361.0	£598,500	5.4	Moderate		
													12			No	0%	0%	361.0	£598,500	5.4			
													13			No	0%	0%	361.0	£598,500	5.4	Risk Reduction		
													14			No	0%	0%	361.0	£598,500	5.4	2.6		
													15			No	0%	0%	361.0	£598,500	5.4			
													16			No	0%	0%	361.0	£598,500	5.4			
													17			No	0%	0%	361.0	£598,500	5.4			
													18			No	0%	0%	361.0	£598,500	5.4			
													19			No	0%	0%	361.0	£598,500	5.4			
2	2	1			Collision between vessels in transit					2	4	8.0	20			No	0%	0%	361.0	£598,500	5.4			
													21			No	0%	0%	361.0	£598,500	5.4			
													22			No	0%	0%	361.0	£598,500	5.4			
													23			No	0%	0%	361.0	£598,500	5.4			
													24			No	0%	0%	361.0	£598,500	5.4			
													25			No	0%	0%	361.0	£598,500	5.4			
													26			No	0%	0%	361.0	£598,500	5.4			
													27			No	0%	0%	361.0	£598,500	5.4			
													28			No	0%	0%	361.0	£598,500	5.4			
													29			No	0%	0%	361.0	£598,500	5.4			
													30			No	0%	0%	361.0	£598,500	5.4			
													31			No	0%	0%	361.0	£598,500	5.4			
													32			No	0%	0%	361.0	£598,500	5.4			
													33			No	0%	0%	361.0	£598,500	5.4			
													34			No	0%	0%	361.0	£598,500	5.4			
													35			No	0%	0%	361.0	£598,500	5.4			
													36			No	0%	0%	361.0	£598,500	5.4			
													37			No	0%	0%	361.0	£598,500	5.4			
													38			No	0%	0%	361.0	£598,500	5.4			
													39			No	0%	0%	361.0	£598,500	5.4			
													40			No	0%	0%	361.0	£598,500	5.4			

Hazard ID	Baseline Hazard Rank	Residual Hazard Rank	Hazard Area	Hazard Category	Hazard Title	Credible Hazard Outcome ID [Consequence]	Credible Hazard Outcome [Consequence]	Hazard Causes ID [Likelihood]	Hazard Causes [Likelihood]	Baseline Risk - with existing risk controls in place			Risk Reduction									Results	Control Actionee	Complete
										Likelihood	Consequence	Baseline Risk	Risk Control ID.	Additional Risk Control (RC) Measures	Cross-reference Consequence Likelihood	Include Risk Control	% Likelihood Reduction	% Consequence Reduction	Residual Risk Score with RC in place					
																			Likelihood Return Period [yr]	Consequence Cost [£]	Cumulative Risk Score			
							Damage to vessels		Failure to apply COLREGS					Baseline with no additional risk controls					1000.0	£100,000	3.0	Baseline Risk		
							Pollution (Tier 2)		Inadequate traffic managament				1	Modification of Tongue Anchorage location		No	20%	0%	1000.0	£100,000	3.0	3.0		
							Minor to moderate injuries		Vessels anchored close to prevailing traffic flows				2	Formal charting of Margate Roads Anchorage		No	10%	0%	1000.0	£100,000	3.0			
							Reputational harm		High density of vessels anchored due to adverse weather				3			No	0%	0%	1000.0	£100,000	3.0	Baseline Level		
							Corporate liability		Inadequate/insufficient passage planning				4			No	0%	0%	1000.0	£100,000	3.0	Minor		
									Loss of situational awareness (including radar interference)				5			No	0%	0%	1000.0	£100,000	3.0			
									Conflict with other vessels boarding/landing/transiting				6			No	0%	0%	1000.0	£100,000	3.0	Residual Risk		
									Use of inappropriate Pilot boarding/landing position				7			No	0%	0%	1000.0	£100,000	3.0	3.0		
									Mechanical failure				8			No	0%	0%	1000.0	£100,000	3.0			
									Onboard deficiency				9			No	0%	0%	1000.0	£100,000	3.0			
									Adverse weather conditions				10			No	0%	0%	1000.0	£100,000	3.0	Residual Level		
													11			No	0%	0%	1000.0	£100,000	3.0	Minor		
													12			No	0%	0%	1000.0	£100,000	3.0			
													13			No	0%	0%	1000.0	£100,000	3.0	Risk Reduction		
													14			No	0%	0%	1000.0	£100,000	3.0	0.0		
													15			No	0%	0%	1000.0	£100,000	3.0			
													16			No	0%	0%	1000.0	£100,000	3.0			
													17			No	0%	0%	1000.0	£100,000	3.0			
													18			No	0%	0%	1000.0	£100,000	3.0			
													19			No	0%	0%	1000.0	£100,000	3.0			
3	5	4			Contact with anchored vessel					1	3	3.0	20			No	0%	0%	1000.0	£100,000	3.0			
													21			No	0%	0%	1000.0	£100,000	3.0			
													22			No	0%	0%	1000.0	£100,000	3.0			
													23			No	0%	0%	1000.0	£100,000	3.0			
													24			No	0%	0%	1000.0	£100,000	3.0			
													25			No	0%	0%	1000.0	£100,000	3.0			
													26			No	0%	0%	1000.0	£100,000	3.0			
													27			No	0%	0%	1000.0	£100,000	3.0			
													28			No	0%	0%	1000.0	£100,000	3.0			
													29			No	0%	0%	1000.0	£100,000	3.0			
													30			No	0%	0%	1000.0	£100,000	3.0			
													31			No	0%	0%	1000.0	£100,000	3.0			
													32			No	0%	0%	1000.0	£100,000	3.0			
													33			No	0%	0%	1000.0	£100,000	3.0			
													34			No	0%	0%	1000.0	£100,000	3.0			
													35			No	0%	0%	1000.0	£100,000	3.0			
													36			No	0%	0%	1000.0	£100,000	3.0			
													37			No	0%	0%	1000.0	£100,000	3.0			
													38			No	0%	0%	1000.0	£100,000	3.0			
													39			No	0%	0%	1000.0	£100,000	3.0			
													40			No	0%	0%	1000.0	£100,000	3.0			

Hazard ID	Baseline Hazard Rank	Residual Hazard Rank	Hazard Area	Hazard Category	Hazard Title	Credible Hazard Outcome ID [Consequence]	Credible Hazard Outcome [Consequence]	Hazard Causes ID [Likelihood]	Hazard Causes [Likelihood]	Baseline Risk - with existing risk controls in place			Risk Reduction								Results	Control Actionee	Complete
										Likelihood	Consequence	Baseline Risk	Risk Control ID.	Additional Risk Control (RC) Measures	Cross-reference Consequence Likelihood	Include Risk Control	% Likelihood Reduction	% Consequence Reduction	Residual Risk Score with RC in place					
																			Likelihood Return Period [yr]	Consequence Cost [£]	Cumulative Risk Score			
							Damage to vessels		Failure to apply COLREGS					Baseline with no additional risk controls					1000.0	£100,000	3.0	Baseline Risk		
							Pollution (Tier 2)		Inadequate traffic managament				1	Use of encounter prediction VTS software		No	60%	5%	1000.0	£100,000	3.0	3.0		
							Minor to moderate injuries		Inadequate/insufficient passage planning				2			No	0%	0%	1000.0	£100,000	3.0			
							Reputational harm		Loss of situational awareness (including radar interference)				3			No	0%	0%	1000.0	£100,000	3.0	Baseline Level		
							Corporate liability		Use of inappropriate Pilot boarding/landing position				4			No	0%	0%	1000.0	£100,000	3.0	Minor		
							Damage to infrastructure		Mechanical failure				5			No	0%	0%	1000.0	£100,000	3.0			
									Onboard deficiency				6			No	0%	0%	1000.0	£100,000	3.0	Residual Risk		
									Adverse weather conditions				7			No	0%	0%	1000.0	£100,000	3.0	3.0		
													8			No	0%	0%	1000.0	£100,000	3.0			
													9			No	0%	0%	1000.0	£100,000	3.0			
													10			No	0%	0%	1000.0	£100,000	3.0	Residual Level		
													11			No	0%	0%	1000.0	£100,000	3.0	Minor		
													12			No	0%	0%	1000.0	£100,000	3.0			
													13			No	0%	0%	1000.0	£100,000	3.0	Risk Reduction		
													14			No	0%	0%	1000.0	£100,000	3.0	0.0		
													15			No	0%	0%	1000.0	£100,000	3.0			
													16			No	0%	0%	1000.0	£100,000	3.0			
													17			No	0%	0%	1000.0	£100,000	3.0			
													18			No	0%	0%	1000.0	£100,000	3.0			
													19			No	0%	0%	1000.0	£100,000	3.0			
4	5	4			Gcontact with windfarm or other fixed structure					1	3	3.0	20			No	0%	0%	1000.0	£100,000	3.0			
													21			No	0%	0%	1000.0	£100,000	3.0			
													22			No	0%	0%	1000.0	£100,000	3.0			
													23			No	0%	0%	1000.0	£100,000	3.0			
													24			No	0%	0%	1000.0	£100,000	3.0			
													25			No	0%	0%	1000.0	£100,000	3.0			
													26			No	0%	0%	1000.0	£100,000	3.0			
													27			No	0%	0%	1000.0	£100,000	3.0			
													28			No	0%	0%	1000.0	£100,000	3.0			
													29			No	0%	0%	1000.0	£100,000	3.0			
													30			No	0%	0%	1000.0	£100,000	3.0			
													31			No	0%	0%	1000.0	£100,000	3.0			
													32			No	0%	0%	1000.0	£100,000	3.0			
													33			No	0%	0%	1000.0	£100,000	3.0			
													34			No	0%	0%	1000.0	£100,000	3.0			
													35			No	0%	0%	1000.0	£100,000	3.0			
													36			No	0%	0%	1000.0	£100,000	3.0			
													37			No	0%	0%	1000.0	£100,000	3.0			
													38			No	0%	0%	1000.0	£100,000	3.0			
													39			No	0%	0%	1000.0	£100,000	3.0			
													40			No	0%	0%	1000.0	£100,000	3.0			

Hazard ID	Baseline Hazard Rank	Residual Hazard Rank	Hazard Area	Hazard Category	Hazard Title	Credible Hazard Outcome ID [Consequence]	Credible Hazard Outcome [Consequence]	Hazard Causes ID [Likelihood]	Hazard Causes [Likelihood]	Baseline Risk - with existing risk controls in place			Risk Reduction								Results	Control Actionee	Complete
										Likelihood	Consequence	Baseline Risk	Risk Control ID.	Additional Risk Control (RC) Measures	Cross-reference Consequence Likelihood	Include Risk Control	% Likelihood Reduction	% Consequence Reduction	Residual Risk Score with RC in place: Likelihood Return Period [yr]	Residual Risk Score with RC in place: Consequence Cost [£]	Residual Risk Score with RC in place: Cumulative Risk Score			
							Damage to vessels		Inadequate/insufficient passage planning					Baseline with no additional risk controls					100.0	£100,000	6.0	Baseline Risk		
							Pollution (Tier 2)		Inadequate traffic managament				1	ESL/PLA/MPA Pilot cutter scheduling and monitoring process		Yes	50%	10%	200.0	£90,000	5.0	6.0		
							Minor to moderate injuries		Use of inappropriate Pilot boarding/landing position				2	Where practicable, prioritise embarking vessels		Yes	40%	30%	333.3	£63,000	4.1			
							Reputational harm		Loss of situational awareness (including radar interference)				3	Planning of critical/high risk vessels with ESL/Pilot/VTS		Yes	80%	20%	1000.0	£50,400	2.7	Baseline Level		
							Corporate liability		Action taken to avoid collision				4			No	0%	0%	1000.0	£50,400	2.7	Moderate		
							Disruption to port operations		Mechanical failure				5			No	0%	0%	1000.0	£50,400	2.7			
									Onboard deficiency				6			No	0%	0%	1000.0	£50,400	2.7	Residual Risk		
									Adverse weather conditions				7			No	0%	0%	1000.0	£50,400	2.7	2.7		
													8			No	0%	0%	1000.0	£50,400	2.7			
													9			No	0%	0%	1000.0	£50,400	2.7			
													10			No	0%	0%	1000.0	£50,400	2.7	Residual Level		
													11			No	0%	0%	1000.0	£50,400	2.7	Minor		
													12			No	0%	0%	1000.0	£50,400	2.7			
													13			No	0%	0%	1000.0	£50,400	2.7	Risk Reduction		
													14			No	0%	0%	1000.0	£50,400	2.7	3.3		
													15			No	0%	0%	1000.0	£50,400	2.7			
													16			No	0%	0%	1000.0	£50,400	2.7			
													17			No	0%	0%	1000.0	£50,400	2.7			
													18			No	0%	0%	1000.0	£50,400	2.7			
													19			No	0%	0%	1000.0	£50,400	2.7			
5	3	6			Grounding of a vessel not at anchor					2	3	6.0	20			No	0%	0%	1000.0	£50,400	2.7			
													21			No	0%	0%	1000.0	£50,400	2.7			
													22			No	0%	0%	1000.0	£50,400	2.7			
													23			No	0%	0%	1000.0	£50,400	2.7			
													24			No	0%	0%	1000.0	£50,400	2.7			
													25			No	0%	0%	1000.0	£50,400	2.7			
													26			No	0%	0%	1000.0	£50,400	2.7			
													27			No	0%	0%	1000.0	£50,400	2.7			
													28			No	0%	0%	1000.0	£50,400	2.7			
													29			No	0%	0%	1000.0	£50,400	2.7			
													30			No	0%	0%	1000.0	£50,400	2.7			
													31			No	0%	0%	1000.0	£50,400	2.7			
													32			No	0%	0%	1000.0	£50,400	2.7			
													33			No	0%	0%	1000.0	£50,400	2.7			
													34			No	0%	0%	1000.0	£50,400	2.7			
													35			No	0%	0%	1000.0	£50,400	2.7			
													36			No	0%	0%	1000.0	£50,400	2.7			
													37			No	0%	0%	1000.0	£50,400	2.7			
													38			No	0%	0%	1000.0	£50,400	2.7			
													39			No	0%	0%	1000.0	£50,400	2.7			
													40			No	0%	0%	1000.0	£50,400	2.7			

Hazard ID	Baseline Hazard Rank	Residual Hazard Rank	Hazard Area	Hazard Category	Hazard Title	Credible Hazard Outcome ID [Consequence]	Credible Hazard Outcome [Consequence]	Hazard Causes ID [Likelihood]	Hazard Causes [Likelihood]	Baseline Risk - with existing risk controls in place			Risk Reduction								Results	Control Actionee	Complete
										Likelihood	Consequence	Baseline Risk	Risk Control ID.	Additional Risk Control (RC) Measures	Cross-reference Consequence Likelihood	Include Risk Control	% Likelihood Reduction	% Consequence Reduction	Residual Risk Score with RC in place: Likelihood Return Period [yr]	Residual Risk Score with RC in place: Consequence Cost [£]	Residual Risk Score with RC in place: Cumulative Risk Score			
							Damage to vessels		Failure to maintain anchor watch					Baseline with no additional risk controls					100.0	£10,000	4.0	Baseline Risk		
							Pollution (Tier 1)		Insufficient VTS oversight				1	Formal charting of Margate Roads Anchorage		No	10%	0%	100.0	£10,000	4.0	4.0		
							Reputational harm		Mechanical failure				2	Undertake responsibility to monitor vessels in Tongue and Margate Roads (VTS Anchor Watch)		No	40%	0%	100.0	£10,000	4.0			
							Corporate liability		Onboard deficiency				3			No	0%	0%	100.0	£10,000	4.0	Baseline Level		
							Disruption to port operations		Adverse weather conditions				4			No	0%	0%	100.0	£10,000	4.0	Minor		
									High density of vessels anchored due to adv				5			No	0%	0%	100.0	£10,000	4.0			
													6			No	0%	0%	100.0	£10,000	4.0	Residual Risk		
													7			No	0%	0%	100.0	£10,000	4.0	4.0		
													8			No	0%	0%	100.0	£10,000	4.0			
													9			No	0%	0%	100.0	£10,000	4.0			
													10			No	0%	0%	100.0	£10,000	4.0	Residual Level		
													11			No	0%	0%	100.0	£10,000	4.0	Minor		
													12			No	0%	0%	100.0	£10,000	4.0			
													13			No	0%	0%	100.0	£10,000	4.0	Risk Reduction		
													14			No	0%	0%	100.0	£10,000	4.0	0.0		
													15			No	0%	0%	100.0	£10,000	4.0			
													16			No	0%	0%	100.0	£10,000	4.0			
													17			No	0%	0%	100.0	£10,000	4.0			
													18			No	0%	0%	100.0	£10,000	4.0			
													19			No	0%	0%	100.0	£10,000	4.0			
6	4	3			Grounding of a vessel at anchor (Margate Roads or Tongue)					2	2	4.0	20			No	0%	0%	100.0	£10,000	4.0			
													21			No	0%	0%	100.0	£10,000	4.0			
													22			No	0%	0%	100.0	£10,000	4.0			
													23			No	0%	0%	100.0	£10,000	4.0			
													24			No	0%	0%	100.0	£10,000	4.0			
													25			No	0%	0%	100.0	£10,000	4.0			
													26			No	0%	0%	100.0	£10,000	4.0			
													27			No	0%	0%	100.0	£10,000	4.0			
													28			No	0%	0%	100.0	£10,000	4.0			
													29			No	0%	0%	100.0	£10,000	4.0			
													30			No	0%	0%	100.0	£10,000	4.0			
													31			No	0%	0%	100.0	£10,000	4.0			
													32			No	0%	0%	100.0	£10,000	4.0			
													33			No	0%	0%	100.0	£10,000	4.0			
													34			No	0%	0%	100.0	£10,000	4.0			
													35			No	0%	0%	100.0	£10,000	4.0			
													36			No	0%	0%	100.0	£10,000	4.0			
													37			No	0%	0%	100.0	£10,000	4.0			
													38			No	0%	0%	100.0	£10,000	4.0			
													39			No	0%	0%	100.0	£10,000	4.0			
													40			No	0%	0%	100.0	£10,000	4.0			