Vattenfall Wind Power Ltd

Thanet Extension Offshore Wind Farm

Annex F Appendix 28 to Deadline 5 Submission: Revised NRA Addendum Hazard Logs

Relevant Examination Deadline: 5

Submitted by Vattenfall Wind Power Ltd

Date: April 2019

Revision B

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

Revision A	Original document submitted to the Examining Authority
Revision B	Revised document submitted to the Examining Authority

Hazard ID	Category	Vessel Type	Hazard Detail	Possible Causes	Y/N	Consequences			Most Likely Hazard Occurrence							Worst Credible Hazard Occurrence								Notes
									Consequence				Likelihood 1 in x yrs			Consequence				Likelihood 1 in x yrs				
						Type	Most Likely Outcome	Worst Credible Outcome	People	Property	Environment	Stakeholders	Baseline Risk	Inherent Risk	Residual Risk	People	Property	Environment	Stakeholders	Baseline Risk	Inherent Risk	Residual Risk		
1	Collision	Class 1 or 2 vessels	Collision Class 1 or 2 vessel with another navigating vessel	1 - Adverse Environmental Conditions	Yes	Narrative	Glancing Blow	Fire / Sinking / Foundering	2	2	2	2	36	18	25	4	5	5	5	450	225	307	Workshop attendees thought collision of Class 1 or 2 vessel was likely to occur twice as often with TEOW in place and no risk controls in place. The inherent likelihood value was therefore increased by 50%. IP Review: Consequence scores for ML Environment and Stakeholder Category increased based on PLA / ESL / DPWLG Request
				2 - Avoiding Other traffic	Yes			Loss Cargo																
				3 - Constriction of Shipping Routes	Yes			Loss of life																
				4 - Equipment or Mechanical Failure	Yes			Large vessel / Tanker / Dangerous Goods																
				5 - Human Error	Yes																			
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality																
				7 - Loss of UKC	No	Property	Minor damage-Costs £10k –£100k	Catastrophic damage-Costs >£10M																
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Negligible-Very Small Spill	Catastrophic-Tier 3+																
				9 - Pilot Transfer Issues	Yes	Stakeholders	Negligible-No significant effects	Major-National adverse media publicity and/or medium-term loss of revenue																
				10 -																				
2	Collision	Class 3 or 4 Vessels	Collision Class 3 or 4 vessel with another navigating vessel	1 - Adverse Environmental Conditions	Yes	Narrative	Glancing Blow	Fire / Sinking / Foundering	2	2	2	2	27	18	21	4	5	5	4	360	240	284	With TEOW in constructed and no risk controls in place the workshop attendees thought that the increase in likelihood of collision for a Class 3 or 4 vessels was not a great as for the Class 1 or 2 vessel, and they would have more sea room following construction of the TEOW (as can pass inshore of NE Racon buoy). With the TEOW constructed and no additional risk controls in place the inherent likelihood return rate was increased by 33%.
				2 - Avoiding Other traffic	Yes			Loss Cargo																
				3 - Constriction of Shipping Routes	Yes			Loss of life																
				4 - Equipment or Mechanical Failure	Yes			Vessel / Tanker / Dangerous Goods																
				5 - Human Error	Yes																			
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality																
				7 - Loss of UKC	No	Property	Minor damage-Costs £10k –£100k	Catastrophic damage-Costs >£10M																
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Negligible-Very Small Spill	Catastrophic-Tier 3+																
				9 - Pilot Transfer Issues	Yes	Stakeholders	Negligible-No significant effects	Major-National adverse media publicity and/or medium-term loss of revenue																
				10 -																				
3	Collision	Vessel less than 90m	Collision vessel less than 90m with another navigating vessel	1 - Adverse Environmental Conditions	Yes	Narrative	Glancing Blow	Fire / Sinking / Foundering	2	2	1	1	27	18	21	4	5	4	4	401	267	316	Workshop attendees thought collision of a vessel less than 90m a similar change as with Class 3 or 4 vessels with the TEOW constructed. With the TEOW constructed and no additional risk controls in place the inherent likelihood return rate was increased by 33%.
				2 - Avoiding Other traffic	Yes		Vessels do not need to slow for Pilot Transfer	Loss Cargo																
				3 - Constriction of Shipping Routes	Yes			Loss of life																
				4 - Equipment or Mechanical Failure	Yes			Cargo / Bunker Barge																
				5 - Human Error	Yes																			
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality																
				7 - Loss of UKC	No	Property	Minor damage-Costs £10k –£100k	Catastrophic damage-Costs >£10M																
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Negligible-Very Small Spill	Major-Tier 3																
				9 - Pilot Transfer Issues	No	Stakeholders	Negligible-No significant effects	Major-National adverse media publicity and/or medium-term loss of revenue																
				10 -																				
4	Collision	Fishing or Recreational	Collision Fishing Vessel or recreational craft with another navigating vessel	1 - Adverse Environmental Conditions	Yes	Narrative	Small vessels colliding	Collides with larger vessel (WSV, Cargo, etc.)	2	2	1	2	10	8	9	5	3	2	4	500	400	435	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%.
				2 - Avoiding Other traffic	Yes		Glancing Blow / Loss of gear	Crossing / Head on Collision																
				3 - Constriction of Shipping Routes	Yes		Lighting of WTG - displace fishing vessels	Sinking / Foundering / Capsize																
				4 - Equipment or Mechanical Failure	Yes		Mostly - potting / netting (less likely trawling) (LOA 8-10m)																	
				5 - Human Error	Yes		Wake / Wash Impacts	* assumes lights as per Kentish Flats																
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Catastrophic-Multiple fatalities																
				7 - Loss of UKC	No	Property	Minor damage-Costs £10k –£100k	Moderate damage-Costs £100k -£1M																
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Negligible-Very Small Spill	Minor-Tier 1																
				9 - Pilot Transfer Issues	No	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																
				10 -																				
5	Collision	WSV	Collision of WSV working or transiting to from Thanet or other OWF in area with another vessel	1 - Adverse Environmental Conditions	Yes	Narrative	Collides with small vessel at low speed	Collides at speed with other vessel	2	2	1	2	50	40	44	5	4	2	4	1000	800	871	With the TEOW constructed and no additional risk controls in place the inherent likelihood return rate was increased by 20%. PLA request to increase ML Consequence to People category not taken forward as People consequences for ML likely to be similar to other vessel types such as pilot boats (which weren't increased by PLA). Also recent incident at Wikinger OWF - Germany shows WC WSV collision likely to be moderate injuries, therefore not considered a most likely occurrence.
				2 - Avoiding Other traffic	Yes		Glancing blow	Crossing / Head on Collision																
				3 - Constriction of Shipping Routes	Yes			Sinking / Foundering / Capsize																
				4 - Equipment or Mechanical Failure	Yes																			
				5 - Human Error	Yes																			
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Catastrophic-Multiple fatalities																
				7 - Loss of UKC	No	Property	Minor damage-Costs £10k –£100k	Major damage -Costs £1M - £10M																
				8 - Low Manoeuvrability of Vessels	No	Environment	Negligible-Very Small Spill	Minor-Tier 1																
				9 - Pilot Transfer Issues	No	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																
				10 -	No																			
6	Collision	Pilot Launch	Collision Pilot Launch with another navigating vessel	1 - Adverse Environmental Conditions		Narrative	Slow Speed collision	High speed collision	2	2	1	2	50	40	45	4	4	2	4	1000	800	904	With the TEOW constructed and no additional risk controls in place the inherent likelihood return rate was increased by 20%.
				2 - Avoiding Other traffic			Glancing Blow	Crossing / Head on Collision																
				3 - Constriction of Shipping Routes			Minimal damage	Significant damage																
				4 - Equipment or Mechanical Failure																				
				5 - Human Error																				
				6 - Increased Traffic Density		People	Minor-Single minor injury	Major-Multiple major injuries or single fatality																
				7 - Loss of UKC		Property	Minor damage-Costs £10k –£100k	Major damage -Costs £1M - £10M																
				8 - Low Manoeuvrability of Vessels		Environment	Negligible-Very Small Spill	Minor-Tier 1																
				9 - Pilot Transfer Issues		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																
				10 -																				

Hazard ID	Category	Vessel Type	Hazard Detail	Possible Causes	Y/N	Consequences			Most Likely Hazard Occurrence							Worst Credible Hazard Occurrence								Notes
									Consequence				Likelihood 1 in x yrs			Consequence				Likelihood 1 in x yrs				
						Type	Most Likely Outcome	Worst Credible Outcome	People	Property	Environment	Stakeholders	Baseline Risk	Inherent Risk	Residual Risk	People	Property	Environment	Stakeholders	Baseline Risk	Inherent Risk	Residual Risk	
7	Contact	Class 1 or 2 Vessels	Class 1 or 2 Vessel comes into contact with a WTG or other structure	1 - Adverse Environmental Conditions	Yes	Narrative	Glancing Blow	Fire / Sinking / Foundering	2	2	1	3	45	23	30	4	4	4	4	486	243	329	With the TEOW constructed and no additional risk controls in place the inherent likelihood return rate was increased by 50% which is the same increase in likelihood as applied to Haz # 1: Collision Class 1 or 2 vessels. IP Review: Consequence scores for ML Stakeholder Category increased based on PLA / ESL / DPWLG request
				2 - Avoiding Other traffic	Yes			Loss Cargo															
				3 - Constriction of Shipping Routes	Yes			Loss of life															
				4 - Equipment or Mechanical Failure	Yes			Large vessel / Tanker / Dangerous Goods															
				5 - Human Error	Yes																		
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality															
				7 - Loss of UKC	No	Property	Minor damage-Costs £10k –£100k	Major damage -Costs £1M - £10M															
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Negligible-Very Small Spill	Major-Tier 3															
				9 - Pilot Transfer Issues	Yes	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															
				10 -																			
8	Contact	Class 3 or 4 Vessels	Class 3 or 4 Vessel comes into contact with a WTG or other structure	1 - Adverse Environmental Conditions	Yes	Narrative	Glancing Blow	Fire / Sinking / Foundering	2	2	1	3	41	27	31	4	4	4	4	451	301	346	With the TEOW constructed and no additional risk controls in place the inherent likelihood return rate was increased by 33% which is the same increase in likelihood as applied to Haz # 2: Collision Class 3 or 4 vessels. IP Review: Consequence scores for ML Stakeholder Category increased based on PLA / ESL / DPWLG request.
				2 - Avoiding Other traffic	Yes			Loss Cargo															
				3 - Constriction of Shipping Routes	Yes			Loss of life															
				4 - Equipment or Mechanical Failure	Yes			Large vessel / Tanker / Dangerous Goods															
				5 - Human Error	Yes																		
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality															
				7 - Loss of UKC	No	Property	Minor damage-Costs £10k –£100k	Major damage -Costs £1M - £10M															
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Negligible-Very Small Spill	Major-Tier 3															
				9 - Pilot Transfer Issues	Yes	Stakeholders	Negligible-No significant effects	Major-National adverse media publicity and/or medium-term loss of revenue															
				10 -																			
9	Contact	Vessel less than 90m	Commercial Vessel less than 90m comes into contact with a WTG or other structure	1 - Adverse Environmental Conditions	Yes	Narrative	Slow Speed contact	High speed contact	2	2	1	2	45	30	35	4	4	4	4	900	600	690	With the TEOW constructed and no additional risk controls in place the inherent likelihood return rate was increased by 33% which is the same increase in likelihood as applied to Haz # 3: Collision less than 90m length.
				2 - Avoiding Other traffic	Yes		Glancing blow	Significant damage															
				3 - Constriction of Shipping Routes	Yes		Minimal damage																
				4 - Equipment or Mechanical Failure	Yes																		
				5 - Human Error	Yes																		
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality															
				7 - Loss of UKC	No	Property	Minor damage-Costs £10k –£100k	Major damage -Costs £1M - £10M															
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Negligible-Very Small Spill	Major-Tier 3															
				9 - Pilot Transfer Issues	No	Stakeholders	Negligible-No significant effects	Major-National adverse media publicity and/or medium-term loss of revenue															
				10 -																			
10	Contact	WSV	WSV comes into contact with a WTG or other structure whilst navigating	1 - Adverse Environmental Conditions	Yes	Narrative	Slow Speed contact	High speed contact	2	2	1	2	50	40	42	4	4	2	4	1000	800	850	With the TEOW constructed and no additional risk controls in place the inherent likelihood return rate was increased by 20%.
				2 - Avoiding Other traffic	Yes		Glancing blow	Significant damage															
				3 - Constriction of Shipping Routes	Yes		Minimal damage																
				4 - Equipment or Mechanical Failure	Yes																		
				5 - Human Error	Yes																		
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality															
				7 - Loss of UKC	No	Property	Minor damage-Costs £10k –£100k	Major damage -Costs £1M - £10M															
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Negligible-Very Small Spill	Minor-Tier 1															
				9 - Pilot Transfer Issues	No	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															
				10 -																			
11	Contact	Fishing or Recreational	Narrative	1 - Adverse Environmental Conditions	Yes	Narrative	Slow Speed contact	High speed contact	2	2	1	2	20	16	17	4	3	2	3	500	400	420	With the TEOW constructed and no additional risk controls in place the inherent likelihood return rate was increased by 20%. IP Review: Consequence scores for ML Stakeholder Category was not increased based on PLA / ESL request as fishing vessel contact with turbines has "anecdotally occurred", but no detailed reports are available and therefore consequences to Stakeholders must necessarily have been minimal.
				2 - Avoiding Other traffic	Yes		Glancing blow	Significant damage															
				3 - Constriction of Shipping Routes	Yes		Minimal damage																
				4 - Equipment or Mechanical Failure	Yes																		
				5 - Human Error	Yes																		
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality															
				7 - Loss of UKC	No	Property	Minor damage-Costs £10k –£100k	Major damage -Costs £1M - £10M															
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Negligible-Very Small Spill	Minor-Tier 1															
				9 - Pilot Transfer Issues	No	Stakeholders	Negligible-No significant effects	Major-National adverse media publicity and/or medium-term loss of revenue															
				10 -																			
12	Contact	Pilot Launch	Pilot Launch comes into contact with a WTG or other structure	1 - Adverse Environmental Conditions	Yes	Narrative	Slow Speed contact	High speed contact	2	2	1	2	50	40	42	4	3	2	3	1000	800	841	With the TEOW constructed and no additional risk controls in place the inherent likelihood return rate was increased by 20%. IP Review: Consequence scores for ML Stakeholder Category was not increased based on PLA / ESL request as pilot launch vessel contact with turbines would no t likely reach "Bad widespread publicity and/or short-term loss of revenue" as standby pilot vessels area available if a vessel need minor repair work.
				2 - Avoiding Other traffic	Yes		Glancing blow	Significant damage															
				3 - Constriction of Shipping Routes	Yes		Minimal damage																
				4 - Equipment or Mechanical Failure	Yes																		
				5 - Human Error	Yes																		
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality															
				7 - Loss of UKC	No	Property	Minor damage-Costs £10k –£100k	Major damage -Costs £1M - £10M															
				8 - Low Manoeuvrability of Vessels	No	Environment	Negligible-Very Small Spill	Minor-Tier 1															
				9 - Pilot Transfer Issues	Yes	Stakeholders	Negligible-No significant effects	Major-National adverse media publicity and/or medium-term loss of revenue															
				10 -																			

Hazard ID	Category	Vessel Type	Hazard Detail	Possible Causes	Y/N	Consequences			Most Likely Hazard Occurrence							Worst Credible Hazard Occurrence								Notes
									Consequence				Likelihood 1 in x yrs			Consequence				Likelihood 1 in x yrs				
						Type	Most Likely Outcome	Worst Credible Outcome	People	Property	Environment	Stakeholders	Baseline Risk	Inherent Risk	Residual Risk	People	Property	Environment	Stakeholders	Baseline Risk	Inherent Risk	Residual Risk		
13	Grounding	Class 1 or 2 Vessels	Displacement or constriction of shipping routes and the loss of depth along cable route results in a Class 1 or 2 vessel running aground.	1 - Adverse Environmental Conditions	Yes	Narrative	Slow Speed grounding	Vessel unable to re-float on same tide / assistance required	2	2	2	2	72	48	57	3	4	4	5	900	600	710	With the TEOW constructed and no additional risk controls in place the inherent likelihood return rate was increased by 33.33%. IP Review: Consequence scores for ML Environment Category increased by one level based on PLA / ESL review. Consequence scores for WC Environment scores was increased by 1 level based on PLA / ESL review (noting that PLA / ESL view requested it be increased by 2 levels - however due to the sea bed type in the vicinity of North East Spit (most likely area for grounding) the WC environmental consequences are not anticipated to be catastrophic).
				2 - Avoiding Other traffic	Yes		Re-float on the same tide	Fire / Sinking / Foundering																
				3 - Constriction of Shipping Routes	Yes			Loss Cargo																
				4 - Equipment or Mechanical Failure	Yes			Loss of life																
				5 - Human Error	Yes			Large vessel / Tanker / Dangerous Goods																
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality																
				7 - Loss of UKC	Yes	Property	Minor damage-Costs £10k –£100k	Catastrophic damage-Costs >£10M																
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Minor-Tier 1	Catastrophic-Tier 3+																
				9 - Pilot Transfer Issues	Yes	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																
				10 -																				
14	Grounding	Class 3 or 4 Vessels	Displacement or constriction of shipping routes and the loss of depth along cable route results in a Class 3 or 4 vessel running aground.	1 - Adverse Environmental Conditions	Yes	Narrative	Slow speed grounding	Higher speed Grounding	2	2	2	2	54	41	45	3	4	4	5	720	540	606	With the TEOW constructed and no additional risk controls in place the inherent likelihood return rate was increased by 25%. IP Review: Consequence scores for ML Environment a Category increased by one level based on PLA / ESL review. Consequence scores for WC Environment scores was increased by 1 level based on PLA / ESL review.
				2 - Avoiding Other traffic	Yes		Vessel touches bottom	Vessel firmly aground																
				3 - Constriction of Shipping Routes	Yes		Vessel re-floats on same tide	Vessel is not re-floated on same tide																
				4 - Equipment or Mechanical Failure	Yes																			
				5 - Human Error	Yes																			
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality																
				7 - Loss of UKC	Yes	Property	Minor damage-Costs £10k –£100k	Catastrophic damage-Costs >£10M																
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Minor-Tier 1	Catastrophic-Tier 3+																
				9 - Pilot Transfer Issues	Yes	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																
				10 -																				
15	Grounding	Vessel less than 90m	Displacement or constriction of shipping routes and the loss of depth along cable route results in a vessel less than 90m running aground.	1 - Adverse Environmental Conditions	Yes	Narrative	Slow speed grounding	Higher speed Grounding	2	2	2	2	54	43	47	3	4	3	4	450	360	393	With the TEOW constructed and no additional risk controls in place the inherent likelihood return rate was increased by 20%. IP Review: Consequence scores for ML Environment Category increased by one level based on PLA / ESL review.
				2 - Avoiding Other traffic	Yes		Vessel touches bottom	Vessel firmly aground																
				3 - Constriction of Shipping Routes	Yes		Vessel re-floats on same tide	Vessel is not re-floated on same tide																
				4 - Equipment or Mechanical Failure	Yes																			
				5 - Human Error	Yes																			
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality																
				7 - Loss of UKC	Yes	Property	Minor damage-Costs £10k –£100k	Catastrophic damage-Costs >£10M																
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Minor-Tier 1	Catastrophic-Tier 3+																
				9 - Pilot Transfer Issues	No	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																
				10 -																				
16	Grounding	Fishing or Recreational	Displacement or constriction of shipping routes and the loss of depth along cable route results in a Fishing vessel or recreational vessel running aground.	1 - Adverse Environmental Conditions	Yes	Narrative	Slow speed grounding	Higher speed Grounding	2	1	1	2	25	23	24	4	3	2	3	1250	1125	1180	With the TEOW constructed and no additional risk controls in place the inherent likelihood return rate was increased by 10%.
				2 - Avoiding Other traffic	Yes		Vessel touches bottom	Vessel firmly aground																
				3 - Constriction of Shipping Routes	Yes		Vessel re-floats on same tide	Vessel is not re-floated on same tide																
				4 - Equipment or Mechanical Failure	Yes																			
				5 - Human Error	Yes																			
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality																
				7 - Loss of UKC	No	Property	Negligible-Costs <£10k	Moderate damage-Costs £100k -£1M																
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Negligible-Very Small Spill	Minor-Tier 1																
				9 - Pilot Transfer Issues	No	Stakeholders	Minor-Bad local publicity and/or possible short-term loss of revenue	Moderate-Bad widespread publicity and/or short-term loss of revenue																
				10 -																				
17	Grounding	WSV	Displacement or constriction of shipping routes and the loss of depth along cable route results in a WSV vessel running aground.	1 - Adverse Environmental Conditions	Yes	Narrative	Slow speed grounding	Higher speed Grounding	2	2	1	2	25	23	24	4	3	2	4	1250	1125	1180	With the TEOW constructed and no additional risk controls in place the inherent likelihood return rate was increased by 10%.
				2 - Avoiding Other traffic	Yes		Vessel touches bottom	Vessel firmly aground																
				3 - Constriction of Shipping Routes	Yes		Vessel re-floats on same tide	Vessel is not re-floated on same tide																
				4 - Equipment or Mechanical Failure	Yes																			
				5 - Human Error	Yes																			
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality																
				7 - Loss of UKC	No	Property	Minor damage-Costs £10k –£100k	Moderate damage-Costs £100k -£1M																
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Negligible-Very Small Spill	Minor-Tier 1																
				9 - Pilot Transfer Issues	No	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																
				10 -																				
18	Grounding	Pilot Launch	Displacement or constriction of shipping routes and the loss of depth along cable route results in a Pilot Launch running aground.	1 - Adverse Environmental Conditions	Yes	Narrative	Slow speed grounding	Higher speed Grounding	2	2	1	2	40	36	38	4	3	2	4	2000	1800	1889	With the TEOW constructed and no additional risk controls in place the inherent likelihood return rate was increased by 10%.
				2 - Avoiding Other traffic	Yes		Vessel touches bottom	Vessel firmly aground																
				3 - Constriction of Shipping Routes	Yes		Vessel re-floats on same tide	Vessel is not re-floated on same tide																
				4 - Equipment or Mechanical Failure	Yes																			
				5 - Human Error	Yes																			
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality																
				7 - Loss of UKC	No	Property	Minor damage-Costs £10k –£100k	Moderate damage-Costs £100k -£1M																
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Negligible-Very Small Spill	Minor-Tier 1																
				9 - Pilot Transfer Issues	No	Stakeholders	Minor-Bad local publicity and/or possible short-term loss of revenue	Moderate-Bad widespread publicity and/or short-term loss of revenue																
				10 -																				

Hazard ID	Category	Vessel Type	Hazard Detail	Possible Causes	Y/N	Consequences			Baseline Risk								Inherent Risk								Residual Risk								Baseline Risk	Inherent Risk	Residual Risk	Additional Risk Controls	Risk Control Effectiveness at Reducing Likelihood	Risk Control Effectiveness at Reducing Likelihood
									Most Likely Risk				Worst Credible Risk				Most Likely Risk				Worst Credible Risk				Most Likely Risk				Worst Credible Risk									
						Type	Most Likely Outcome	Worst Credible Outcome	People	Property	Env'onment	Stakeholders	People	Property	Env'onment	Stakeholders	People	Property	Env'onment	Stakeholders	People	Property	Env'onment	Stakeholders	People	Property	Env'onment	Stakeholders	People	Property	Env'onment	Stakeholders						
1	Collision	Class 1 or 2 vessels	Collision Class 1 or 2 vessel with another navigating vessel	1 - Adverse Environmental Conditions	Yes	Narrative	Glancing Blow	Fire / Sinking / Foundering	2.81	2.81	2.81	2.81	5.19	6.26	6.26	6.26	3.15	3.15	3.15	3.15	5.51	6.59	6.59	6.59	2.99	2.99	2.99	2.99	5.36	6.44	6.44	6.44	4.47	4.80	4.65	1. Enhanced Promulgation of Information (already adopted by the Applicant)	Low	15%
				2 - Avoiding Other traffic	Yes			Loss Cargo																												2. Shipping and Navigation Liaison Group (already adopted by the Applicant)	Medium	30%
				3 - Constriction of Shipping Routes	Yes			Loss of life																												3. Post Consent Monitoring for Operational Phase (requested by Trinity House)	Low	15%
				4 - Equipment or Mechanical Failure	Yes			Large vessel / Tanker / Dangerous Goods																												4. Enhanced Optimisation of TEOW line of orientation and symmetry (already adopted by Applicant)	Low	15%
				5 - Human Error	Yes																														5. Aids to Navigation / Buoyage (already adopted by the Applicant)	Low	15%
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality																														
				7 - Loss of UKC	No	Property	Minor damage-Costs £10k –£100k	Catastrophic damage-Costs >£10M																														
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Negligible-Very Small Spill	Catastrophic-Tier 3+																														
				9 - Pilot Transfer Issues	Yes	Stakeholders	Negligible-No significant effects	Major-National adverse media publicity and/or medium-term loss of revenue																														
				10 -																																
2	Collision	Class 3 or 4 Vessels	Collision Class 3 or 4 vessel with another navigating vessel	1 - Adverse Environmental Conditions	Yes	Narrative	Glancing Blow	Fire / Sinking / Foundering	2.94	2.94	2.94	2.94	5.28	6.37	6.37	5.28	3.15	3.15	3.15	3.15	5.47	6.55	6.55	5.47	3.06	3.06	3.06	3.06	5.39	6.48	6.48	5.39	4.52	4.72	4.63	1. Enhanced Promulgation of Information (already adopted by the Applicant)	Low	15%
				2 - Avoiding Other traffic	Yes			Loss Cargo																												2. Shipping and Navigation Liaison Group (already adopted by the Applicant)	Medium	30%
				3 - Constriction of Shipping Routes	Yes			Loss of life																												3. Post Consent Monitoring for Operational Phase (requested by Trinity House)	Low	15%
				4 - Equipment or Mechanical Failure	Yes			Vessel / Tanker / Dangerous Goods																												4. Enhanced Optimisation of TEOW line of orientation and symmetry (already adopted by Applicant)	Low	15%
				5 - Human Error	Yes																														5. Aids to Navigation / Buoyage (already adopted by the Applicant)	Low	15%
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality																														
				7 - Loss of UKC	No	Property	Minor damage-Costs £10k –£100k	Catastrophic damage-Costs >£10M																														
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Negligible-Very Small Spill	Catastrophic-Tier 3+																														
				9 - Pilot Transfer Issues	Yes	Stakeholders	Negligible-No significant effects	Major-National adverse media publicity and/or medium-term loss of revenue																														
				10 -																																
3	Collision	Vessel less than 90m	Collision vessel less than 90m with another navigating vessel	1 - Adverse Environmental Conditions	Yes	Narrative	Glancing Blow	Fire / Sinking / Foundering	2.94	2.94	0.00	0.00	5.24	6.32	5.24	5.24	3.15	3.15	0.00	0.00	5.42	6.50	5.42	5.42	3.06	3.06	3.06	0.00	0.00	5.34	6.43	5.34	4.06	4.23	4.16	1. Enhanced Promulgation of Information (already adopted by the Applicant)	Low	15%
				2 - Avoiding Other traffic	Yes		Vessels do not need to slow for Pilot Transfer	Loss Cargo																												2. Shipping and Navigation Liaison Group (already adopted by the Applicant)	Medium	30%
				3 - Constriction of Shipping Routes	Yes			Loss of life																												3. Post Consent Monitoring for Operational Phase (requested by Trinity House)	Low	15%
				4 - Equipment or Mechanical Failure	Yes			Cargo / Bunker Barge																												4. Enhanced Optimisation of TEOW line of orientation and symmetry (already adopted by Applicant)	Low	15%
				5 - Human Error	Yes																														5. Aids to Navigation / Buoyage (already adopted by the Applicant)	Low	15%
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality																														
				7 - Loss of UKC	No	Property	Minor damage-Costs £10k –£100k	Catastrophic damage-Costs >£10M																														
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Negligible-Very Small Spill	Major-Tier 3																														
				9 - Pilot Transfer Issues	No	Stakeholders	Negligible-No significant effects	Major-National adverse media publicity and/or medium-term loss of revenue																														
				10 -																																
4	Collision	Fishing or Recreational	Collision Fishing Vessel or recreational craft with another navigating vessel	1 - Adverse Environmental Conditions	Yes	Narrative	Small vessels colliding	Collides with larger vessel (WSV, Cargo, etc.)	3.50	3.50	0.00	3.50	6.22	3.74	1.99	5.14	3.65	3.65	0.00	3.65	6.32	3.82	2.04	5.24	3.59	3.59	0.00	3.59	6.28	3.79	2.02	5.20	4.15	4.26	4.22	1. Enhanced Promulgation of Information (already adopted by the Applicant)	Medium	30%
				2 - Avoiding Other traffic	Yes		Glancing Blow / Loss of gear	Crossing / Head on Collision																												2. Shipping and Navigation Liaison Group (already adopted by the Applicant)	Medium	30%
				3 - Constriction of Shipping Routes	Yes		Lighting of WTG - displace fishing vessels	Sinking / Foundering / Capsize																												3. Post Consent Monitoring for Operational Phase (requested by Trinity House)	Low	15%
				4 - Equipment or Mechanical Failure	Yes		Mostly - potting / netting (less likely trawling) (LOA 8-10m)																														4. Enhanced Optimisation of TEOW line of orientation and symmetry (already adopted by Applicant)	Low	15%
				5 - Human Error	Yes		Wake / Wash Impacts	* assumes lights as per Kentish Flats																												5. Aids to Navigation / Buoyage (already adopted by the Applicant)	N/A	0%
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Catastrophic-Multiple fatalities																														
				7 - Loss of UKC	No	Property	Minor damage-Costs £10k –£100k	Moderate damage-Costs £100k -£1M																														
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Negligible-Very Small Spill	Minor-Tier 1																														
				9 - Pilot Transfer Issues	No	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																														
				10 -																																
5	Collision	WSV	Collision of WSV working or transiting to from Thanet or other OWF in area with another vessel	1 - Adverse Environmental Conditions	Yes	Narrative	Collides with small vessel at low speed	Collides at speed with other vessel	2.68	2.68	0.00	2.68	5.92	4.85	1.85	4.85	2.77	2.77	0.00	2.77	6.02	4.94	1.89	4.94	2.73	2.73	0.00	2.73	5.98	4.91	1.87	4.91	3.74	3.83	3.79	1. Enhanced Promulgation of Information (already adopted by the Applicant)	Medium	30%
				2 - Avoiding Other traffic	Yes		Glancing blow	Crossing / Head on Collision																												2. Shipping and Navigation Liaison Group (already adopted by the Applicant)	Medium	30%
				3 - Constriction of Shipping Routes	Yes			Sinking / Foundering / Capsize																												3. Post Consent Monitoring for Operational Phase (requested by Trinity House)	Low	15%
				4 - Equipment or Mechanical Failure	Yes																														4. Enhanced Optimisation of TEOW line of orientation and symmetry (already adopted by Applicant)	Low	15%
				5 - Human Error	Yes																														5. Aids to Navigation / Buoyage (already adopted by the Applicant)	N/A	0%
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Catastrophic-Multiple fatalities																														
				7 - Loss of UKC	No	Property	Minor damage-Costs £10k –£100k	Major damage -Costs £1M - £10M																														
				8 - Low Manoeuvrability of Vessels	No	Environment	Negligible-Very Small Spill	Minor-Tier 1																														
				9 - Pilot Transfer Issues	No	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																														
				10 -	No																																
6	Collision	Pilot Launch	Collision Pilot Launch with another navigating vessel	1 - Adverse Environmental Conditions		Narrative	Slow Speed collision	High speed collision	2.68	2.68	0.00	2.68	4.85	4.85	1.85	4.85	2.77	2.77	0.00	2.77	4.94	4.94	1.89	4.94	2.72	2.72	0.00	2.72	4.89	4.89	1.87	4.89	3.41	3.49	3.45	1. Enhanced Promulgation of Information (already adopted by the Applicant)	Low	15%
				2 - Avoiding Other traffic			Glancing Blow	Crossing / Head on Collision																												2. Shipping and Navigation Liaison Group (already adopted by the Applicant)	Low	15%
				3 - Constriction of Shipping Routes			Minimal damage	Significant damage																												3. Post Consent Monitoring for Operational Phase (requested by Trinity House)	Low	15%
				4 - Equipment or Mechanical Failure																																4. Enhanced Optimisation of TEOW line of orientation and symmetry (already adopted by Applicant)	Low	15%
				5 - Human Error																																5. Aids to Navigation / Buoyage (already adopted by the Applicant)	N/A	0%
				6 - Increased Traffic Density		People	Minor-Single minor injury	Major-Multiple major injuries or single fatality																														
				7 - Loss of UKC		Property	Minor damage-Costs £10k –£100k	Major damage -Costs £1M - £10M																														
				8 - Low Manoeuvrability of Vessels		Environment	Negligible-Very Small Spill	Minor-Tier 1																														
				9 - Pilot Transfer Issues		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																														
				10 -																																
7	Contact	Class 1 or 2 Vessels	Class 1 or 2 Vessel comes into contact with a WTG or other structure	1 - Adverse Environmental Conditions	Yes	Narrative	Glancing Blow	Fire / Sinking / Foundering	2.72	2.72	0.00	4.87	5.15	5.15	5.15	5.15	3.03	3.03	0.00	5.31	5.47	5.47	5.47	5.47	2.89	2.89	0.00	5.11	5.33	5.33	5.33	5.33	4.44	4.77	4.62	1. Enhanced Promulgation of Information (already adopted by the Applicant)	N/A	0%
				2 - Avoiding Other traffic	Yes			Loss Cargo																												2. Shipping and Navigation Liaison Group (already adopted by the Applicant)	Medium	30%
				3 - Constriction of Shipping Routes	Yes			Loss of life																												3. Post Consent Monitoring for Operational Phase (requested by Trinity House)	Low	15%
				4 - Equipment or Mechanical Failure	Yes			Large vessel / Tanker / Dangerous Goods																												4. Enhanced Optimisation of TEOW line of orientation and symmetry (already adopted by Applicant)	Low	15%
				5 - Human Error	Yes																														5. Aids to Navigation / Buoyage (already adopted by the Applicant)	Medium	30%
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality																														
				7 - Loss of UKC	No	Property	Minor damage-Costs £10k –£100k	Major damage -Costs £1M - £10M																														
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Negligible-Very Small Spill	Major-Tier 3																														
				9 - Pilot Transfer Issues	Yes	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																														
				10 -																																
8	Contact	Class 3 or 4 Vessels	Class 3 or 4 Vessel comes into contact with a WTG or other structure	1 - Adverse Environmental Conditions	Yes	Narrative	Glancing Blow	Fire / Sinking / Foundering	2.76	2.76	0.00	4.93	5.18	5.18	5.18	5.18	2.94	2.94	0.00	5.18	5.37	5.37	5.37	5.37	2.87	2.87	0.00	5.09	5.30	5.30	5.30	5.30	4.48	4.67	4.60	1. Enhanced Promulgation of Information (already adopted by the Applicant)	Low	15%
				2 - Avoiding Other traffic	Yes			Loss Cargo																												2. Shipping and Navigation Liaison Group (already adopted by the Applicant)	Medium	30%
				3 - Constriction of Shipping Routes	Yes			Loss of life																												3. Post Consent Monitoring for Operational Phase (requested by Trinity House)	Low	15%
				4 - Equipment or Mechanical Failure	Yes			Large vessel / Tanker / Dangerous Goods																												4. Enhanced Optimisation of TEOW line of orientation and symmetry (already adopted by Applicant)	Low	15%
				5 - Human Error	Yes																														5. Aids to Navigation / Buoyage (already adopted by the Applicant)	Medium	30%
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality																														
				7 - Loss of UKC	No	Property	Minor damage-Costs £10k –£100k	Major damage -Costs £1M - £10M																														
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Negligible-Very Small Spill	Major-Tier 3																														
				9 - Pilot Transfer Issues	Yes	Stakeholders	Negligible-No significant effects	Major-National adverse media publicity and/or medium-term loss of revenue																														
				10 -																																

Hazard ID	Category	Vessel Type	Hazard Detail	Possible Causes	Y/N	Consequences			Baseline Risk								Inherent Risk								Residual Risk								Baseline Risk	Inherent Risk	Residual Risk	Additional Risk Controls	Risk Control Effectiveness at Reducing Likelihood	Risk Control Effectiveness at Reducing Likelihood
									Most Likely Risk				Worst Credible Risk				Most Likely Risk				Worst Credible Risk				Most Likely Risk				Worst Credible Risk									
						Type	Most Likely Outcome	Worst Credible Outcome	People	Property	Environment	Stakeholders	People	Property	Environment	Stakeholders	People	Property	Environment	Stakeholders	People	Property	Environment	Stakeholders	People	Property	Environment	Stakeholders	People	Property	Environment	Stakeholders						
9	Contact	Vessel less than 90m	Commercial Vessel less than 90m comes into contact with a WTG or other structure	1 - Adverse Environmental Conditions	Yes	Narrative	Slow Speed contact	High speed contact	2.72	2.72	0.00	2.72	4.89	4.89	4.89	4.89	2.89	2.89	0.00	2.89	5.06	5.06	5.06	5.06	2.83	2.83	0.00	2.83	5.00	5.00	5.00	5.00	3.64	3.80	3.74	1. Enhanced Promulgation of Information (already adopted by the Applicant)	Low	15%
				2 - Avoiding Other traffic	Yes		Glancing blow	Significant damage																												2. Shipping and Navigation Liaison Group (already adopted by the Applicant)	Medium	30%
				3 - Constriction of Shipping Routes	Yes		Minimal damage																													3. Post Consent Monitoring for Operational Phase (requested by Trinity House)	Low	15%
				4 - Equipment or Mechanical Failure	Yes																															4. Enhanced Optimisation of TEOW line of orientation and symmetry (already adopted by Applicant)	Low	15%
				5 - Human Error	Yes																															5. Aids to Navigation / Buoyage (already adopted by the Applicant)	Medium	30%
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality																														
				7 - Loss of UKC	No	Property	Minor damage-Costs £10k –£100k	Major damage -Costs £1M - £10M																														
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Negligible-Very Small Spill	Major-Tier 3																														
				9 - Pilot Transfer Issues	No	Stakeholders	Negligible-No significant effects	Major-National adverse media publicity and/or medium-term loss of revenue																														
				10																																		
10	Contact	WSV	WSV comes into contact with a WTG or other structure whilst navigating	1 - Adverse Environmental Conditions	Yes	Narrative	Slow Speed contact	High speed contact	2.68	2.68	0.00	2.68	4.85	4.85	1.85	4.85	2.77	2.77	0.00	2.77	4.94	4.94	1.89	4.94	2.74	2.74	0.00	2.74	4.92	4.92	1.88	4.92	3.41	3.49	3.47	1. Enhanced Promulgation of Information (already adopted by the Applicant)	Low	15%
				2 - Avoiding Other traffic	Yes		Glancing blow	Significant damage																												2. Shipping and Navigation Liaison Group (already adopted by the Applicant)	Medium	30%
				3 - Constriction of Shipping Routes	Yes		Minimal damage																													3. Post Consent Monitoring for Operational Phase (requested by Trinity House)	Low	15%
				4 - Equipment or Mechanical Failure	Yes																															4. Enhanced Optimisation of TEOW line of orientation and symmetry (already adopted by Applicant)	Medium	30%
				5 - Human Error	Yes																															5. Aids to Navigation / Buoyage (already adopted by the Applicant)	Medium	30%
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality																														
				7 - Loss of UKC	No	Property	Minor damage-Costs £10k –£100k	Major damage -Costs £1M - £10M																														
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Negligible-Very Small Spill	Minor-Tier 1																														
				9 - Pilot Transfer Issues	No	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																														
				10																																		
11	Contact	Fishing or Recreational	Narrative	1 - Adverse Environmental Conditions	Yes	Narrative	Slow Speed contact	High speed contact	3.09	3.09	0.00	3.09	5.14	3.74	1.99	3.74	3.21	3.21	0.00	3.21	5.24	3.82	2.04	3.82	3.18	3.18	0.00	3.18	5.22	3.80	2.03	3.80	3.55	3.65	3.63	1. Enhanced Promulgation of Information (already adopted by the Applicant)	Medium	30%
				2 - Avoiding Other traffic	Yes		Glancing blow	Significant damage																												2. Shipping and Navigation Liaison Group (already adopted by the Applicant)	Medium	30%
				3 - Constriction of Shipping Routes	Yes		Minimal damage																													3. Post Consent Monitoring for Operational Phase (requested by Trinity House)	Low	15%
				4 - Equipment or Mechanical Failure	Yes																															4. Enhanced Optimisation of TEOW line of orientation and symmetry (already adopted by Applicant)	Medium	30%
				5 - Human Error	Yes																															5. Aids to Navigation / Buoyage (already adopted by the Applicant)	Medium	30%
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality																														
				7 - Loss of UKC	No	Property	Minor damage-Costs £10k –£100k	Major damage -Costs £1M - £10M																														
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Negligible-Very Small Spill	Minor-Tier 1																														
				9 - Pilot Transfer Issues	No	Stakeholders	Negligible-No significant effects	Major-National adverse media publicity and/or medium-term loss of revenue																														
				10																																		
12	Contact	Pilot Launch	Pilot Launch comes into contact with a WTG or other structure	1 - Adverse Environmental Conditions	Yes	Narrative	Slow Speed contact	High speed contact	2.68	2.68	0.00	2.68	4.85	3.50	1.85	3.50	2.77	2.77	0.00	2.77	4.94	3.57	1.89	3.57	2.75	2.75	0.00	2.75	4.92	3.55	1.88	3.55	3.24	3.32	3.30	1. Enhanced Promulgation of Information (already adopted by the Applicant)	Medium	30%
				2 - Avoiding Other traffic	Yes		Glancing blow	Significant damage																												2. Shipping and Navigation Liaison Group (already adopted by the Applicant)	Medium	30%
				3 - Constriction of Shipping Routes	Yes		Minimal damage																													3. Post Consent Monitoring for Operational Phase (requested by Trinity House)	Low	15%
				4 - Equipment or Mechanical Failure	Yes																															4. Enhanced Optimisation of TEOW line of orientation and symmetry (already adopted by Applicant)	Medium	30%
				5 - Human Error	Yes																															5. Aids to Navigation / Buoyage (already adopted by the Applicant)	Medium	30%
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality																														
				7 - Loss of UKC	No	Property	Minor damage-Costs £10k –£100k	Major damage -Costs £1M - £10M																														
				8 - Low Manoeuvrability of Vessels	No	Environment	Negligible-Very Small Spill	Minor-Tier 1																														
				9 - Pilot Transfer Issues	Yes	Stakeholders	Negligible-No significant effects	Major-National adverse media publicity and/or medium-term loss of revenue																														
				10																																		
13	Grounding	Class 1 or 2 Vessels	Displacement or constriction of shipping routes and the loss of depth along cable route results in a Class 1 or 2 vessel running aground.	1 - Adverse Environmental Conditions	Yes	Narrative	Slow Speed grounding	Vessel unable to re-float on same tide / assistance required	2.54	2.54	2.54	2.54	3.53	4.89	4.89	5.97	2.69	2.69	2.69	2.69	3.67	5.06	5.06	6.14	2.63	2.63	2.63	2.63	3.61	4.99	4.99	6.07	3.97	4.13	4.06	1. Enhanced Promulgation of Information (already adopted by the Applicant)	Low	15%
				2 - Avoiding Other traffic	Yes		Re-float on the same tide	Fire / Sinking / Foundering																												2. Shipping and Navigation Liaison Group (already adopted by the Applicant)	Low	15%
				3 - Constriction of Shipping Routes	Yes			Loss Cargo																												3. Post Consent Monitoring for Operational Phase (requested by Trinity House)	Low	15%
				4 - Equipment or Mechanical Failure	Yes			Loss of life																												4. Enhanced Optimisation of TEOW line of orientation and symmetry (already adopted by Applicant)	Low	15%
				5 - Human Error	Yes			Large vessel / Tanker / Dangerous Goods																												5. Aids to Navigation / Buoyage (already adopted by the Applicant)	Medium	30%
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality																														
				7 - Loss of UKC	Yes	Property	Minor damage-Costs £10k –£100k	Catastrophic damage-Costs >£10M																														
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Minor-Tier 1	Catastrophic-Tier 3+																														
				9 - Pilot Transfer Issues	Yes	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																														
				10																																		
14	Grounding	Class 3 or 4 Vessels	Displacement or constriction of shipping routes and the loss of depth along cable route results in a Class 3 or 4 vessel running aground.	1 - Adverse Environmental Conditions	Yes	Narrative	Slow speed grounding	Higher speed Grounding	2.65	2.65	2.65	2.65	3.61	4.99	4.99	6.06	2.76	2.76	2.76	2.76	3.71	5.11	5.11	6.18	2.71	2.71	2.71	2.71	3.67	5.06	5.06	6.13	4.07	4.18	4.14	1. Enhanced Promulgation of Information (already adopted by the Applicant)	Low	15%
				2 - Avoiding Other traffic	Yes		Vessel touches bottom	Vessel firmly aground																												2. Shipping and Navigation Liaison Group (already adopted by the Applicant)	Low	15%
				3 - Constriction of Shipping Routes	Yes		Vessel re-floats on same tide	Vessel is not re-floated on same tide																												3. Post Consent Monitoring for Operational Phase (requested by Trinity House)	Low	15%
				4 - Equipment or Mechanical Failure	Yes																															4. Enhanced Optimisation of TEOW line of orientation and symmetry (already adopted by Applicant)	Low	15%
				5 - Human Error	Yes																															5. Aids to Navigation / Buoyage (already adopted by the Applicant)	Medium	30%
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality																														
				7 - Loss of UKC	Yes	Property	Minor damage-Costs £10k –£100k	Catastrophic damage-Costs >£10M																														
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Minor-Tier 1	Catastrophic-Tier 3+																														
				9 - Pilot Transfer Issues	Yes	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																														
				10																																		
15	Grounding	Vessel less than 90m	Displacement or constriction of shipping routes and the loss of depth along cable route results in a vessel less than 90m running aground.	1 - Adverse Environmental Conditions	Yes	Narrative	Slow speed grounding	Higher speed Grounding	2.65	2.65	2.65	2.65	3.78	5.19	3.78	5.19	2.73	2.73	2.73	2.73	3.86	5.28	3.86	5.28	2.70	2.70	2.70	2.70	3.83	5.25	3.83	5.25	3.74	3.83	3.80	1. Enhanced Promulgation of Information (already adopted by the Applicant)	Low	15%
				2 - Avoiding Other traffic	Yes		Vessel touches bottom	Vessel firmly aground																												2. Shipping and Navigation Liaison Group (already adopted by the Applicant)	Low	15%
				3 - Constriction of Shipping Routes	Yes		Vessel re-floats on same tide	Vessel is not re-floated on same tide																												3. Post Consent Monitoring for Operational Phase (requested by Trinity House)	Low	15%
				4 - Equipment or Mechanical Failure	Yes																															4. Enhanced Optimisation of TEOW line of orientation and symmetry (already adopted by Applicant)	Low	15%
				5 - Human Error	Yes																															5. Aids to Navigation / Buoyage (already adopted by the Applicant)	Medium	30%
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality																														
				7 - Loss of UKC	Yes	Property	Minor damage-Costs £10k –£100k	Catastrophic damage-Costs >£10M																														
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Minor-Tier 1	Catastrophic-Tier 3+																														
				9 - Pilot Transfer Issues	No	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																														
				10																																		
16	Grounding	Fishing or Recreational	Displacement or constriction of shipping routes and the loss of depth along cable route results in a Fishing vessel or recreational vessel running aground.	1 - Adverse Environmental Conditions	Yes	Narrative	Slow speed grounding	Higher speed Grounding	2.98	0.00	0.00	2.98	4.77	3.42	1.81	3.42	3.03	0.00	0.00	3.03	4.81	3.46	1.83	3.46	3.01	0.00	0.00	3.01	4.79	3.44	1.82	3.44	3.15	3.19	3.17	1. Enhanced Promulgation of Information (already adopted by the Applicant)	Low	15%
				2 - Avoiding Other traffic	Yes		Vessel touches bottom	Vessel firmly aground																												2. Shipping and Navigation Liaison Group (already adopted by the Applicant)	Low	15%
				3 - Constriction of Shipping Routes	Yes		Vessel re-floats on same tide	Vessel is not re-floated on same tide																												3. Post Consent Monitoring for Operational Phase (requested by Trinity House)	Low	15%
				4 - Equipment or Mechanical Failure	Yes																															4. Enhanced Optimisation of TEOW line of orientation and symmetry (already adopted by Applicant)	Low	15%
				5 - Human Error	Yes																															5. Aids to Navigation / Buoyage (already adopted by the Applicant)	Low	15%
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality																														
				7 - Loss of UKC	No	Property	Negligible-Costs <£10k	Moderate damage-Costs £100k -£1M																														
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Negligible-Very Small Spill	Minor-Tier 1																														
				9 - Pilot Transfer Issues	No	Stakeholders	Minor-Bad local publicity and/or possible short-term loss of revenue	Moderate-Bad widespread publicity and/or short-term loss of revenue																														
				10																																		

Hazard ID	Category	Vessel Type	Hazard Detail	Possible Causes	Y/N	Consequences			Baseline Risk								Inherent Risk								Residual Risk								Baseline Risk	Inherent Risk	Residual Risk	Additional Risk Controls	Risk Control Effectiveness at Reducing Likelihood	Risk Control Effectiveness at Reducing Likelihood
									Most Likely Risk				Worst Credible Risk				Most Likely Risk				Worst Credible Risk				Most Likely Risk				Worst Credible Risk									
						Type	Most Likely Outcome	Worst Credible Outcome	People	Property	Env/comment	Stakeholders	People	Property	Env/comment	Stakeholders	People	Property	Env/comment	Stakeholders	People	Property	Env/comment	Stakeholders	People	Property	Env/comment	Stakeholders	People	Property	Env/comment	Stakeholders						
17	Grounding	WSV	Displacement or constriction of shipping routes and the loss of depth along cable route results in a WSV vessel running aground.	1 - Adverse Environmental Conditions	Yes	Narrative	Slow speed grounding	Higher speed Grounding	2.98	2.98	0.00	2.98	4.77	3.42	1.81	4.77	3.03	3.03	0.00	3.03	4.81	3.46	1.83	4.81	3.01	3.01	0.00	3.01	4.79	3.44	1.82	4.79	3.42	3.46	3.44	1. Enhanced Promulgation of Information (already adopted by the Applicant)	Low	15%
				2 - Avoiding Other traffic	Yes		Vessel touches bottom	Vessel firmly aground																												2. Shipping and Navigation Liaison Group (already adopted by the Applicant)	Low	15%
				3 - Constriction of Shipping Routes	Yes		Vessel re-floats on same tide	Vessel is not re-floated on same tide																												3. Post Consent Monitoring for Operational Phase (requested by Trinity House)	Low	15%
				4 - Equipment or Mechanical Failure	Yes																															4. Enhanced Optimisation of TEOW line of orientation and symmetry (already adopted by Applicant)	Low	15%
				5 - Human Error	Yes																															5. Aids to Navigation / Buoyage (already adopted by the Applicant)	Low	15%
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality																														
				7 - Loss of UKC	No	Property	Minor damage-Costs £10k –£100k	Moderate damage-Costs £100k -£1M																														
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Negligible-Very Small Spill	Minor-Tier 1																														
				9 - Pilot Transfer Issues	No	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																														
				10 -																																
18	Grounding	Pilot Launch	Displacement or constriction of shipping routes and the loss of depth along cable route results in a Pilot Launch running aground.	1 - Adverse Environmental Conditions	Yes	Narrative	Slow speed grounding	Higher speed Grounding	2.77	2.77	0.00	2.77	4.59	3.28	1.72	4.59	2.81	2.81	0.00	2.81	4.63	3.31	1.74	4.63	2.79	2.79	0.00	2.79	4.61	3.30	1.73	4.61	3.25	3.28	3.27	1. Enhanced Promulgation of Information (already adopted by the Applicant)	Low	15%
				2 - Avoiding Other traffic	Yes		Vessel touches bottom	Vessel firmly aground																												2. Shipping and Navigation Liaison Group (already adopted by the Applicant)	Low	15%
				3 - Constriction of Shipping Routes	Yes		Vessel re-floats on same tide	Vessel is not re-floated on same tide																												3. Post Consent Monitoring for Operational Phase (requested by Trinity House)	Low	15%
				4 - Equipment or Mechanical Failure	Yes																															4. Enhanced Optimisation of TEOW line of orientation and symmetry (already adopted by Applicant)	Low	15%
				5 - Human Error	Yes																															5. Aids to Navigation / Buoyage (already adopted by the Applicant)	Low	15%
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality																														
				7 - Loss of UKC	No	Property	Minor damage-Costs £10k –£100k	Moderate damage-Costs £100k -£1M																														
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Negligible-Very Small Spill	Minor-Tier 1																														
				9 - Pilot Transfer Issues	No	Stakeholders	Minor-Bad local publicity and/or possible short-term loss of revenue	Moderate-Bad widespread publicity and/or short-term loss of revenue																														
				10 -																																