

# **Vattenfall Wind Power Ltd**

## **Thanet Extension Offshore Wind Farm**

Annex F to Appendix 1 to Deadline 4B

Submission: Hazard Logs

Relevant Examination Deadline: 4B

Submitted by Vattenfall Wind Power Ltd

Date: April 2019

Revision A

Drafted By:	Marico Marine
Approved By:	Daniel Bates
Date of Approval:	April 2019
Revision:	A

Revision A	Original document submitted to the Examining Authority

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Hazard ID	Category	Vessel Type	Hazard Detail	Consequences			Most Likely Hazard Occurrence					Worst Credible Hazard Occurrence					Notes				
				Possible Causes	Type	Most Likely Outcome	Worst Credible Outcome	Consequence			Likelihood 1 in x yrs		Consequence			Likelihood 1 in x yrs					
								People	Property	Environment	Stakeholders	Baseline Risk	Inherent Risk	People	Property	Environment		Stakeholders	Baseline Risk	Inherent Risk	
1	Collision	Class 1 or 2 vessels	Collision Class 1 or 2 vessel with another navigating vessel	1 - Adverse Environmental Conditions	Narrative	Glancing Blow	Fire / Sinking / Foundering														
				2 - Avoiding Other traffic			Loss Cargo														
				3 - Constriction of Shipping Routes			Loss of life														
				4 - Equipment or Mechanical Failure			Large vessel / Tanker / Dangerous Goods														
				5 - Human Error																	
				6 - Increased Traffic Density	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality	2	2	1	1	36	18	4	5	5	4	450	225	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%.	
				7 - Loss of UKC	Property	Minor damage-Costs £10k –£100k	Catastrophic damage-Costs >£10M														
				8 - Low Manoeuvrability of Vessels	Environment	Negligible-Very Small Spill	Catastrophic-Tier 3+														
				9 - Pilot Transfer Issues	Stakeholders	Negligible-No significant effects	Major-National adverse media publicity and/or medium-term loss of revenue														
				10 -																	
1 - Adverse Environmental Conditions	Narrative	Glancing Blow	Fire / Sinking / Foundering																		
2 - Avoiding Other traffic			Loss Cargo																		
3 - Constriction of Shipping Routes			Loss of life																		
4 - Equipment or Mechanical Failure			Vessel / Tanker / Dangerous Goods																		
5 - Human Error																					
6 - Increased Traffic Density	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality	2	2	1	1	27	18	4	5	5	4	360	240	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%.					
7 - Loss of UKC	Property	Minor damage-Costs £10k –£100k	Catastrophic damage-Costs >£10M																		
8 - Low Manoeuvrability of Vessels	Environment	Negligible-Very Small Spill	Catastrophic-Tier 3+																		
9 - Pilot Transfer Issues	Stakeholders	Negligible-No significant effects	Major-National adverse media publicity and/or medium-term loss of revenue																		
10 -																					
1 - Adverse Environmental Conditions	Narrative	Glancing Blow	Fire / Sinking / Foundering																		
2 - Avoiding Other traffic		Vessel do not need to slow for Pilot Transfer	Loss Cargo																		
3 - Constriction of Shipping Routes			Loss of life																		
4 - Equipment or Mechanical Failure			Cargo / Bunker Barge																		
5 - Human Error																					
6 - Increased Traffic Density	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality	2	2	1	1	27	18	4	5	4	4	401	267	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%.					
7 - Loss of UKC	Property	Minor damage-Costs £10k –£100k	Catastrophic damage-Costs >£10M																		
8 - Low Manoeuvrability of Vessels	Environment	Negligible-Very Small Spill	Major-Tier 3																		
9 - Pilot Transfer Issues	Stakeholders	Negligible-No significant effects	Major-National adverse media publicity and/or medium-term loss of revenue																		
10 -																					
1 - Adverse Environmental Conditions	Narrative	Small vessels colliding	Collides with larger vessel (WSV, Cargo, etc.)																		
2 - Avoiding Other traffic		Glancing Blow / Loss of gear	Crossing / Head on Collision																		
3 - Constriction of Shipping Routes		Lighting of WTG - displace fishing vessels	Sinking / Foundering / Capsize																		
4 - Equipment or Mechanical Failure		Mostly - potting / netting (less likely trawling) (LOA 8-10m)																			
5 - Human Error		Wake / Wash Impacts	* assumes lights as per Kentish Flats																		
6 - Increased Traffic Density	People	Minor-Single minor injury	Catastrophic-Multiple fatalities	2	2	1	2	10	8	5	3	2	4	500	400	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%.					
7 - Loss of UKC	Property	Minor damage-Costs £10k –£100k	Moderate damage-Costs £100k –£1M																		
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 -																					
1 - Adverse Environmental Conditions	Narrative	Collides with small vessel at low speed	Collides at speed with other vessel																		
2 - Avoiding Other traffic		Glancing blow	Crossing / Head on Collision																		
3 - Constriction of Shipping Routes			Sinking / Foundering / Capsize																		
4 - Equipment or Mechanical Failure																					
5 - Human Error																					
6 - Increased Traffic Density	People	Minor-Single minor injury	Catastrophic-Multiple fatalities	2	2	1	2	50	40	5	4	2	4	1000	800	With the TEOW constructed and no additional risk controls in place the inherent likelihood return rate was increased by 20%.					
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 -																					
1 - Adverse Environmental Conditions	Narrative	Slow Speed collision	High speed collision																		
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	2	2	1	2	50	40	4	4	2	4	1000	800	With the TEOW constructed and no additional risk controls in place the inherent likelihood return rate was increased by 20%.					
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	Hazard Category	Vessel Type	Hazard Detail	Consequences			Most Likely Hazard Occurrence					Worst Credible Hazard Occurrence					Notes				
				Possible Causes	Type	Most Likely Outcome	Worst Credible Outcome	Consequence					Likelihood 1 in x yrs								
								People	Property	Environment	Stakeholders	Baseline Risk	Inherent Risk	People	Property	Environment		Stakeholders	Baseline Risk	Inherent 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	Narrative	Glancing Blow	Fire / Sinking / Foundering														
				2 - Avoiding Other traffic			Loss Cargo														
				3 - Constriction of Shipping Routes			Loss of life														
				4 - Equipment or Mechanical Failure			Large vessel / Tanker / Dangerous Goods														
				5 - Human Error																	
				6 - Increased Traffic Density	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality	2	2	1	2	50	25	4	4	4	4	540	270	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.	
				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	Major-Tier 3														
				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 -																	
1 - Adverse Environmental Conditions	Narrative	Glancing Blow	Fire / Sinking / Foundering																		
2 - Avoiding Other traffic			Loss Cargo																		
3 - Constriction of Shipping Routes			Loss of life																		
4 - Equipment or Mechanical Failure			Large vessel / Tanker / Dangerous Goods																		
5 - Human Error																					
6 - Increased Traffic Density	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality	2	2	1	2	40	27	4	4	4	4	501	334	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.					
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	Major-Tier 3																		
9 - Pilot Transfer Issues	Stakeholders	Negligible-No significant effects	Major-National adverse media publicity and/or medium-term loss of revenue																		
10 -																					
1 - Adverse Environmental Conditions	Narrative	Slow Speed contact	High speed contact																		
2 - Avoiding Other traffic		Glancing blow	Significant damage																		
3 - Constriction of Shipping Routes		Minimal 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	2	2	1	2	50	33	4	4	4	4	1000	667	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.					
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	Major-Tier 3																		
9 - Pilot Transfer Issues	Stakeholders	Negligible-No significant effects	Major-National adverse media publicity and/or medium-term loss of revenue																		
10 -																					
1 - Adverse Environmental Conditions	Narrative	Slow Speed contact	High speed contact																		
2 - Avoiding Other traffic		Glancing blow	Significant damage																		
3 - Constriction of Shipping Routes		Minimal 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	2	2	1	2	50	40	4	4	2	4	1000	800	With the TEOW constructed and no additional risk controls in place the inherent likelihood return rate was increased by 20%.					
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 -																					
1 - Adverse Environmental Conditions	Narrative	Slow Speed contact	High speed contact																		
2 - Avoiding Other traffic		Glancing blow	Significant damage																		
3 - Constriction of Shipping Routes		Minimal 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	2	2	1	1	20	16	4	3	2	3	500	400	With the TEOW constructed and no additional risk controls in place the inherent likelihood return rate was increased by 20%.					
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	Negligible-No significant effects	Major-National adverse media publicity and/or medium-term loss of revenue																		
10 -																					
1 - Adverse Environmental Conditions	Narrative	Slow Speed contact	High speed contact																		
2 - Avoiding Other traffic		Glancing blow	Significant damage																		
3 - Constriction of Shipping Routes		Minimal 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	2	2	1	1	50	40	4	3	2	3	1000	800	With the TEOW constructed and no additional risk controls in place the inherent likelihood return rate was increased by 20%.					
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	Negligible-No significant effects	Major-National adverse media publicity and/or medium-term loss of revenue																		
10 -																					

Hazard ID	Hazard Category	Vessel Type	Hazard Detail	Consequences			Most Likely Hazard Occurrence					Worst Credible Hazard Occurrence					Notes			
				Possible Causes	Type	Most Likely Outcome	Worst Credible Outcome	Consequence			Likelihood 1 in x yrs		Consequence			Likelihood 1 in x yrs				
								People	Property	Environment	Stakeholders	Baseline Risk	Inherent Risk	People	Property	Environment		Stakeholders	Baseline Risk	Inherent 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	Narrative	Slow Speed grounding	Vessel unable to re-float on same tide / assistance required	2	2	1	2	80	53	3	4	3	5	1000	667	With the TEOW constructed and no additional risk controls in place the inherent likelihood return rate was increased by 33.33%.
				2 - Avoiding Other traffic		Re-float on the same tide	Fire / Sinking / Foundering													
				3 - Constriction of Shipping Routes			Loss Cargo													
				4 - Equipment or Mechanical Failure			Loss of life													
				5 - Human Error			Large vessel / Tanker / Dangerous Goods													
				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	Catastrophic damage-Costs >£10M													
				8 - Low Manoeuvrability of Vessels	Environment	Minor-Tier 1	Catastrophic-Tier 3+													
				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 -																
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	Narrative	Slow speed grounding	Higher speed Grounding	2	2	1	2	60	45	3	4	3	5	800	600	With the TEOW constructed and no additional risk controls in place the inherent likelihood return rate was increased by 25%.
				2 - Avoiding Other traffic		Vessel touches bottom	Vessel firmly aground													
				3 - Constriction of Shipping Routes		Vessel re-floats on same tide	Vessel is not re-floated on same tide													
				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	Catastrophic damage-Costs >£10M													
				8 - Low Manoeuvrability of Vessels	Environment	Minor-Tier 1	Catastrophic-Tier 3+													
				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 -																
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	Narrative	Slow speed grounding	Higher speed Grounding	2	2	1	2	60	48	3	4	3	4	500	400	With the TEOW constructed and no additional risk controls in place the inherent likelihood return rate was increased by 20%.
				2 - Avoiding Other traffic		Vessel touches bottom	Vessel firmly aground													
				3 - Constriction of Shipping Routes		Vessel re-floats on same tide	Vessel is not re-floated on same tide													
				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	Catastrophic damage-Costs >£10M													
				8 - Low Manoeuvrability of Vessels	Environment	Minor-Tier 1	Catastrophic-Tier 3+													
				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 -																
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	Narrative	Slow speed grounding	Higher speed Grounding	2	1	1	2	25	23	4	3	2	3	1250	1125	With the TEOW constructed and no additional risk controls in place the inherent likelihood return rate was increased by 10%.
				2 - Avoiding Other traffic		Vessel touches bottom	Vessel firmly aground													
				3 - Constriction of Shipping Routes		Vessel re-floats on same tide	Vessel is not re-floated on same tide													
				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	Negligible-Costs <£10k	Moderate damage-Costs £100k –£1M													
				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	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	Narrative	Slow speed grounding	Higher speed Grounding	2	2	1	2	25	23	4	3	2	4	1250	1125	With the TEOW constructed and no additional risk controls in place the inherent likelihood return rate was increased by 10%.
				2 - Avoiding Other traffic		Vessel touches bottom	Vessel firmly aground													
				3 - Constriction of Shipping Routes		Vessel re-floats on same tide	Vessel is not re-floated on same tide													
				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	Moderate damage-Costs £100k –£1M													
				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 -																
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	Narrative	Slow speed grounding	Higher speed Grounding	2	2	1	2	40	36	4	3	2	4	2000	1800	With the TEOW constructed and no additional risk controls in place the inherent likelihood return rate was increased by 10%.
				2 - Avoiding Other traffic		Vessel touches bottom	Vessel firmly aground													
				3 - Constriction of Shipping Routes		Vessel re-floats on same tide	Vessel is not re-floated on same tide													
				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	Moderate damage-Costs £100k –£1M													
				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	Moderate-Bad widespread publicity and/or short-term loss of revenue													
				10 -																

Hazard ID	Category	Vessel Type	Hazard Detail	Consequences			Baseline Risk								Inherent Risk										
							Most Likely Risk				Worst Credible Risk				Most Likely Risk				Worst Credible Risk						
				Possible Causes	Type	Most Likely Outcome	Worst Credible Outcome	People	Property	Environment	Stakeholders	People	Property	Environment	Stakeholders	People	Property	Environment	Stakeholders	People	Property	Environment	Stakeholders	Baseline Risk	Inherent Risk
1	Collision	Class 1 or 2 vessels	Collision Class 1 or 2 vessel with another navigating vessel	1 - Adverse Environmental Conditions	Narrative	Glancing Blow	Fire / Sinking / Foundering	2.81	2.81	0.00	0.00	5.19	6.26	6.26	5.19	3.15	3.15	0.00	0.00	5.51	6.59	6.59	5.51	4.05	4.34
				2 - Avoiding Other traffic			Loss Cargo																		
				3 - Constriction of Shipping Routes			Loss of life																		
				4 - Equipment or Mechanical Failure			Large vessel / Tanker / Dangerous Goods																		
				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	Catastrophic damage-Costs >£10M																		
				8 - Low Manoeuvrability of Vessels	Environment	Negligible-Very Small Spill	Catastrophic-Tier 3+																		
				9 - Pilot Transfer Issues	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	Narrative	Glancing Blow	Fire / Sinking / Foundering	2.94	2.94	0.00	0.00	5.28	6.37	6.37	5.28	3.15	3.15	0.00	0.00	5.47	6.55	6.55	5.47	4.15	4.32
				2 - Avoiding Other traffic			Loss Cargo																		
				3 - Constriction of Shipping Routes			Loss of life																		
				4 - Equipment or Mechanical Failure			Vessel / Tanker / Dangerous Goods																		
				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	Catastrophic damage-Costs >£10M																		
				8 - Low Manoeuvrability of Vessels	Environment	Negligible-Very Small Spill	Catastrophic-Tier 3+																		
				9 - Pilot Transfer Issues	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	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	4.06	4.23
				2 - Avoiding Other traffic			Vessel do not need to slow for Pilot Transfer																		
				3 - Constriction of Shipping Routes			Loss of life																		
				4 - Equipment or Mechanical Failure			Cargo / Bunker Barge																		
				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	Catastrophic damage-Costs >£10M																		
				8 - Low Manoeuvrability of Vessels	Environment	Negligible-Very Small Spill	Major-Tier 3																		
				9 - Pilot Transfer Issues	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	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	4.15	4.26
				2 - Avoiding Other traffic			Glancing Blow / Loss of gear																		
				3 - Constriction of Shipping Routes			Lighting of WTG - displace fishing vessels																		
				4 - Equipment or Mechanical Failure			Mostly - potting / netting (less likely trawling) (LOA 8-10m)																		
				5 - Human Error			Wake / Wash Impacts																		
				6 - Increased Traffic Density	People	Minor-Single minor injury	Catastrophic-Multiple fatalities																		
				7 - Loss of UKC	Property	Minor damage-Costs £10k –£100k	Moderate damage-Costs £100k -£1M																		
				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 -																					
5	Collision	WSV	Collision of WSV working or transiting to from Thanet or other OWF in area with another vessel	1 - Adverse Environmental Conditions	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	3.74	3.83
				2 - Avoiding Other traffic			Glancing blow																		
				3 - Constriction of Shipping Routes			Sinking / Foundering / Capsize																		
				4 - Equipment or Mechanical Failure																					
				5 - Human Error																					
				6 - Increased Traffic Density	People	Minor-Single minor injury	Catastrophic-Multiple fatalities																		
				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	Consequences			Baseline Risk				Inherent Risk				Baseline Risk	Inherent Risk									
							Most Likely Risk		Worst Credible Risk		Most Likely Risk		Worst Credible Risk												
				Possible Causes	Type	Most Likely Outcome	Worst Credible Outcome	People	Property	Environment	Stakeholders	People	Property	Environment			Stakeholders	People	Property	Environment	Stakeholders				
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	3.41	3.49
				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 -																					
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	Narrative	Glancing Blow	Fire / Sinking / Foundering	2.68	2.68	0.00	2.68	5.11	5.11	5.11	5.11	2.98	2.98	0.00	2.98	5.42	5.42	5.42	5.42	3.72	4.01
				2 - Avoiding Other traffic			Loss Cargo																		
				3 - Constriction of Shipping Routes			Loss of life																		
				4 - Equipment or Mechanical Failure			Large vessel / Tanker / Dangerous Goods																		
				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	Major-Tier 3																		
				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 -																					
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	Narrative	Glancing Blow	Fire / Sinking / Foundering	-0.02	-0.02	0.00	-0.02	5.14	5.14	5.14	5.14	2.95	2.95	0.00	2.95	5.32	5.32	5.32	5.32	2.57	3.95
				2 - Avoiding Other traffic			Loss Cargo																		
				3 - Constriction of Shipping Routes			Loss of life																		
				4 - Equipment or Mechanical Failure			Large vessel / Tanker / Dangerous Goods																		
				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	Major-Tier 3																		
				9 - Pilot Transfer Issues	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	Narrative	Slow Speed contact	High speed contact	-0.02	-0.02	0.00	-0.02	4.85	4.85	4.85	4.85	2.85	2.85	0.00	2.85	5.02	5.02	5.02	5.02	2.42	3.75
				2 - Avoiding Other traffic		Glancing blow	Significant damage																		
				3 - Constriction of Shipping Routes		Minimal 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	Major-Tier 3																		
				9 - Pilot Transfer Issues	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	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	3.41	3.49
				2 - Avoiding Other traffic		Glancing blow	Significant damage																		
				3 - Constriction of Shipping Routes		Minimal 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	Consequences			Baseline Risk								Inherent Risk										
							Most Likely Risk				Worst Credible Risk				Most Likely Risk				Worst Credible Risk						
				Possible Causes	Type	Most Likely Outcome	Worst Credible Outcome	People	Property	Environment	Stakeholders	People	Property	Environment	Stakeholders	People	Property	Environment	Stakeholders	Baseline Risk	Inherent Risk				
11	Contact	Fishing or Recreational	Narrative	1 - Adverse Environmental Conditions	Narrative	Slow Speed contact	High speed contact	3.09	3.09	0.00	0.00	5.14	3.74	1.99	3.74	3.21	3.21	0.00	0.00	5.24	3.82	2.04	3.82	3.36	3.45
				2 - Avoiding Other traffic		Glancing blow	Significant damage																		
				3 - Constriction of Shipping Routes		Minimal 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	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	Narrative	Slow Speed contact	High speed contact	2.68	2.68	0.00	0.00	4.85	3.50	1.85	3.50	2.77	2.77	0.00	0.00	4.94	3.57	1.89	3.57	3.07	3.15
				2 - Avoiding Other traffic		Glancing blow	Significant damage																		
				3 - Constriction of Shipping Routes		Minimal 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	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	Narrative	Slow Speed grounding	Vessel unable to re-float on same tide / assistance required	2.50	2.50	0.00	2.50	3.50	4.85	3.50	5.92	2.65	2.65	0.00	2.65	3.63	5.02	3.63	6.09	3.69	3.83
				2 - Avoiding Other traffic		Re-float on the same tide	Fire / Sinking / Foundering																		
				3 - Constriction of Shipping Routes			Loss Cargo																		
				4 - Equipment or Mechanical Failure			Loss of life																		
				5 - Human Error			Large vessel / Tanker / Dangerous Goods																		
				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	Catastrophic damage-Costs >£10M																		
				8 - Low Manoeuvrability of Vessels	Environment	Minor-Tier 1	Catastrophic-Tier 3+																		
				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 -																					
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	Narrative	Slow speed grounding	Higher speed Grounding	2.61	2.61	0.00	2.61	3.57	4.94	3.57	6.02	2.72	2.72	0.00	2.72	3.67	5.06	3.67	6.14	3.78	3.88
				2 - Avoiding Other traffic		Vessel touches bottom	Vessel firmly aground																		
				3 - Constriction of Shipping Routes		Vessel re-floats on same tide	Vessel is not re-floated on same tide																		
				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	Catastrophic damage-Costs >£10M																		
				8 - Low Manoeuvrability of Vessels	Environment	Minor-Tier 1	Catastrophic-Tier 3+																		
				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 -																					
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	Narrative	Slow speed grounding	Higher speed Grounding	2.61	2.61	0.00	2.61	3.74	5.14	3.74	5.14	2.69	2.69	0.00	2.69	3.82	5.24	3.82	5.24	3.53	3.62
				2 - Avoiding Other traffic		Vessel touches bottom	Vessel firmly aground																		
				3 - Constriction of Shipping Routes		Vessel re-floats on same tide	Vessel is not re-floated on same tide																		
				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	Catastrophic damage-Costs >£10M																		
				8 - Low Manoeuvrability of Vessels	Environment	Minor-Tier 1	Catastrophic-Tier 3+																		
				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	Consequences			Baseline Risk								Inherent 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	Baseline Risk	Inherent Risk					
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	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	3.15	3.19
				2 - Avoiding Other traffic		Vessel touches bottom	Vessel firmly aground																		
				3 - Constriction of Shipping Routes		Vessel re-floats on same tide	Vessel is not re-floated on same tide																		
				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	Negligible-Costs <£10k	Moderate damage-Costs £100k -£1M																		
				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	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	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	3.42	3.46
				2 - Avoiding Other traffic		Vessel touches bottom	Vessel firmly aground																		
				3 - Constriction of Shipping Routes		Vessel re-floats on same tide	Vessel is not re-floated on same tide																		
				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	Moderate damage-Costs £100k -£1M																		
				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 -																					
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	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	3.25	3.28
				2 - Avoiding Other traffic		Vessel touches bottom	Vessel firmly aground																		
				3 - Constriction of Shipping Routes		Vessel re-floats on same tide	Vessel is not re-floated on same tide																		
				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	Moderate damage-Costs £100k -£1M																		
				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	Moderate-Bad widespread publicity and/or short-term loss of revenue																		
				10 -																					