



DOCKYARD PORT OF PLYMOUTH

HAZMAN HAZARD RANKED RISK ASSESSMENT

JULY 2019



1 INTRODUCTION

This document reports on the result of annual review of a risk assessment originally undertaken on behalf of the Queen's Harbour Master (QHM) and the Cattewater Harbour Commissioners (CHC) for the Port of Plymouth and now annually reviewed. It is used as a basis to review the Harbour Safety Management System (SMS) for the port implemented in conformance to the United Kingdom Port Marine Safety Code (PMSC). It should be read in conjunction with the Dockyard Port of Plymouth Safety and Environmental Management System part II, which details the process by which an annual review of all risks is achieved. This review of port risks is enabled by use of the HAZMAN II port risk assessment tool.

Purpose and Scope

The purpose of the assessment and reviews is to identify key hazards associated with the operation of ships within the limits of the Dockyard Port of Plymouth (DPoP) as shown on **Figure 1**¹. It should be noted that the Pilotage limits defined by CHC, as Competent Harbour Authority (CHA), are set at a radius of 3.5 nautical miles from the lighthouse on Plymouth Breakwater, i.e., approximately one nautical mile south of the limit shown on **Figure 1**.

After ranking these hazards in order of relative risk, measures for management of higher levels of risk are then reviewed and developed further if necessary.

The scope of the risk assessment also includes consideration of:

- Incident data and near-miss reports;
- The views of relevant harbour stakeholders about navigational safety;
- The varying trade and activities, military and non-military, using DPoP;
- The varying environmental conditions at the entrance to DPoP and within the harbour;
- The organisational structure available to manage any identified risks of significance.

¹ For completeness the limit of the assessment/review extends to the limits of pilotage determined by the Cattewater Harbour Commissioners, i.e., as defined in Regulation 3 of The Cattewater (Pilotage) Harbour Revision Order 1988, three and one half nautical miles radius from the lighthouse on Plymouth Breakwater.



**Figure 1: Limit of Dockyard Port of Plymouth
(Reproduced From The Dockyard Port of Plymouth Order 1999 © Crown
Copyright 1999)**

2. RISK ASSESSMENT SCORING

Expert judgement is a core part of the scoring process when assessing risk in a diverse harbour, which can result in some subjectivity. In the case of DPoP, incident data is available and its review assists significantly in providing consistency of scoring. The populated Hazman II software allows for programmed review of hazards, based on the ranking priority and the presence of heightened risk scoring in any of the individual risk categories.

Scoring of hazards was undertaken using the “most-likely” and “worst-credible” approach to consequence assessment. The scoring meeting participants used the Matrix presented at **Annex A** both as a basis to consider outcomes that had occurred and outcomes of the same accident realisation that would represent the “worst credible” case. The local knowledge of DPoP is vital to provide a consistency of consequence assessment and the “worst-credible” scoring should be clearly differentiated from the “worst-possible” case.

3. IDENTIFICATION OF RISK CONTROL MEASURES

After the hazard list is generated/reviewed and rationalised, drawing upon stakeholder input, risk control measures are identified and reviewed. The risk control measures are then developed in relation to the key hazards as appear at the top end of the ranked hazard list.

4. RISK MANAGEMENT DEFINITIONS

Using the risk matrix **Table 1** below, each hazard is scored against a scale of 1 to 10 for each of the four consequence categories within the adopted Risk Assessment Guidelines (i.e. impacts on: Life; Property; Environment; Reputation).

Where:-

0 & 1	Negligible Risk
2 & 3	Low Risk
4, 5, 6	Assessed to be in the ALARP region
7, 8, 9	Significant Risk
10	High Risk

C o n s e q u e n c e	C4	5	6	7	8	10
	C3	4	5	6	7	9
	C2	3	3	4	6	8
	C1	1	2	2	3	6
	C0	0	0	0	0	0
Frequency		F 5	F 4	F 3	F 2	F 1

Table 1: Risk Matrix Used to Score This Risk Assessment

From the frequency and consequence data (see **Table 1**), risk scores are obtained for each hazard using these criteria, in both the ‘most-likely’ and ‘worst-credible’ scenarios (i.e. providing eight risk scores per hazard). Each hazard is scored optimistically, to provide the risk assessment with a cautious approach when the average situation is taken into account. It should be noted that occasionally, most likely scenarios can generate higher risk levels than worst credible; this is due to the increased frequency naturally associated with the most likely event. In effect, the assessment is scoring the risk associated with two different outcomes from the same initiating event. This tends to occur when consequence levels are similar between most-likely and worst-credible and/or where the frequency of the worst credible is very much less than that of the most likely.

Where the most-likely event does show higher risk levels it is worthy of special note as, for example, in the case of berthing contact, it may be suggesting that a large number of small berthing contact damages are of greater loss significance than a single heavy contact at a much lesser frequency.

5. Hazard Ranking for Risk Mitigation Assessment

The risk data of each of the four categories (Life, Property, Environment and Port Business) is analysed within the Hazman software to obtain four indices for each hazard as follows:

- a) The average risk value of the four categories in the ‘most-likely’ set.
- b) The average risk value of the four categories in the ‘worst credible’ set.
- c) The maximum risk value of the four categories in the ‘most-likely’ set.

- d) The maximum risk value of the four categories in the ‘worst-credible’ set.

Average risk values are sensitive towards hazards that score moderately or highly over a number of categories, whilst the maximum risk values are sensitive towards hazards that score particularly high in any category.

These values are combined in the Hazman software to produce a numeric value representing each of the four indices. The hazard list is then sorted in order of the aggregate of the four indices to produce a Ranked Hazard List, in descending order, with the highest risk hazards prioritised at the top. This list, comprising 69 hazards is reproduced in full in **Annex B**. This Ranked Hazard List describes the Risk Profile of the Harbour with regard to navigational operations.

6. RISK MITIGATION ACTION CRITERIA

Matrix Outcome	Risk Definition	Action Taken
0 & 1	Negligible Risk	A level where operational safety is unaffected
2 & 3	Low Risk	A level where operational safety is assumed.
4, 5, 6	As Low As Reasonably Practicable (ALARP)	A level defined by Study at which risk control in place is reviewed. It should be kept under review in the ensuing Safety Management System.
7, 8 & 9	Significant Risk	A level where existing risk control is automatically reviewed and suggestions made where additional risk control could be applied if appropriate. Significant risk can occur in the average case or in individual categories. New risk controls identified should be introduced in a timescale of two years.
10	High Risk	An area where the Harbourmaster needs to recommend rapid action.

Table 2: - Risk Management Action Criteria

7. Use of the Concept of ALARP in this Risk Assessment

It is recognised that risk may need to be managed in a qualitative and comparative way in situations where the actual levels of risk are very difficult to determine. Part of the reason for this difficulty is that, whilst a Harbour Regulator will aim to reduce risk to ‘As Low As Reasonably Practicable

(ALARP), not all contributory factors and circumstances are under the regulators' control. A harbour regulator can only set comprehensive requirements that, as far as is foreseeable, would reduce the risk to ALARP levels. It then has to monitor compliance and take action if necessary. It is important to be aware that in the case of a vessel, the responsibility for ensuring the ALARP case exists is in part the vessel operators' responsibility (and crew) and in part the responsibility of the Harbour Regulator. Where risk levels are found to be significant or high (i.e. outside the ALARP region), the Harbour Regulator needs to be in the position to influence an improvement in safety performance of vessels using the waterway, it then needs to be in a position to monitor the effect of the improvement.

The use of ALARP in this study is therefore practical in nature, reflecting the practical problems that a Harbour Regulator has in influencing the navigation of a vessel that may not itself be operated to an ALARP standard.

Annex 1

Risk Criteria Used For the Assessment

The criteria used by HAZMAN II for each risk assessment is as follows:

Scale	Description	Definition	Operational Frequency
F5	Frequent	An event occurring in the range once a week to once an operating year.	0 – 1 year (One or more times in 1 year)
F4	Likely	An event occurring in the range once a year to once every 10 operating years.	1 - 9 years (One or more times in 10 years)
F3	Possible	An event occurring in the range once every 10 operating years to once in 100 operating years.	10 – 99 years (One or more times in 100 years)
F2	Unlikely	An event occurring in the range less than once in 100 operating years.	100 – 999 years (One or more times in 1000 years)
F1	Rare	Considered to occur less than once in 1000 operating years (e.g. it may have occurred at a similar port or harbour elsewhere in the world).	>1000 years (One or more times in 10000 years)

Table 3: Frequency Matrix Scales

Scale	People	Property	Environment	Harbour Stakeholders
C1	NEGLIGIBLE Possible very minor injury (e.g. bruise)	NEGLIGIBLE Costs <£100,000	INSIGNIFICANT Negligible environmental impact. Tier 1 may be declared but criteria not necessarily met. Costs <£100,000	INSIGNIFICANT Incident dealt with internally Costs <£100,000
C2	MINOR Single minor injury	MINOR Minor damage Costs £100K-1M	MINOR Tier 1 to Tier 2 criteria reached. (Small operational spill). Costs £100K-1M	MINOR Bad local publicity or short-term loss of revenue, etc. Costs £100K-1M
C3	MODERATE Multiple minor or single major injury	MODERATE Moderate damage Costs £1M – 10M	MODERATE Tier 2 Spill criteria Reached, capable of being limited to immediate area within harbour or port zone. Costs £1M – 10M	MODERATE Bad widespread publicity, temporary navigation closure or prolonged restriction of navigation Costs £1M – 10M
C4	MAJOR Multiple major injuries or single fatality	MAJOR/SERIOUS Major damage Costs £10M-100M	MAJOR/SERIOUS Lower Tier 3 criteria reached, with pollution outside harbour or port zone expected. Chemical spillage or small gas release. Potential loss of environmental amenity. Costs £10M-100M	MAJOR/SERIOUS National Publicity Harbour faces temporary closure of a navigation channel affecting movements to a port or ports for several days. Ensuing loss of trade. Costs £10M-100M
C5	CATASTROPHIC Multiple fatalities	CATASTROPHIC/MAJOR Catastrophic damage Costs £100M+	CATASTROPHIC/MAJOR Tier 3 criteria oil spill reached with support from international clean up funds. Widespread beach contamination or serious chemical/gas release. Significant threat to environmental amenity. Costs £100M+	CATASTROPHIC/MAJOR International media publicity. Port closes, navigation seriously disrupted for an extended period. Serious and long term loss of trade. Costs £100M+

Table 4: Consequence Matrix Scales

Annex B

RANKED HAZARD LIST

Ranked Hazard List : QHM Plymouth (10 July 2019)

Rank	Hazard Ref.	Affected Areas	Accident Category	Hazard Title	Hazard Detail	Affected Vessel Types	Affected Stakeholders	Possible Causes	Consequence Descriptions		Risk By Consequence Category								Risk Overall	Remarks
									Most Likely (ML)	Worst Credible (WC)	ML				WC					
											Environment	People	Property	Stakeholders	Environment	People	Property	Stakeholders		
1	20	Western Channel, Eastern Channel	Contact - Navigation	Vessel contact with breakwater/ Mount Batten breakwater	Commercial, fishing vessel / warship entering or leaving port in contact with breakwater	All	Admiralty Pilots, CHA Pilots, CHC HM, Commercial Vessel Operator, Emergency Responders, QHM, Relevant Harbour Authority, Royal Navy / RFA, Sutton Harbour HM	Mechanical failure / defect; Master / Pilot or skipper error; Reduced visibility; Adverse weather / tidal conditions; Result of avoiding action with 3rd party vessel; Heavy traffic; FOST manoeuvres; Inappropriate use of tugs; Poor local knowledge. Nav Aid failure.	Minor damage to vessel	Serious injuries; Significant damage to vessel / breakwater; Major pollution; Vessel sinks blocking access; Media attention.	0	3	3	5	7	6	7	7	5.38	Pilotage Directions; Bunker tanks not always provided with double hull protection; Restricted use of eastern channel. Allocate tugs to vessels with known defects. FV Algrie grounded on Mt Batten bkwater (Apr 17)
2	40	Port Approach, Western Channel, Eastern Channel, Plymouth Sound, Hamoaze	Grounding	Grounding of warship in port approaches and north of breakwater	Warship grounds in port approaches and north of breakwater;	Warship	ABP HM, Admiralty Pilots, CHC HM, QHM, Relevant Harbour Authority, Royal Navy / RFA, Serco Denholm - Port Ops, Sutton Harbour HM	Pilot / Master error; Equipment/mechanical defect / failure; Restricted visibility; Adverse weather / tidal conditions; Vessel motion; squat; heel; shallow water effect; Result of avoiding action with 3rd party vessel; Port control failure; Heavy traffic; Loss of directional control of (active) escort tug.	Major damage to external equipment / sensors - sonar etc;	Minor injuries; Major damage to vessel; Vessel sinks blocking access; Pollution; Media attention;	2	4	6	4	3	3	6	6	4.91	WC scenario based on HMS Nottingham incident, 2003; Port area subject to regular Hydrographic surveys. Eastern Entrance more rocky than Western. Normally western entrance shall be used. FGS Luebeck departed via E Channel after mistaking Sound Sitrep for VTS Instruction (May 17). Nr miss when HMS Albion parted both bridles (Mar 19)

Rank	Hazard Ref.	Affected Areas	Accident Category	Hazard Title	Hazard Detail	Affected Vessel Types	Affected Stakeholders	Possible Causes	Consequence Descriptions		Risk By Consequence Category						Risk Overall	Remarks		
									Most Likely (ML)	Worst Credible (WC)	ML			WC						
											Environment	People	Property	Stakeholders	Environment	People			Property	Stakeholders
3	30	Port Approach, Western Channel, Eastern Channel, Plymouth Sound, Cattewater & Sutton Harbours, Millbay Docks, Hamoaze, River Lynher & St Johns Lake	Collision	Collision involving non-seagoing (charter) passenger vessel	Collision between a chartered passenger vessel and a vessel of similar or larger size. This includes Cremyll, Mt Batten, RWY, Cawsand Bay ferries as well as Commercial Pleasure Cruise vessels. Cruise ship tenders.	Passenger	ABP HM, CHA Pilots, Charter Passenger, CHC HM, MCA, Plymouth City Council, QHM, Relevant Harbour Authority	Mechanical failure / defect; Master / Pilot / Skipper error; Restricted visibility; Adverse weather / tidal conditions; FOST training; Port Control failure; Result of avoiding action with 3rd party vessel; Heavy traffic.	Potential minor injuries / damage	Multiple fatalities and / or major injuries; Major damage to both vessels; Minor pollution; Vessel sinks blocking access; Media attention	0	6	3	0	2	7	4	6	4.83	Passenger vessels with capacity up to 240 persons operate in port waters; Multiple small vessels available to support recovery work. WC scenario based on striking of recreational vessel beneath Sydney Harbour Bridge by local ferry 2007 - six fatalities. Hazard includes small military vessels. CHA appropriate person with local knowledge to be used in poor visibility when boat crews have no local knowledge. Northern Belle /LVCP Collision Incident in the Narrows Dec 13. Edgcombe Belle collision with sports FV. Assurance gained from MCA re crew competence and qualifications. Cremyll Ferry failed to give way to motor boat (Jul 17) - Action taken by PBT to provide assurance of safe operation to QHM and MCA. RWY ferry failed to sound sound signal on leaving Camber (Aug 17). QHM has requested local knowledge questionnaire fm MCA.
4	64	Port Approach, Western Channel, Eastern Channel, Plymouth Sound, Millbay Docks, Hamoaze, River Lynher & St Johns Lake	Collision	Collision involving small military vessel	Small military landing craft or RHIB (etc;) in collision with a similar or larger vessel whilst operating within harbour.	Warship	ABP HM, Brittany Ferries, CHC HM, Commercial Vessel Operator, Emergency Responders, MCA, QHM, Relevant Harbour Authority, Royal Navy / RFA, Serco Denholm - Port Ops, Sutton Harbour HM	Mechanical/equipment failure / defect; Master / Skipper /Pilot error; Restricted visibility; Adverse weather / tidal conditions; FOST training; Port Control failure; Result of avoiding action with 3rd party vessel; Heavy traffic; No lights shown at night;	Minor injuries / man overboard on smaller vessel; Minor damage	Fatalities or major injuries; Major damage to vessels; Possible pollution; Media attention	0	6	3	0	2	7	4	6	4.83	WC incident defined by recreational vessel collision Brisbane River, 2006. Vessels racing down river to firework event in harbour in high speed collision. Royal Marine training squadron now operating in the port. military Water Users Committee initiated. Dutch LC made contact with moored boat. Danger of RM craft exercising without lights in contravention of agreed protocol. Near miss between unlit LCVP and SD Cawsand (Nov 16). Nr misses between LCVP/SD Cawsand (Nov 17), unlit IRCs and Cremyll Ferry (Nov 17) and LCU and Police launch (Jan 18). Collision between JP RIBs (Mar 18). Nr miss collision at night between LCU and MDP launch (Jul 18). Nr miss between MDP launch and 1AGRM IRC operating without lights (Nov 18)

Rank	Hazard Ref.	Affected Areas	Accident Category	Hazard Title	Hazard Detail	Affected Vessel Types	Affected Stakeholders	Possible Causes	Consequence Descriptions		Risk By Consequence Category							Risk Overall	Remarks	
									Most Likely (ML)	Worst Credible (WC)	ML			WC						
											Environment	People	Property	Stakeholders	Environment	People	Property			Stakeholders
5	15	Port Approach, Plymouth Sound, Hamoaze	Contact - Navigation	Recreational / fishing / Chartered Passenger vessel in contact with ship moored or anchored.	Chartered passenger / recreational vessel / fishing vessel collides with ship berthed on one of the fixed mooring buoys located to the north of the breakwater or at anchor.	All	CHA Pilots, CHC HM, Commercial Vessel Operator, Emergency Responders, MCA, QHM, Relevant Harbour Authority	Mechanical failure / defect; Master / skipper error; Reduced visibility; Adverse weather / tidal conditions; Excessive speed; Vessel lies across main channel; Heavy traffic. Result of avoiding action with 3rd party vessel	Minor / serious injury; Minor damage; Local media interest.	Fatality and / or major injuries; Significant damage to vessel; Vessel sinking blocking access; Minimal pollution; Media attention.	0	6	6	3	2	6	4	6	4.83	QHM has requested MCA provide a Local Knowledge Qualification.
6	68	Eastern Channel, Plymouth Sound, Cattewater & Sutton Harbours, Millbay	Contact - Navigation	Rogue Vessel	Vessel loses its steering or crew and it continues moving	Leisure	ABP HM, CHC HM, QHM, Relevant Harbour Authority, Royal Navy / RFA, Sutton Harbour HM	Mechanical failure, Man overboard, injury, illness or sudden death and any kill cord hasn't worked.	Vessel beeches or runs out of fuel	Vessel crashes into passenger vessel with passengers on board. Fatality	0	8	0	0	2	6	2	4	4.81	Incident (2009) where speedboat lost crew in Plymouth Sound, retrieved safely by MDP jumping onto boat. Fatal speedboat incident at Padstow 2013. Rider fell off jet ski causing damage to yacht (Jun 18).
7	42	Port Approach, Plymouth Sound, Millbay Docks	Grounding	Seagoing passenger ship grounding in port approach /north of breakwater	Large seagoing passenger ship grounds in port approaches / north of breakwater	Passenger	ABP HM, Admiralty Pilots, CHA Pilots, Commercial Vessel Operator, Plymouth City Council, QHM, Relevant Harbour Authority, Serco Denholm - Port Ops	Pilot / Master error; Equipment/mechanical defect / failure; Restricted visibility; Adverse weather / tidal conditions; Vessel motion; squat; heel; shallow water effect; Result of avoiding action with 3rd party vessel; Port Control failure; Heavy traffic	Minor damage to vessel;	Major damage to vessel; Injuries; Vessel sinks blocking access; Pollution; Media attention; Fatalities	0	2	4	6	3	6	5	6	4.75	See MAIB report and recommendations following grounding of Quiberon in Plymouth Sound on 17 March 1999; Port area subject to regular Hydrographic surveys. Ex Sound Move (Oct 15) involved ferry with fire onboard and prop failure. More and larger cruise liners using port.

Rank	Hazard Ref.	Affected Areas	Accident Category	Hazard Title	Hazard Detail	Affected Vessel Types	Affected Stakeholders	Possible Causes	Consequence Descriptions		Risk By Consequence Category						Risk Overall	Remarks		
									Most Likely (ML)	Worst Credible (WC)	ML			WC						
											Environment	People	Property	Stakeholders	Environment	People			Property	Stakeholders
8	8	Cattewater & Sutton Harbours, Millbay Docks, Hamoaze, River Lynher & St Johns Lake	Contact - Berthing	FV / charter passenger vessel / non-seagoing passenger vessel contact berthing	Fishing vessel/ Charter Passenger Vessel/ Non sea-going passenger vessel in contact berthing. This includes Cremyll, Mt Batten, RWY, Cawsand Bay ferries as well as Commercial Pleasure Cruise Vessels.	Fishing Vessel	ABP HM, Admiralty Pilots, Charter Passenger, CHC HM, Commercial Vessel Operator, Fish Market, Plymouth City Council, Relevant Harbour Authority, Sutton Harbour HM	Adverse Weather, Alcohol / Drugs, Mechanical Defect/Failure, Reduced Visibility, Skipper Error/Result of action with third party vessel	Minor damage to berth / vessel	Fatality/ Serious injuries; Damage to vessel and berth; Some disruption to port; Media attention.	0	6	6	0	2	6	4	6	4.66	
9	1	Cattewater & Sutton Harbours, Millbay Docks, Hamoaze	Contact - Berthing	Vessel contact whilst berthing alongside	Vessel manoeuvring alongside contacts berth	All	ABP HM, Admiralty Pilots, Brittany Ferries, CHA Pilots, CHC Commercial Wharves, CHC HM, Commercial Vessel Operator, QHM, Relevant Harbour Authority, Serco Denholm - Passenger, Serco Denholm - Port Ops, Sutton Harbour HM, VTS	Mechanical failure / defect; Pilot / Master / skipper error; Reduced visibility; Adverse weather / tidal conditions; Inappropriate use of tugs; Vessel too large for berth; Tug operational failure or poor comms; Result of action with 3rd party vessel.	Minor damage to vessel and / or berth fendering.	Major injuries / potential fatality; Major damage to vessel / berth / crane; pollution; Berth closure; Media exposure.	0	5	5	0	4	6	6	6	4.64	PEC; Pilotage Directions; Wind limitations; Towage Guidelines; Fendering provided; Nuclear submarines based in port. Brittany Ferry contacted with pier fendering during sternboard into Millbay - Dec 15. Berthing procedures reviewed in 2018 - Duty QHM to be informed if vessel requests/required to berth downstream. HMS Tyne contacted jetty (Jan 18). FMT Gulmulder contacted gate at Cattedown wharves.

Rank	Hazard Ref.	Affected Areas	Accident Category	Hazard Title	Hazard Detail	Affected Vessel Types	Affected Stakeholders	Possible Causes	Consequence Descriptions		Risk By Consequence Category						Risk Overall	Remarks		
									Most Likely (ML)	Worst Credible (WC)	ML			WC						
											Environment	People	Property	Stakeholders	Environment	People			Property	Stakeholders
10	35	Port Approach, Western Channel, Eastern Channel, Plymouth Sound, Cattedwater & Sutton Harbours, Millbay Docks, Hamoaze, River Lynher & St Johns Lake	Collision	Two recreational vessels in collision	Collision between a recreational vessel and another - powered or otherwise	Leisure	ABP HM, CHC HM, Emergency Responders, MCA, Plymouth City Council, QHM, Relevant Harbour Authority, Sutton Harbour HM	Skipper error or inexperienced; Mechanical failure / defect; Craft operated at speed; Racing; Heavy traffic; Result of avoiding action with 3rd party vessel; Unlit recreational craft; Restricted visibility; Adverse weather; tidal conditions; No National requirement for qualification or regulation.	Minor damage to both vessels; Minor injuries;	Multiple fatalities; Major damage to both vessels; Vessel sinks blocking access; Minimal pollution; Media attention;	0	5	0	0	2	7	4	6	4.59	Organised events specifically authorised by QHM and subject to specific risk assessment; WC incident defined by recreational vessel collision Brisbane River, 2006, vessels racing down river to firework event in harbour in high speed collision. Increasing numbers of non compliances and near misses involving speeding jet ski, etc (2015). Various jet ski complaints Summer 17. MDP priority to enforce increased, media message. Numerous cases of irresponsible/dangerous operation of PWC (Summer 2018).
11	56	Western Channel, Plymouth Sound, Cattedwater & Sutton Harbours, Millbay Docks, Hamoaze	Swamping & Foundering	Small military / harbour support vessel loses stability during ship / barge handling operations	Tug or line boat floods or is capsized whilst conducting towage / line operations / small military vessel capsizes within port limits. Near Mis SD Faithful Feb 2015. Girding and capsize of Mooring Launch Asterix (Mar 15).	Port Support	ABP HM, CHA Pilots, CHC Commercial Wharves, CHC HM, Emergency Responders, QHM, Relevant Harbour Authority, Serco Denholm - Port Ops, Sutton Harbour HM	Master / Pilot / Skipper error; Ship moves ahead unexpectedly while tug connected; Girding of tug; Tug / line boat not fit for purpose; Mechanical failure / defect; Quick release failure; Gog-rope parts or not in use; Watertight hatches not secured; Adverse weather tidal conditions	Minor damage; Personnel in water	Fatalities / major injuries; Major damage to tug / line boat; Pollution; Vessel sinks blocking access; Media interest;	0	4	2	2	4	7	4	6	4.55	WC scenario based on Flying Phantom incident in the Clyde, December 2007. HM (not QHM) requires use of pilot for all operations involving tugs. Tugs tow supply barges with stores and bunkers from River Tamar to vessels berthed on the buoys. CAP to review Tugmaster and Pilotage refresher training 2014. Nr Miss Girding between Sd Adept and HMS Montrose (Apr18). MAIB reports noted (2018). Nr miss when ASD tug nearly lost control and contact SSK when leading out of WML (Apr 18).

Rank	Hazard Ref.	Affected Areas	Accident Category	Hazard Title	Hazard Detail	Affected Vessel Types	Affected Stakeholders	Possible Causes	Consequence Descriptions		Risk By Consequence Category								Risk Overall	Remarks
									Most Likely (ML)	Worst Credible (WC)	ML				WC					
											Environment	People	Property	Stakeholders	Environment	People	Property	Stakeholders		
12	47	Plymouth Sound, Cattewater & Sutton Harbours, Hamoaze, River Lynher & St Johns Lake	Grounding	Recreational vessel grounding	Recreational vessel grounds on an obstruction	Leisure	CHC HM, Emergency Responders, MCA, Plymouth City Council, QHM, Relevant Harbour Authority	Skipper error; Mechanical defect / failure; Restricted visibility; Adverse weather / tidal conditions; Uncharted hazard;	Minor injury; Minor damage to craft	Fatality and serious injuries; Major damage to vessel; Media interest;	0	5	0	0	2	7	4	6	4.54	WC scenario based on MAIB report on the investigation of the grounding at high speed of the leisure powerboat Sea Snake near the entrance to Tarbert harbour, Loch Fyne on 10 July 2005 with the loss of three lives. Report 10/2006. Port area subject to regular Hydrographic surveys. Dialouic Solo Sailor on Crownhill Bay 2013. Yacht Red Sox grounded on mud off Millbay Mar 2015. Number of minor groundings owing to human error (2016). Yacht Rosemary grounded nr The Bridge Jul 2017. Speedboat grounded at night N of Cargreen Aug 2017. Yacht grounded on falling tide (Jul 18). Yacht grounded off Ft Picklecombe (Jun 19). Yacht close to grounding in Jennycliff Bay after prop failure (Jun19).
13	43	Port Approach, Western Channel, Plymouth Sound, Hamoaze	Grounding	Nuclear submarine grounding port approaches and north of breakwater	Nuclear submarine grounds manoeuvring in port approaches / harbour - north of breakwater	Nuclear Submarine	ABP HM, Admiralty Pilots, CHC HM, QHM, Relevant Harbour Authority, Royal Navy / RFA, Serco Denholm - Port Ops	Pilot / Master error; Equipment/mechanical defect / failure; Restricted visibility; Adverse weather / tidal conditions; Vessel motion; squat; heel; shallow water effect; 3rd party vessel obstructs / impedes manoeuvre on approach; Port Control failure;	Minor damage	Minor injuries; Major vessel damage; Media attention concerns expressed over safety of nuclear submarines;	0	2	4	6	2	3	5	6	4.49	WC scenario based on HMS Trafalgar incident in Clyde 2002; Vanguard Class draw in excess of 11.5 metres. All passage plans rehearsed through the use of simulators; US submarines visit port from time to time. Admiralty Pilots will be navigating at slow speed. Minneapolis St Paul Incident. First A class visit Jan 2016. Visit risk assessed to minimise risk including simulation. FSC 250 under review (Jul 17). SSN nr miss grounding on Vanguard Bank after helmsman misheard course to steer - failure in comms and supervision (Jul 18). FSC 250 Issue 2 published Oct 18.

Rank	Hazard Ref.	Affected Areas	Accident Category	Hazard Title	Hazard Detail	Affected Vessel Types	Affected Stakeholders	Possible Causes	Consequence Descriptions		Risk By Consequence Category						Risk Overall	Remarks		
									Most Likely (ML)	Worst Credible (WC)	ML			WC						
											Environment	People	Property	Stakeholders	Environment	People			Property	Stakeholders
14	31	Port Approach, Western Channel, Plymouth Sound, Millbay Docks	Collision	Collision involving seagoing passenger vessel	Collision between a passenger liner or ferry entering / leaving port and a vessel of similar or larger size	Large Vessel (>100 Metres) Generic	ABP HM, Brittany Ferries, CHA Pilots, CHC HM, Commercial Vessel Operator, Emergency Responders, MCA, QHM, Relevant Harbour Authority	Mechanical failure / defect; Master / Pilot error; Restricted visibility; Adverse weather / tidal conditions; FOST training; Port Control failure; Result of avoiding action with 3rd party vessel; Heavy traffic.	Minor injuries / damage to both vessels	Fatality or major injuries to passengers / crew; Major damage to vessels; vessel sinks blocking access; Possible pollution; Media attention	0	4	4	2	5	6	5	6	4.45	Ferries operate to regular schedule with PEC holders. Passenger liners always piloted. Ferries typically cut across anchorage using Asia Pass. Change to harmonised VHF channel to de-conflict in Western Channel.
15	33	Port Approach, Western Channel, Eastern Channel, Plymouth Sound, Hamoaze	Collision	Collision involving warship or RFA vessel	Collision between a warship or a RFA vessel and a vessel of similar size	Warship	Admiralty Pilots, CHA Pilots, Commercial Vessel Operator, QHM, Relevant Harbour Authority, Royal Navy / RFA	Mechanical failure / defect; Master / Pilot error; Restricted visibility; Adverse weather / tidal conditions; FOST training; Port Control failure; Result of avoiding action with 3rd party vessel; Heavy traffic;	Minor injuries; Minor damage to both vessels;	Fatality and /or major injuries; Major damage to both vessels; Vessel sinks blocking access; Pollution; Media attention	0	4	4	2	3	6	6	6	4.42	Warships regularly conduct manoeuvres, notably during Thursday war. Change to harmonised VHF channel to de-conflict in Western Channel. Nr Miss between HMS SUTH and NATO MCM Gp in Western Channel (Mar 17). Nr Miss HMS MTRE crossed bow of RFA LYME at close quarters (Mar 18)
16	37	Hamoaze	Collision	Collision with Torpoint Ferry	Any vessel collides with Torpoint chain ferry as it crosses River Tamar;	Passenger	Plymouth City Council, QHM, Relevant Harbour Authority, Torpoint Ferry	Mechanical failure / defect; Master / Pilot / Skipper error; Restricted visibility; Adverse weather / tidal conditions; FOST training; Port Control failure; Result of avoiding action with 3rd party vessel; Heavy traffic; sailing racing	Minor damage	Multiple fatalities and / or major injuries; Major damage to both vessels; Minor pollution; Vessel sinks blocking access; Media attention	0	3	3	3	4	7	4	6	4.41	Ferries held at shore if large vessel passing. Poly Apple collision Incident 2013. Changes to DPOP regulations to regulate against other occurrences. Near Miss with racing yacht (July 2016). Issue discussed with ferry operators and local sailing clubs (2016). Torpoint ferry emerg stop for yacht to avoid collision (Aug 18). Nr miss collision when tug(stand on vessel) forced to alter to avoid ferry (Oct 18).

Rank	Hazard Ref.	Affected Areas	Accident Category	Hazard Title	Hazard Detail	Affected Vessel Types	Affected Stakeholders	Possible Causes	Consequence Descriptions		Risk By Consequence Category						Risk Overall	Remarks		
									Most Likely (ML)	Worst Credible (WC)	ML			WC						
											Environment	People	Property	Stakeholders	Environment	People			Property	Stakeholders
17	32	Port Approach, Western Channel, Eastern Channel, Plymouth Sound, Cattewater & Sutton Harbours, Millbay Docks, Hamoaze	Collision	Collision involving large cargo vessel	Collision between a large cargo vessel entering / leaving port and a vessel of similar size	Large Vessel (>100 Metres) Generic	ABP HM, CHA Pilots, CHC HM, Commercial Vessel Operator, Emergency Responders, MCA, QHM, Relevant Harbour Authority	Mechanical failure / defect; Master / Pilot error; Restricted visibility; Adverse weather / tidal conditions; FOST training; Port Control failure; Result of avoiding action with 3rd party vessel; Heavy traffic.	Potential minor injuries / damage to vessel	Fatality or major injuries; Major damage to both vessels; Pollution; Vessel sinks blocking access; Media attention	0	4	4	2	5	6	5	5	4.37	Change to harmonised VHF channel to de-conflict in Western Channel.
18	63	Port Approach, Western Channel, Eastern Channel, Plymouth Sound, Cattewater & Sutton Harbours, Millbay Docks, Hamoaze, River Lynher & St Johns Lake	Pollution	Operational fuel spill	Spillage of gas /fuel oil during bunkering / fuel transfer or internal operations	All	ABP HM, Brittany Ferries, CHC Commercial Wharves, CHC HM, Commercial Vessel Operator, Fish Market, MCA, Plymouth City Council, QHM, Relevant Harbour Authority, Royal Navy / RFA, Serco Denholm - Port Ops, Sutton Harbour HM	Human error or equipment failure during bunkering operation from ashore / bunker vessel; Result of striking or contact; Discharge of pollutants from vessel;	Minor pollution; Major Pollution	Major Pollution	0	0	0	6	6	2	4	6	4.36	Warships / fishing / recreational vessels use gas oil; bunker operating procedures in place, Fuel Oil transfers regular in Millbay Docks. Sutton Harbour demanded full clean up costs and civil prosecution for spill by FV Lady L (May 17). Further guidance for MoD vessels at RNTM 06-005/18 and letter from DNS (Jun 18). Since 2018 review 22 oil spill incidents logged over the year.
19	52	Plymouth Sound, Cattewater & Sutton Harbours, Millbay Docks	Personal Injury	Fall from height	Persons fall or jump from port structures;	All	ABP HM, CHC HM, Emergency Responders, Plymouth City Council, QHM, Relevant Harbour Authority, Sutton Harbour HM	Poor lighting / fencing; Public footpaths through port areas; Trips; falls; congestion on footpaths; Unauthorised diving; Bravado; Excess alcohol; Continued port operations at times of high public mobility on footpaths; special events;	Minor injury /serious injury; Media interest;	Fatality /serious injury; Media interest;	0	6	0	0	0	7	0	3	4.26	Public have right of access to many areas of the port; Swing bridge for public footpath crosses lock entrance to Sutton Harbour, closed to public 2300 and 0400. Reported that individuals will climb over gates and /or try to swim across lock entrance when closed. QHM works closely with RNLI "Respect the Water" campaign. Fatality from tombstoning (2016). Education campaign ongoing.

Rank	Hazard Ref.	Affected Areas	Accident Category	Hazard Title	Hazard Detail	Affected Vessel Types	Affected Stakeholders	Possible Causes	Consequence Descriptions		Risk By Consequence Category						Risk Overall	Remarks		
									Most Likely (ML)	Worst Credible (WC)	ML			WC						
											Environment	People	Property	Stakeholders	Environment	People			Property	Stakeholders
20	62	Port Approach, Western Channel, Eastern Channel, Plymouth Sound, Cattewater & Sutton Harbours, Millbay Docks, Hamaoze, River Lynher & St Johns Lake	Fire & Explosion	Vessel fire when underway i.e.; not alongside	Fire on a vessel underway in port limits	All	ABP HM, CHC HM, Emergency Responders, FRS, MCA, QHM, Relevant Harbour Authority, Serco Denholm - Port Ops, Sutton Harbour HM	Human error; Equipment failure or faulty; Failure to conform with fire prevention standards; Oil leak in engine room; Smoking; Lightning strike; Sabotage; Failure to promptly activate FiFi equipment or take appropriate action;	Minor injuries; Minor damage to vessel;	Fatality or major injuries; Serious vessel damage; Vessel sinking blocking access; Pollution Tier 2; Media attention;	0	6	3	0	3	5	5	5	4.25	Contract to provide fire fighting capability. Also tugs have FF capability. MV Suikit fire incident 2014. Scenario exercised during Ex Sound Move (Oct 15). Nortrader bottom ash explosion (Jan 17). Minor fires reported in LCVP (Oct 17), FB Vigilies(Dec 17), SD Padstow (May 18). Scenario for Sound Move 3 in Nov 18 involved burning LCU with explosive embarked.
21	29	Port Approach, Western Channel, Eastern Channel, Plymouth Sound, Cattewater & Sutton Harbours, Millbay Docks, Hamaoze	Collision	Collison between small leisure or commercial vessel and larger vessel or vice versa	Small recreational, or charter fishing or military craft struck by larger vessel underway in port waters. Or vice versa	Large Vessel (>100 Metres) Generic	ABP HM, Admiralty Pilots, CHA Pilots, CHC HM, Commercial Vessel Operator, Emergency Responders, QHM, Relevant Harbour Authority, Sutton Harbour HM	Mechanical failure / defect; Master / Pilot / Skipper error; Restricted visibility; Adverse weather / tidal conditions; FOST training; Port Control failure; Result of avoiding action with 3rd party vessel; Heavy traffic. No National requirement for qualification or regulation.	Minor injuries / man overboard on smaller vessel; Minor damage	Fatalities and /or major injuries; Major damage to both vessels; Vessel sinks blocking access; Pollution; Media attention	0	3	3	3	2	7	4	6	4.24	WC scenario based on striking of recreational vessel beneath Sydney Harbour Bridge by local ferry 2007 - six fatalities. Hazard includes small military vessels. Significant number of near misses where small vessels impeded larger vessels(2016). Larger vessels reminded of the importance of Rule 34(d) (5 short blasts). 6 incidents/nr misses reported 2017. Nr Miss when when FV crossed HMS DRGN bows at close quarters (Apr 18).
22	57	Plymouth Sound, Cattewater & Sutton Harbours, Millbay Docks, Hamaoze, River Lynher & St Johns Lake	Swamping & Foundering	Small vessel founders on berth	A small vessel swamps / sinks whilst alongside the quay or on a mooring buoy (trot)	Leisure	ABP HM, CHC Commercial Wharves, CHC HM, Fish Market, Plymouth City Council, QHM, Relevant Harbour Authority, Sutton Harbour HM	Human error; Mechanical failure / defect; Vandalism; Severe weather; passing vessel wash	Vessel swamps minor damage;	Vessel sinks; Major damage; Pollution; Berth blocked;	0	0	6	0	2	6	4	2	4.13	Yarmouth Navigator Incident 2011. Plus an Incident in Clyde where a privately owned tug foundered on a mooring. Barge Riverman foundered at mooring (Mar 2016). 4 small craft foundered after meteotsunami in Hooe Lake (Aug 16). Hulk Kronenbourg sank at mooring ((Oct 17). Wake from speeding tug nearly resulted in swamping of small passenger vessel on MBL (May 19).

Rank	Hazard Ref.	Affected Areas	Accident Category	Hazard Title	Hazard Detail	Affected Vessel Types	Affected Stakeholders	Possible Causes	Consequence Descriptions		Risk By Consequence Category							Risk Overall	Remarks	
									Most Likely (ML)	Worst Credible (WC)	ML				WC					
											Environment	People	Property	Stakeholders	Environment	People	Property			Stakeholders
23	34	Port Approach, Western Channel, Plymouth Sound, Hamoaze	Collision	Collision involving nuclear submarine	Collision between a nuclear submarine and another ship whilst manoeuvring within port waters	Nuclear Submarine	Admiralty Pilots, CHA Pilots, CHC HM, Emergency Responders, QHM, Relevant Harbour Authority, Royal Navy / RFA, Serco Denholm - Port Ops	Mechanical failure / defect; Master / Pilot error; Restricted visibility; Adverse weather / tidal conditions; FOST training; Port Control failure; Result of avoiding action with 3rd party vessel;	Potential minor injuries / damage;	Multiple fatalities and / or major injuries; Major damage to both vessels (Significant damage to external equipment of submarine; however pressure hull integrity not compromised); Pollution; Vessel sinks blocking access; Media attention; concerns expressed	0	2	3	5	3	5	4	5	4.07	100 metre exclusion zone strictly enforced through the use of Piquet Boats / MoD Police. All other ship movements suspended. Cobbler Channel Guard Ship in place. Change to harmonised VHF channel to de-conflict in Western Channel.
24	11	Plymouth Sound	Contact - Navigation	Seagoing passenger vessel in contact with nuclear submarine berthed or anchored in Sound	Seagoing passenger vessel - liner or ferry service - collides with nuclear submarine moored on one of the fixed mooring buoys located to the north of the breakwater or at anchor.	Passenger	ABP HM, Admiralty Pilots, Brittany Ferries, CHA Pilots, CHC HM, Emergency Responders, MCA, QHM, Relevant Harbour Authority, Royal Navy / RFA, VTS	Mechanical failure / defect; Master / pilot error; Reduced visibility; Adverse weather / tidal conditions; Excessive speed; Heavy traffic; Port control failure; Result of avoiding action with 3rd party vessel;	Minor damage to both vessels.	Fatality / multiple injuries; Major damage to both vessels; Pollution threat; Media attention, concerns expressed over safety of nuclear submarines.	0	2	3	5	3	4	5	5	4.07	Large ships may swing across main channel; not applicable to submarine on D Buoy Passenger ships too large to enter Millbay anchor in Sound. Brittany Ferries would normally use Asia Pass rather than Smeaton Pass. Nuclear submarines would only use 'z' berths; Not considered credible for submarine pressure hull to be damaged by contact; FSC 250 under review. Frequency of SSN ops/visits much reduced (2016). FSC 250 Issue 2 published Oct 18 - ALARP based justification based on speed limits and separation.

Rank	Hazard Ref.	Affected Areas	Accident Category	Hazard Title	Hazard Detail	Affected Vessel Types	Affected Stakeholders	Possible Causes	Consequence Descriptions		Risk By Consequence Category						Risk Overall	Remarks		
									Most Likely (ML)	Worst Credible (WC)	ML			WC						
											Environment	People	Property Stakeholders	Environment	People	Property Stakeholders				
25	51	Port Approach, Western Channel, Eastern Channel, Plymouth Sound, Cattedwater & Sutton Harbours, Millbay Docks, Hamoaze, River Lynher & St Johns Lake	Personal Injury	Man overboard	Personal injury as the result of falling overboard.	All	ABP HM, Brittany Ferries, CHC HM, Commercial Vessel Operator, Emergency Responders, QHM, Relevant Harbour Authority, Sutton Harbour HM	Sudden movement of vessel; Slips and trips; Inexperience; Hit by boom; Failure to use appropriate safety equipment; Operations in unsuitable weather conditions. Over confidence.	Minor injury	Fatal injury; Media interest;	0	5	0	0	0	7	0	3	4.05	Torpoint Ferry fatal Incident December 2012. Padstow speedboat MOB Incident 2013. HMS Northumberland MOB incident 2014. MOB fm Torpoint ferry Jun 2014. QHM represented at RNLI water safety forum. Usually alcohol related -Drunk overboard from Plymouth Princess (Jul 16). MOB fm HMS RCMD(Sep 17). MOB fm Yacht at Oreston (Feb 18). MOB fm Battery Buoy during maintenance (Jun 18). MOB fm MV Plymouth Sound (alcohol related) (Jul 18). 2x MOB from FV alongside in Victoria Wharf ((Oct 18)
26	2	Port Approach, Western Channel, Plymouth Sound	Contact - Berthing	MoD Passenger Craft Contact Berthing Alongside Warship	Passenger carrying vessel operated by, or under charter to military in contact berthing alongside warship underway or at anchor.	Passenger	QHM, Relevant Harbour Authority, Royal Navy / RFA, Serco Denholm - Passenger	Mechanical failure / defect; Skipper / Master error; Reduced visibility; Adverse weather / tidal conditions; Result of action with 3rd party vessel; Heavy traffic.	Minor damage to vessel and fendering.	Fatality and major injuries; damage to both vessels; Media attention	0	5	0	0	0	6	4	4	4.02	Serco Denholm operate a number of MCA certificated launches / crew on behalf of MoD; MoD safety procedures; Hazard has reportedly occurred in port. Fog viewed to be most likely causal factor for loss of situational awareness. Bad Seamanship. Near Miss when SD Cawsand struck RFA Lyme bay Pilot Ladder. SD Newhaven approached HMS St Albans with brow lowered. SD Newhaven suffered 2 x SG failures in 2 months (2018). £ x near misses reported when lines parted setting up for underway boat tx. (Mar 18)
27	41	Port Approach, Western Channel, Eastern Channel, Plymouth Sound, Cattedwater & Sutton Harbours, Millbay Docks	Grounding	Commercial (incl passenger) vessel grounding in port waters	Commercial / passenger vessel other than tanker grounds in port waters. This includes Cremyll, Mt Batten, RWY, Cawsand Bay ferries as well as Commercial Pleasure Cruise vessels.	Large Vessel (>100 Metres) Generic	ABP HM, CHA Pilots, CHC HM, Commercial Vessel Operator, Emergency Responders, QHM, Relevant Harbour Authority	Pilot / Master error; Equipment/mechanical defect / failure; Restricted visibility; Adverse weather / tidal conditions; Vessel motion; squat; heel; shallow water effect; Result of action with 3rd Party vessel; Port Control failure; Heavy traffic ; Loss of directional control of (active) escort tug.	Minor damage	Major damage to vessel; Pollution; Vessel sinks blocking access; Significant media attention;	0	3	3	3	6	4	6	6	4.01	Commercial vessels grounded 1955 and 1973. Commercial vessels increasingly using HFO as bunkers; No requirement for ships to have double bottoms to protect bunker tanks; Once vessel committed no opportunity to abort; Eastern Entrance rarely used; Well sheltered other than from SW quarter; Port area subject to regular Hydrographic surveys; Exposed to wind from S in port approaches. See MAIB report and recommendations following grounding of Quiberon in Plymouth Sound on 17 March 1999; MAIB report 'Midland 2' grounding. Near miss Nov 2015 when Celtic navigator suffered engine failure outbound Victoria Wharf.

Rank	Hazard Ref.	Affected Areas	Accident Category	Hazard Title	Hazard Detail	Affected Vessel Types	Affected Stakeholders	Possible Causes	Consequence Descriptions		Risk By Consequence Category							Risk Overall	Remarks	
									Most Likely (ML)	Worst Credible (WC)	ML			WC						
											Environment	People	Property	Stakeholders	Environment	People	Property			Stakeholders
28	9	Plymouth Sound	Contact - Navigation	Commercial / fishing vessel in contact with nuclear submarine berthed or anchored in Sound	Commercial / fishing vessel collides with nuclear submarine moored on one of the fixed mooring buoys located to the north of the breakwater or at anchor.	All	Admiralty Pilots, CHA Pilots, Charter Passenger, CHC HM, Emergency Responders, Fish Market, MCA, Plymouth City Council, QHM, Relevant Harbour Authority, Royal Navy / RFA, Sutton Harbour HM	Mechanical failure / defect; Master / Skipper / pilot error; Result of avoiding action with 3rd party vessel; FOST manoeuvres; Reduced visibility; Adverse weather / tidal conditions; Berthed submarine lies across main channel; Excessive speed; Heavy traffic, Port Control Failure.	Minor damage to both vessels	Fatalities and / or major injuries; Major damage to both vessels; pollution; vessel sinks blocking access; Media attention with questions raised over safety of nuclear submarine operations.	0	2	2	5	4	4	4	5	3.99	Nuclear submarines would normally only use 'z' berths; 100 metre exclusion zone rigorously enforced by MoD. FSC 250 Issue 2 published Oct 18.
29	70	Port Approach, Western Channel, Eastern Channel, Plymouth Sound, Cattedwater & Sutton Harbours, Millbay Docks, Hamoaze, River Lynher & St Johns Lake	Personal Injury	Air Craft Crash	Aircraft crashes within the DPoP.	All	ABP HM, Admiralty Pilots, Emergency Responders, MCA, QHM, Relevant Harbour Authority, Royal Navy / RFA, Salvors, Serco Denholm - Port Ops, VTS	Fault within Aircraft, fire, or explosion. Pilot Error. Adverse weather.	Ditches in the water with some causalities avoiding any vessels within the vicinity.	Crashes into the sea colliding with a vessel with many casualties and fatalities.	1	4	3	3	3	5	4	5	3.99	The secondary risk would be to the Emergency responders when they attend the crash site (especially with military aircraft) as stated in BR45(4). Shoreham air crash. New restrictive guidelines - regulatory scrutiny.

Rank	Hazard Ref.	Affected Areas	Accident Category	Hazard Title	Hazard Detail	Affected Vessel Types	Affected Stakeholders	Possible Causes	Consequence Descriptions		Risk By Consequence Category							Risk Overall	Remarks	
									Most Likely (ML)	Worst Credible (WC)	ML				WC					
											Environment	People	Property	Stakeholders	Environment	People	Property			Stakeholders
30	65	Port Approach, Western Channel, Eastern Channel, Plymouth Sound, Cattewater & Sutton Harbours, Millbay Docks, Hamoaze	Collision	Collision involving tanker	Collision between a tanker entering / leaving port and a vessel of similar size	Tanker	Admiralty Pilots, CHA Pilots, CHC HM, Commercial Vessel Operator, Emergency Responders, FRS, MCA, QHM, Relevant Harbour Authority, Royal Navy / RFA, Sutton Harbour HM	Mechanical/equipment failure / defect; Master / Pilot error; Restricted visibility; Adverse weather / tidal conditions; FOST training; Port Control failure; Result of avoiding action with 3rd party vessel; Heavy traffic;	Potential minor injuries / vessel damage	Fatality or major injuries; Major damage to both vessels; Significant pollution; Potential for fire on tanker; Vessel sinks blocking access; Media attention;	4	2	2	2	5	5	5	5	3.98	Change to harmonised VHF channel to de-conflict in Western Channel. Large volumes of highly flammable gasoline (petrol), diesel and jet fuel delivered to both Cattewater and Yonderberry. Heavy Fuel Oil in Millbay. Nr miss when tanker Bro Nibe impeded by yacht (Jun 16).
31	50	Port Approach, Western Channel, Plymouth Sound, Cattewater & Sutton Harbours, Millbay Docks, Hamoaze	Personal Injury	Personal injury to tug / support craft crew	Personal injury to tug / support craft crew during escort or ship assist duty	Port Support	ABP HM, CHC HM, QHM, Relevant Harbour Authority, Serco Denholm - Port Ops	Inexperienced skipper / crew; Tow line failure; Heavy weather; water on deck; Heavy landing; Mechanical failure / defect; Weighted heaving lines; Incorrect PPE; Girting	Minor injury	Fatality; Media interest	0	5	0	0	0	6	4	4	3.95	Cold moves of vessels accounts for approximately 40% of Admiralty Pilots' workload. Serco provides Seamanship, including line tending brief to visiting ships. Numerous nr misses reported due to mistaking of lines during Boat TX - New SOP succesful to date(Jul 17). Contact between SD Assist and RFA Tidespring bulbous bow, Assist prop damaged but no injuries(Feb 18). Assist briefly trapped by AO lines while assisting RFA to depart D Buoy (May 19).

Rank	Hazard Ref.	Affected Areas	Accident Category	Hazard Title	Hazard Detail	Affected Vessel Types	Affected Stakeholders	Possible Causes	Consequence Descriptions		Risk By Consequence Category						Risk Overall	Remarks		
									Most Likely (ML)	Worst Credible (WC)	ML			WC						
											Environment	People	Property	Stakeholders	Environment	People			Property	Stakeholders
32	16	Plymouth Sound, Hamoaze	Contact - Navigation	Non seagoing (charter) passenger / powered recreational vessel in contact with nuclear submarine berthed or anchored in Sound	Non-seagoing passenger / powered recreational vessel collides with nuclear submarine moored on one of the fixed mooring buoys located to the north of the breakwater or at anchor. This includes RWY, Cawsand Bay ferries as well as Commercial Pleasure Cruise vessels	Passenger	Charter Passenger, Emergency Responders, MCA, QHM, Relevant Harbour Authority, Royal Navy / RFA, VTS	Mechanical failure / defect; Master / skipper error; Reduced visibility; Adverse weather / tidal conditions; Excessive speed; Heavy traffic. Result of avoiding action with 3rd party vessel. No requirement for national qualification or regulation.	Serious injuries; Minor damage to ship. National media interest.	Fatality / multiple serious injuries; Major vessel damage; Media attention, concerns expressed over safety of nuclear submarines	0	4	2	4	1	4	4	5	3.88	Nuclear submarines would normally only use 'z' berths; 100 metre exclusion zone established around submarine and strictly enforced by piquet boats / MoD police. CHA Pilot boat coxswain to be used in poor visibility when boat crews have no local knowledge. Local Knowledge Qualification required via boatman's licence.
33	53	Plymouth Sound, Cattewater & Sutton Harbours, Millbay Docks, Hamoaze, River Lynher & St Johns Lake	Personal Injury	Inappropriate swimming activity	Persons engage in swimming at a location or time when it is inappropriate to do so	All	ABP HM, CHC HM, Plymouth City Council, QHM, Relevant Harbour Authority, Sutton Harbour HM	Swimming in vicinity of vessel movements; Lack of clear signposting of dangers presented by swimming; Cold water / winter; Incorrect attire; Bravado; influence of alcohol; peer pressure; over estimate of capabilities; Strong wind / tide; Poor health; hear	Minor injury	Fatality; Media interest;	0	6	0	0	0	6	0	4	3.85	Public have right of access to many areas of the port; Swing bridge for public footpath crosses lock entrance to Sutton Harbour, closed to public 2300 and 0400. Reported that individuals will climb over gates and /or try to swim across lock entrance when closed. Harbour authority to provide advice to facility owner/local authority. Lone swimmer reported by Torpoint ferry after birthday celebration (Jun 2016). Increase in popularity of "Wild Swimming". 2 persons recovered from port (2016). Swimmers escorted from main channel (Jun 18).

Rank	Hazard Ref.	Affected Areas	Accident Category	Hazard Title	Hazard Detail	Affected Vessel Types	Affected Stakeholders	Possible Causes	Consequence Descriptions		Risk By Consequence Category							Risk Overall	Remarks	
									Most Likely (ML)	Worst Credible (WC)	ML				WC					
											Environment	People	Property	Stakeholders	Environment	People	Property			Stakeholders
34	48	Plymouth Sound, Cattewater & Sutton Harbours, Millbay Docks, Hamoaze	Personal Injury	Personal Injury to workboat crew	Work boat crew suffer personal injury during berthing operations; including line handling.	Port Support	ABP HM, CHA Pilots, CHC Commercial Wharves, CHC HM, QHM, Relevant Harbour Authority, Serco Denholm - Passenger	Crossing ropes (line boat passing over the top of); Line boat caught between berth face and ship; Anchor dropped while line boat underneath; Uncontrolled dropping of mooring lines or wires onto line boat; Line boat underpowered for lines being passed;	Minor injury	Fatality; Media interest	0	6	0	0	0	6	0	4	3.84	Mitigated by AP/tug master meetings. Assist briefly trapped by AO lines while assisting RFA to depart buoy.
35	61	Plymouth Sound, Cattewater & Sutton Harbours, Millbay Docks, Hamoaze	Fire & Explosion	Commercial / military vessel fire alongside	Fire on a commercial / tanker / warship / passenger vessel whilst alongside berths, buoys or anchor.	All	ABP HM, Admiralty Pilots, CHA Pilots, Charter Passenger, CHC Commercial Wharves, CHC HM, Commercial Vessel Operator, FRS, QHM, Relevant Harbour Authority, Royal Navy / RFA, Serco Denholm - Passenger, Serco Denholm - Port Ops, Sutton Harbour HM	Faulty equipment; Human error; Arson; Sabotage; Failure to conform with fire prevention standards; Oil leak in engine room; Smoking; Lightning strike; Inadequate FiFi equipment or appropriate action; Failure to take appropriate precaution with gas bottle	Minor injury; Minor damage to vessel;	Fatality and / or major injuries; Extensive damage to vessel; Fire spreads to neighbouring vessels; Minor pollution; Berth closure; Media attention;	0	3	3	3	3	5	5	5	3.81	Devon FRS have undertaken drills with Brittany Ferries at Millbay Docks; gas oil / petrol / jet fuel delivered to Cattewater / Yonderberry. Fire Boat Vigiles will attend all waterborne fires from 2014. MV Lady Nola cargo fire incident 2013.

Rank	Hazard Ref.	Affected Areas	Accident Category	Hazard Title	Hazard Detail	Affected Vessel Types	Affected Stakeholders	Possible Causes	Consequence Descriptions		Risk By Consequence Category							Risk Overall	Remarks	
									Most Likely (ML)	Worst Credible (WC)	ML				WC					
											Environment	People	Property	Stakeholders	Environment	People	Property			Stakeholders
36	10	Plymouth Sound	Contact - Navigation	Seagoing passenger vessel in contact with ship berthed or anchored in Sound	Seagoing passenger vessel - liner or ferry service - collides with ship moored on one of the fixed mooring buoys located to the north of the breakwater or at anchor.	All	ABP HM, Brittany Ferries, CHA Pilots, CHC HM, Emergency Responders, QHM, Relevant Harbour Authority, Royal Navy / RFA	Mechanical failure / defect; Master / pilot error; Reduced visibility; Adverse weather / tidal conditions; Excessive speed; Result of avoiding action with 3rd party vessel; Vessel lies across main channel; Heavy traffic; Port control failure;	Minor damage to both parties.	Potential fatality / multiple injuries; Major damage to both vessels; Pollution; Media attention.	0	2	2	3	3	5	5	6	3.81	Large ships may swing across main channel. Large passenger ships anchor in Sound. Brittany Ferries would normally use Asia Pass rather than Smeaton Pass. Major passenger evacuation. Scenario used for emergency response exercise (2015). Reduction in Ferry movts (2018).
37	55	Plymouth Sound, Cattewater & Sutton Harbours, Millbay Docks, Hamoaze, River Lynher & St Johns Lake	Swamping & Foundering	Recreational/Fishing vessel swamping	Recreational vessel swamped or otherwise founders	Leisure	ABP HM, CHC HM, Emergency Responders, Plymouth City Council, QHM, Sutton Harbour HM	Skipper error; Equipment failure / defect; Sudden change in wind / sea conditions; Failure to cancel event; Wash from emergency response craft;	Minor hypothermia / shock	Fatality / multiple injuries; Media interest;	0	5	0	0	0	6	2	4	3.8	WC scenario based on MAIB report into yacht Ouzo incident; Many events take place within port limits; Conformance with Recreational Craft Directive and fulfilment of safety standards, including use of lifejackets; Majority incidents associated with dinghies capsizing with no untoward effect. Wreck removal. FV Solstice foundered off Rame Hd (Sep 18). FV Laura Jane capsized with 1 fatality nr Mt Batten (May 18).
38	44	Port Approach, Western Channel, Plymouth Sound	Grounding	Vessel drags anchor	Vessel drags anchor in port limits.	All	CHC HM, QHM, Relevant Harbour Authority	Inappropriate anchorage position; Human error; Adverse weather / tidal stream; Insufficient anchor cable; Poor holding ground; Engines not ready for manoeuvre; Clearance not obtained from Port Control to immobilise engines; Port Control failure;	Minor damage	Major damage; Significant pollution; Media interest;	0	0	3	3	4	4	6	4	3.79	WC scenario based m.t. Willy incident. Port area subject to regular Hydrographic surveys. MV Stadium dragging anchor incident in Cawsand Bay 2014. VTS no longer IALA compliant, alarm threshold range reduced. HMS Diamond dragged anchor (Feb 17)

Rank	Hazard Ref.	Affected Areas	Accident Category	Hazard Title	Hazard Detail	Affected Vessel Types	Affected Stakeholders	Possible Causes	Consequence Descriptions		Risk By Consequence Category							Risk Overall	Remarks	
									Most Likely (ML)	Worst Credible (WC)	ML				WC					
											Environment	People	Property	Stakeholders	Environment	People	Property			Stakeholders
39	12	Port Approach, Western Channel, Eastern Channel, Plymouth Sound, Cattewater & Sutton Harbours, Hamoaze, River Lynher & St Johns Lake	Contact - Navigation	Non seagoing (charter) passenger vessel in contact with buoy in Harbour	Charter passenger / powered recreational vessel in contact with one of the fixed mooring buoys located in harbour. This includes Cremyll, Mt Batten, RWY, Cawsand Bay ferries as well as Commercial Pleasure Cruise vessels	Passenger	Charter Passenger, CHC HM, Emergency Responders, MCA, Plymouth City Council, QHM, Relevant Harbour Authority	Mechanical failure / defect; Master / skipper error; Reduced visibility; Adverse weather / tidal conditions; Result of avoiding action with 3rd party vessel; Excessive speed;	Minor damage to vessel / buoy	Multiple injuries; Significant damage to buoy; Damage to vessel; media attention.	0	3	0	3	2	6	4	6	3.79	Many passenger craft carry up to 240 persons operate, notably during the summer months; Certified by MCA; Boatmasters certificate. CHA appropriate person with local knowledge to be used in poor visibility when boat crews have no local knowledge. MCA local knowledge qualification requested.
40	28	Port Approach, Western Channel, Plymouth Sound, Cattewater & Sutton Harbours, Millbay Docks, Hamoaze	Contact - Navigation	Heavy contact between tug or other support craft with commercial vessel or warship	Tug or other port support craft makes heavy, damaging contact with commercial or military vessel it is deployed to assist	Port Support	Admiralty Pilots, CHA Pilots, CHC HM, Commercial Vessel Operator, QHM, Relevant Harbour Authority, Royal Navy / RFA, Serco Denholm - Port Ops	Mechanical defect / failure; Master / Pilot /Tug skipper error; Pilot error; Reduced visibility; Tug error or failure; Adverse weather / tidal conditions; Sudden change in weather conditions;	Minor damage to vessels	Major damage to vessels; Pollution; Local media interest.	0	3	3	0	4	4	6	4	3.78	Tugs (normally Serco Denholm) required to be deployed to assist seagoing passenger vessels if wind speed exceeds 35 knots. Contact between SD Florence and Plym II while cold moving (Nov 18)

Rank	Hazard Ref.	Affected Areas	Accident Category	Hazard Title	Hazard Detail	Affected Vessel Types	Affected Stakeholders	Possible Causes	Consequence Descriptions		Risk By Consequence Category							Risk Overall	Remarks	
									Most Likely (ML)	Worst Credible (WC)	ML				WC					
											Environment	People	Property	Stakeholders	Environment	People	Property			Stakeholders
41	21	Western Channel	Contact - Navigation	Nuclear submarine contact with breakwater	Nuclear submarine entering or leaving port in contact with breakwater	Nuclear Submarine	Admiralty Pilots, QHM, Relevant Harbour Authority, Royal Navy / RFA, Serco Denholm - Port Ops	Mechanical failure / defect; Master / pilot error; Reduced visibility; Adverse weather / tidal conditions; Heavy traffic; Port control failure; Result of avoiding action with 3rd party vessel; FOST manoeuvres; Failure to use or inappropriate use of tugs.	Minor damage	Minor injuries; Significant damage to submarine external equipment without compromising integrity of pressure hull; Damage to breakwater; Extensive media exposure with questions raised over safety of nuclear submarine operations.	0	2	3	5	0	3	4	5	3.76	All nuclear submarine movements overseen by Admiralty Pilots. Extensive use made of simulators as part of passage planning. Nuclear moves have reduced in recent years.
42	45	Plymouth Sound, Cattedwater & Sutton Harbours, Hamoaze, River Lynher & St Johns Lake	Grounding	Non-seagoing passenger (charter) vessel grounds in harbour	A charter passenger vessel grounds whilst operating within port limits. This includes Cremyll, Mt Batten, RWY, Cawsand Bay ferries as well as Commercial Pleasure Cruise vessels.	Passenger	CHC HM, Commercial Vessel Operator, Emergency Responders, MCA, Plymouth City Council, QHM, Relevant Harbour Authority	Skipper error; Mechanical defect / failure; Adverse weather / tidal conditions; Restricted visibility; Uncharted hazard; Heavy traffic	Minor damage	Fatality or serious injury; Major damage to vessel; Media attention	0	3	0	3	0	6	4	6	3.66	May be licensed to carry up to 240 passengers. Operations close to shore generally required to enhance experience for passengers. Dangers of over reliance on use of visual navigation alone in Sound highlighted in MAIB report into grounding of Quiberon. Port area subject to regular Hydrographic surveys. CHA Pilot boat coxswain to be used in poor visibility when passenger boat crews have no local knowledge. MCA requested for local knowledge endorsement.

Rank	Hazard Ref.	Affected Areas	Accident Category	Hazard Title	Hazard Detail	Affected Vessel Types	Affected Stakeholders	Possible Causes	Consequence Descriptions		Risk By Consequence Category							Risk Overall	Remarks	
									Most Likely (ML)	Worst Credible (WC)	ML				WC					
											Environment	People	Property	Stakeholders	Environment	People	Property			Stakeholders
43	18	Port Approach, Western Channel, Plymouth Sound, Hamoaze	Contact - Navigation	Nuclear submarine contact with fixed navigational mark	Nuclear submarine entering or leaving port in contact with fixed navigational mark in harbour	Nuclear Submarine	Admiralty Pilots, QHM, Relevant Harbour Authority, Royal Navy / RFA, Serco Denholm - Port Ops	Mechanical failure / defect; Master / pilot error; Reduced visibility; Adverse weather / tidal conditions; Port control failure; Failure to use or inappropriate use of tugs. Nav Aid failure	Minor damage to vessel or mark.	Damage to navigation mark and vessel; Media interest with questions raised over safety of nuclear submarine operations.	0	0	2	5	1	3	4	5	3.64	All manoeuvres conducted under guidance of Admiralty Pilots and with the use of tugs. 100 metre exclusion zone strictly enforced by piquet boats / MD Police.
44	58	Western Channel, Eastern Channel, Plymouth Sound, Cattewater & Sutton Harbours, Millbay Docks, Hamoaze, River Lynher & St Johns Lake	Swamping & Foundering	Non-seagoing passenger (charter) vessel loses stability	Charter passenger vessel floods as the result of some failure with the vessel; This includes Cremyll, Mt Batten, RWY, Cawsand Bay ferries as well as Commercial Pleasure Cruise vessels.	Passenger	ABP HM, Charter Passenger, CHC HM, Emergency Responders, MCA, Plymouth City Council, QHM, Relevant Harbour Authority, Serco Denholm - Passenger, Sutton Harbour HM	Human error; Mechanical failure / defect; Structural failure; Inappropriate loading;	Minor damage; Shock / distress for passengers;	Possible fatalities and / or major injuries; Major damage to vessel; Pollution; Media interest;	0	3	0	3	2	6	3	5	3.62	All vessels subject to Local Authority or MCA Certification and UK stability standards. FV nearly swamped by Serco vessel while transiting The Bridge (Feb 18)

Rank	Hazard Ref.	Affected Areas	Accident Category	Hazard Title	Hazard Detail	Affected Vessel Types	Affected Stakeholders	Possible Causes	Consequence Descriptions		Risk By Consequence Category								Risk Overall	Remarks
									Most Likely (ML)	Worst Credible (WC)	ML				WC					
											Environment	People	Property	Stakeholders	Environment	People	Property	Stakeholders		
45	36	Port Approach, Western Channel, Eastern Channel, Plymouth Sound, Cattedwater & Sutton Harbours	Collision	Collision involving fishing / fishing charter vessel	Collision between a fishing / fishing charter vessel; and a vessel of similar or larger size; This includes Cremyll, Mt Batten, RWY, Cawsand Bay ferries as well as Commercial Pleasure Cruise vessels.	Fishing Vessel	CHC HM, Emergency Responders, Fish Market, MCA, QHM, Relevant Harbour Authority, Sutton Harbour HM	Mechanical failure / defect; Master / Pilot / Skipper error; Restricted visibility; Adverse weather / tidal conditions; FOST training; Port Control failure; Result of avoiding action with 3rd party vessel; Heavy traffic;	Minor injuries; Minor damage to both vessels;	Fatality and /or major injuries; Major damage to both vessels; Vessel sinks blocking access; Pollution; Media attention;	0	3	0	0	4	6	4	4	3.59	No requirement for less 20m vessels to report to Port Control. No requirement for operators to hold certificates of competence. Fishing vessels possibly more likely to monitor Sutton Harbour Control (lock) on Channel 12. Near Miss Between HMS Diamond and FV Emily J (2016). Nr miss between HMS Duncan and FV Avon Valley (2017) resulted in Cobbler Guard duty SOP being clarified. Near Miss collision between FV and HMS Dragon (Apr 18). Nr miss between FV N Osprey and FGS Hamburg in approach to Cobbler Channel (Mar 19).
46	39	Port Approach, Western Channel, Eastern Channel, Plymouth Sound, Cattedwater & Sutton Harbours, Millbay Docks, Hamoaze	Grounding	Laden tanker grounding in port approaches; East and West entrances and north of breakwater	Laden tanker grounds in port waters ;	Tanker	ABP HM, Admiralty Pilots, CHA Pilots, CHC HM, Commercial Vessel Operator, Emergency Responders, QHM, Relevant Harbour Authority, Royal Navy / RFA, Serco Denholm - Port Ops	Pilot / Master error; Equipment/mechanical defect / failure; Restricted visibility; Adverse weather / tidal conditions; Vessel motion; squat; heel; shallow water effect; Result of avoiding action with 3rd party vessel; Escort tug failure; Port Control f	Minor damage;	Major damage to vessel; Pollution; Vessel sinks blocking access; Significant media attention;	2	0	2	2	6	3	5	6	3.57	Older RFA tankers not double skinned; Port area subject to regular Hydrographic surveys; Exposure to SE winds; Tankers up to 11.5m bound for Yonderberry;

Rank	Hazard Ref.	Affected Areas	Accident Category	Hazard Title	Hazard Detail	Affected Vessel Types	Affected Stakeholders	Possible Causes	Consequence Descriptions		Risk By Consequence Category						Risk Overall	Remarks		
									Most Likely (ML)	Worst Credible (WC)	ML			WC						
											Environment	People	Property	Stakeholders	Environment	People			Property	Stakeholders
47	23	Cattewater & Sutton Harbours	Contact - Navigation	Vessel contact approach Sutton Harbour lock	Fishing, charter or recreational vessel contacts lock gate or dockside on entering or leaving Sutton Harbour	Fishing Vessel	CHC HM, QHM, Relevant Harbour Authority, Sutton Harbour HM	Mechanical failure / defect; Master / skipper error; Reduced visibility; Adverse weather / tidal conditions; Transit impeded by 3rd party vessel; Lock gates opened with vessel in channel / poor control by lockkeeper; Heavy traffic.	Minor damage to vessel and / or lock; minor pollution; Some disruption to port operations	Major injuries / possible fatality; significant damage to vessel and / or lock; Pollution; Local media interest.	3	0	0	0	2	6	4	4	3.44	Reportedly waters congested during summer with movements from adjacent marina as well to / from Sutton Harbour. F/V's leave early hours before most recreational vessel activity. Speed limit 4 kts
48	14	Port Approach, Plymouth Sound	Contact - Navigation	Commercial vessel in contact with ship berthed or anchored in Sound	Commercial vessel collides with ship moored on one of the fixed mooring buoys located to the north of the breakwater or at anchor.	Large Vessel (>100 Metres) Generic	CHA Pilots, Commercial Vessel Operator, Emergency Responders, QHM, Relevant Harbour Authority, Royal Navy / RFA, VTS	Mechanical failure / defect; Master / pilot error; Reduced visibility; Adverse weather / tidal conditions; Excessive speed; Vessel lies across main channel; Heavy traffic; Port Control failure; Result of avoiding action with 3rd party vessel	Minor damage to both vessels.	Multiple minor injuries; Major damage to vessels; Vessel sinks blocking access; Pollution; Media attention.	0	2	2	2	3	3	5	6	3.44	Reported that large ships swing on buoy or at anchor across main channel. 50 metre exclusion zone established around warships
49	67	Port Approach, Western Channel, Plymouth Sound	Personal Injury	Personnel transfer by boat with vessels underway	Personnel injury resulting from accident during transfer process from passenger craft to or from vessel underway / making way	All	Admiralty Pilots, CHA Pilots, CHC HM, QHM, Relevant Harbour Authority, Serco Denholm - Passenger, Serco Denholm - Port Ops	Skipper error; Inexperienced crew; Mechanical/equipment failure / defect; Adverse weather / tidal conditions; Excessive wash; Poor lee; Heavy landing; Incorrect PPE; Slips; Trips & Falls	Minor injury	Fatality; Media interest;	0	3	0	0	0	6	4	6	3.43	FOST personnel transfers occur regularly north of the Breakwater with both vessels underway. HMS Northumberland MOB incident 2014. New SOP in place for passing lines for boat tx (2016). Pilot embarkation HAZOP reviewed (Jan 17).
50	7	Hamoaze	Contact - Berthing	Contact Berthing Torpoint Ferry	Torpoint Ferry contacts berth during berthing manoeuvres	Passenger	Cornwall C C, Emergency Responders, Plymouth City Council, QHM, Torpoint Ferry	Master error; Mechanical defect / failure; Adverse weather condition; Restricted visibility; Chain Failure	Minor damage to bow ramp; Minor pollution;	Multiple moderate injuries, Major damage to vessel; Damage to vehicles; Local media interest	0	3	3	3	0	4	4	4	3.37	Service provided by three chain ferries operating on a 10 minute scheduled service. New ferries introduced have greater windage than old. During strong southerlies two ferries may run in parallel; the downstream ferry providing shelter for the upstream.

Rank	Hazard Ref.	Affected Areas	Accident Category	Hazard Title	Hazard Detail	Affected Vessel Types	Affected Stakeholders	Possible Causes	Consequence Descriptions		Risk By Consequence Category							Risk Overall	Remarks	
									Most Likely (ML)	Worst Credible (WC)	ML				WC					
											Environment	People	Property	Stakeholders	Environment	People	Property			Stakeholders
51	59	Port Approach, Western Channel, Eastern Channel	Swamping & Foundering	Seagoing vessel loses stability at port entrance	Seagoing vessel floods entering or leaving port;	All	CHC HM, Emergency Responders, MCA, Relevant Harbour Authority, Royal Navy / RFA	Human error; Mechanical defect / failure; Adverse weather / tidal conditions; Watertight hatches left open	Minor damage	Fatalities; Vessel sinks blocking access; Pollution threat; Media interest	0	2	0	0	3	6	5	5	3.3	Notably applicable to bulk carriers leaving port with hatches open for cleaning.
52	4	Plymouth Sound	Contact - Berthing	Warship / RFA Contact Berthing in Sound	Warship or RFA contacts buoy whilst berthing	Warship	Admiralty Pilots, QHM, Relevant Harbour Authority, Royal Navy / RFA, Serco Denholm - Port Ops	Master / pilot / tug master error; Mechanical defect / failure; Adverse weather / tidal conditions; Restricted visibility; Tug not used in adverse wind and /or strong tidal stream; Tug failure;	Minor damage to buoy and vessel	Major damage to buoy; Significant damage to vessel; Media attention	0	0	3	0	2	2	6	2	3.3	Buoys (berths) in Sound regularly used for operational purposes. These are the only berths with the capability to handle vessels at the maximum draught of 12 metres. Not considered credible for buoy to puncture hull, but note lightweight construction of warship.
53	13	Western Channel, Eastern Channel, Plymouth Sound	Contact - Navigation	Commercial vessel in contact with buoy.	Commercial vessel collides with fixed mooring buoys	Large Vessel (>100 Metres) Generic	ABP HM, CHA Pilots, CHC HM, Commercial Vessel Operator, Emergency Responders, Fish Market, QHM, VTS	Mechanical failure / defect; Master / pilot / skipper error; Reduced visibility; Adverse weather / tidal conditions; Excessive speed; Port control failure; Heavy traffic. Result of avoiding action with 3rd party vessel. Nav Aid Failure.	Minor damage to vessel / buoy	Serious injuries; Damage to vessel and buoy; Buoy out of commission.	0	3	3	3	2	2	4	2	3.16	Not considered credible for contact with buoy to cause significant damage to ship. BF normally use Asia Pass rather than Smeaton Pass. Mooring buoys located north of breakwater outside main channel.
54	27	Port Approach, Western Channel, Eastern Channel, Plymouth Sound, Cattewater & Sutton Harbours, Millbay Docks, Hamoaze, River Lynher & St Johns Lake	Contact - Navigation	Loss of control of dead ship	Control over the movement of a dead ship (cold move) within the harbour is lost	All	Admiralty Pilots, CHA Pilots, CHC HM, QHM, Relevant Harbour Authority, Royal Navy / RFA, Serco Denholm - Port Ops	Tug skipper error; Mechanical failure / defect on tug; Inadequate towage power; Adverse weather / tidal conditions; Sudden change of weather conditions.	Minor damage	Minor injuries; Vessel contacts nuclear submarine on berth; Moderate damage to casing and / external equipment on both vessels; Media interest with concerns raised over safety of nuclear vessel operations.	0	3	0	0	2	3	5	5	3.13	Movement of 'dead ship' v/ls account for approx. 40% of Admiralty pilot workload;

Rank	Hazard Ref.	Affected Areas	Accident Category	Hazard Title	Hazard Detail	Affected Vessel Types	Affected Stakeholders	Possible Causes	Consequence Descriptions		Risk By Consequence Category							Risk Overall	Remarks	
									Most Likely (ML)	Worst Credible (WC)	ML				WC					
											Environment	People	Property	Stakeholders	Environment	People	Property			Stakeholders
55	22	Western Channel, Eastern Channel	Contact - Navigation	Small vessel (fishing / recreational / charter passenger) in contact with breakwater	Vessel in contact with breakwater. This includes Cawsand Bay ferry and Commercial Pleasure Cruise vessels	Fishing Vessel	Charter Passenger, CHC HM, Emergency Responders, MCA, Plymouth City Council, QHM, Relevant Harbour Authority, Sutton Harbour HM	Mechanical failure / defect; Master / skipper error; Reduced visibility; Adverse weather / tidal conditions; Heavy traffic; FOST manoeuvres; Result of action with 3rd Party vessel. Poor local knowledge. Nav Aid failure.	Minor damage to vessel	Fatality and / or serious injury; Significant damage to vessel; Pollution; Port operations disrupted; Media interest.	0	3	0	0	2	5	3	5	3.1	Tidal influences. Exposed to wind from S through to SW. Restricted use of eastern channel. Yacht Larissa struck Breakwater 01 Sep 2014 owing to navigational error.
56	69	Port Approach, Western Channel, Plymouth Sound	Collision	FOST South Coast Exercise (Thursday War)	Exercise causes congestion in certain areas of the port and brings together a large number of assets and passenger transfers increasing the chance of collision.	Warship	ABP HM, Brittany Ferries, CHC HM, QHM, Relevant Harbour Authority, Royal Navy / RFA, Serco Denholm - Passenger, Serco Denholm - Port Ops, Sutton Harbour HM, VTS	Congestion, Inexperienced crew, foreign vessels new to port, war scenarios, aircraft involved,	Small collision between support vessel and warship	Collision between two warships causing many casualties	0	2	2	0	3	5	3	5	3	Weekly practice programme published with command and control structure inc. Special precautions, description of all processes in addition to normal safety procedures. All movements in/out of the port are mitigated by time and distance and an establishment of comms for coordinated Departure/Tactical manoeuvres.

Rank	Hazard Ref.	Affected Areas	Accident Category	Hazard Title	Hazard Detail	Affected Vessel Types	Affected Stakeholders	Possible Causes	Consequence Descriptions		Risk By Consequence Category							Risk Overall	Remarks	
									Most Likely (ML)	Worst Credible (WC)	ML			WC						
											Environment	People	Property	Stakeholders	Environment	People	Property			Stakeholders
57	66	Plymouth Sound	Contact - Navigation	Contact with towed array;	Towed array struck by vessel during deployment or recovery from warship in Sound;	All	Admiralty Pilots, Brittany Ferries, CHA Pilots, Charter Passenger, CHC HM, Commercial Vessel Operator, QHM, Relevant Harbour Authority, Royal Navy / RFA, Serco Denholm - Port Ops, Sutton Harbour HM	Mechanical/equipment failure / defect; Master / pilot/ skipper error; Reduced visibility; Adverse weather / tidal conditions; Excessive speed; Heavy traffic; Failure of array handling vessels to display appropriate lights; Scheduling towed array operation	Minor damage to vessel / array	Fatality / serious injuries; Major damage to vessel and array; Media interest;	0	0	3	0	0	5	3	3	2.97	Royal Navy submarines, operate with towed arrays. These are attached / recovered from the vessel within the Sound by Serco Denholm craft. 100 metre exclusion zone enforced around submarines, No surface vessel TA ops in DPop. Chartered pilot boat Gribben ran over TA recovery buoy (2016)
58	6	Plymouth Sound, Millbay Docks, Hamoaze	Contact - Berthing	Fuel barge contact berthing alongside warship	Fuel (bunker) barge contacts warship whilst being brought alongside for bunkering operations	Barge & Tug	Admiralty Pilots, QHM, Royal Navy / RFA, Serco Denholm - Port Ops	Tug Master / pilot error; Adverse weather / tidal conditions; Restricted visibility; Insufficient towage power; Tug mechanical failure / defect; Tug incorrectly deployed. Fenders incorrectly deployed; Result of avoiding action with 3rd party vessel;	Minor damage	Moderate damage; Local media interest. Pollution	0	0	3	0	4	0	4	4	2.95	Bunker barges only used to supply warships. Operated by Serco Denholm. Operations normally only conducted within Hamoaze, but bunkering may take place at berths (buoys) in Sound. Iron Duke struck by sullage barge before fendering in place (Sep 15)

Rank	Hazard Ref.	Affected Areas	Accident Category	Hazard Title	Hazard Detail	Affected Vessel Types	Affected Stakeholders	Possible Causes	Consequence Descriptions		Risk By Consequence Category								Risk Overall	Remarks
									Most Likely (ML)	Worst Credible (WC)	ML				WC					
											Environment	People	Property	Stakeholders	Environment	People	Property	Stakeholders		
59	17	Port Approach, Western Channel, Eastern Channel, Plymouth Sound, Cattewater & Sutton Harbours, Hamoaze	Contact - Navigation	Commercial, fishing vessel / warship contact with navigational mark	Commercial, fishing vessel / warship entering or leaving port in contact with fixed navigational mark in harbour	All	Admiralty Pilots, CHA Pilots, CHC Commercial Wharves, CHC HM, Commercial Vessel Operator, Emergency Responders, Fish Market, MCA, QHM, Relevant Harbour Authority, Royal Navy / RFA, Sutton Harbour HM	Mechanical defect / failure; Master / Pilot / Skipper error; Adverse weather / tidal conditions; Reduced visibility; FOST manoeuvres; Heavy traffic; Result of avoiding action with 3rd party vessel; Nav Aid Failure.	Minor damage to mark / vessel	Minor injuries; Major damage to mark; Minor damage to vessel;	0	0	3	3	0	4	4	2	2.9	Pilotage Directions otherwise, operate under PEC. FS Dixmude contacted Ash Buoy (2016). MV Navin Vulture contacted buoy off Deadman's Bay (Nov 18)
60	5	Hamoaze	Contact - Berthing	Nuclear submarine contact berthing in Dockyard	Nuclear submarine contacts jetty or moored ship during berthing manoeuvres.	Nuclear Submarine	Admiralty Pilots, QHM, Relevant Harbour Authority, Royal Navy / RFA, Serco Denholm - Port Ops	Master / pilot / tug master error; Mechanical failure / defect; Restricted visibility; Adverse weather / tidal conditions. Insufficient towage power; Tug mechanical failure / defect; Result of avoiding action with 3rd party vessel;	Minor damage to vessel / berth fendering	Nuclear submarine contacts other nuclear submarine on berth; Moderate damage to vulnerable external equipment on both vessels; Media interest with concerns raised over safety of nuclear vessel operations	0	0	3	2	0	1	4	4	2.76	All submarine movements under guidance of pilot. All pilots receive extensive, specialist training in the handling of nuclear submarines, including the use of simulators. All manoeuvres typically planned months in advance. 100 metre dynamic exclusion zone maintained and enforced around submarines. FSC 250 Issue 2 published Oct 18 -ALARP based Safety Case.

Rank	Hazard Ref.	Affected Areas	Accident Category	Hazard Title	Hazard Detail	Affected Vessel Types	Affected Stakeholders	Possible Causes	Consequence Descriptions		Risk By Consequence Category							Risk Overall	Remarks	
									Most Likely (ML)	Worst Credible (WC)	ML				WC					
											Environment	People	Property	Stakeholders	Environment	People	Property			Stakeholders
61	49	Port Approach, Western Channel, Plymouth Sound	Personal Injury	Personal injury to pilot / pilot launch crew	Pilot / pilot launch crew suffers personal injury during transfer.	Port Support	ABP HM, Admiralty Pilots, CHA Pilots, CHC HM, QHM, Relevant Harbour Authority, Serco Denholm - Port Ops	Coxswain error; Pilot / pilot launch crew is injured or falls during embarkation / disembarkation; Pilot ladder not rigged appropriately; Poor lee; Misjudge timing of transfer; Poor weather conditions causing severe movement of pilot launch; Pilot launch	Minor injury to Pilot / crew member;	Fatality; Media interest	0	3	0	0	0	5	0	3	2.72	Pilot boarding / landing regulations, helicopter ops south of the breakwater, SD Tamar Racer Pilot Incident 2013. HMS Tyne near miss, unsafe pilot ladder reported. - Nov 2014. 2x near misses in 2015 when ladder not correctly secured and ladder non compliant. Mitigated by visual inspection of ladder by pilot. Post PLA pilot fatality, pilot embarkation HAZOP reviewed (Jan 17), CHC in attendance.
62	19	Port Approach, Plymouth Sound, Hamoaze, River Lynher & St Johns Lake	Contact - Navigation	Non-seagoing (charter) passenger vessel contact with navigational mark	All small craft including non-seagoing (charter) passenger vessel operating within harbour in contact with navigational mark. This includes Cremyll, Mt Batten, RWY, Cawsand Bay ferries as well as Commercial Pleasure Cruise vessels.	Passenger	Charter Passenger, CHC HM, Emergency Responders, MCA, QHM, Relevant Harbour Authority	Mechanical failure / defect; Master / skipper error; Reduced visibility; Adverse weather / tidal conditions; Excessive speed; Heavy traffic; ; Result of avoiding action with 3rd party vessel. Nav Aid failure.	Minor damage to mark / vessel	Minor injuries; Serious damage to mark or vessel; Media attention.	0	0	2	0	2	4	4	4	2.72	Vessels operate with a capacity of up to 240 persons and subject to MCA regulation, including operator certification. CHA appropriate person with local knowledge to be used in poor visibility when boat crews have no local knowledge. No 3 bridge beacon struck by Princess 60, yacht and MDP launch in 2015.

Rank	Hazard Ref.	Affected Areas	Accident Category	Hazard Title	Hazard Detail	Affected Vessel Types	Affected Stakeholders	Possible Causes	Consequence Descriptions		Risk By Consequence Category							Risk Overall	Remarks	
									Most Likely (ML)	Worst Credible (WC)	ML				WC					
											Environment	People	Property	Stakeholders	Environment	People	Property			Stakeholders
63	54	Port Approach, Western Channel, Eastern Channel, Plymouth Sound, Hamoaze	Personal Injury	Inappropriate diving activity	Persons engage in diving at a location or time when it is inappropriate to do so;	All	ABP HM, Admiralty Pilots, CHA Pilots, CHC HM, Commercial Vessel Operator, Plymouth City Council, QHM, Relevant Harbour Authority, Royal Navy / RFA, Sutton Harbour HM	Human error / failure; Diving in vicinity of vessels movements; Failure to notify Port Control / secure QHM approval; Failure to display appropriate lights / signals; Adverse weather / tide conditions; Bends;	Vessel movements halted until diver(s) recovered;	Fatality; Port operations suspended; Media interest;	0	2	0	0	0	5	0	5	2.52	Wreck close to the recommended track in the vicinity of the Penlee reporting point Systems in place to manage the recovery of personnel suffering the bends. Lone diver recovered off Devils pt (Sep 2015). Diver advice flyers provided to dive shops. Diver advice regularly reviewed and updated. PLNTM 19/18 more closely controls recreational diving in The North Sound. Singleton diver fatality off Bovisand (Oct 18). Discussed at PPMLC, RNLI diving "kiosk" requested.
64	26	Port Approach, Plymouth Sound, Hamoaze	Contact - Navigation	Small vessel struck by anchor dropped by larger vessel	Port operations support craft - line handler, pilot boat etc. - struck by the anchor of a larger vessel dropped inappropriately as it is brought alongside	All	CHC HM, Plymouth City Council, QHM, Relevant Harbour Authority, Serco Denholm - Port Ops	Human error; Mechanical defect / failure; Failure of small vessel to observe; Unexpected event for ship at berth or in motion.	Minor damage	Fatality / major injuries; Major damage; Media interest	0	2	0	0	0	4	3	3	2.38	
65	25	Western Channel, Eastern Channel, Plymouth Sound, Hamoaze, River Lynher & St Johns	Contact - Navigation	Contact with drift wood	Vessel operating within port waters strikes drift wood	All	CHC HM, Emergency Responders, QHM, Relevant Harbour Authority	Aftermath of severe weather; Spring tides; Dumping of forestry waste in rivers; Loss of deck cargo; Failure to keep a proper lookout; Port Control failure.	Minor damage	Serious injuries / fatalities; Media interest	0	0	0	0	0	6	2	4	2.24	Reported that tree trunks have been observed drifting in port waters, particularly during Spring Tides. Regular PCO surveys.

Rank	Hazard Ref.	Affected Areas	Accident Category	Hazard Title	Hazard Detail	Affected Vessel Types	Affected Stakeholders	Possible Causes	Consequence Descriptions		Risk By Consequence Category						Risk Overall	Remarks		
									Most Likely (ML)	Worst Credible (WC)	ML			WC						
											Environment	People	Property	Stakeholders	Environment	People			Property	Stakeholders
66	60	Cattewater & Sutton Harbours, Millbay Docks, Hamoaze, River Lynher & St Johns Lake	Mooring Breakout	Mooring Breakout of vessel alongside	Berthed vessel breaks from wharf;	All	ABP HM, CHC Commercial Wharves, CHC HM, Plymouth City Council, QHM, Relevant Harbour Authority, Serco Denholm - Port Ops, Sutton Harbour HM	Larger vessel passes vessel alongside at close range and interaction occurs; Moorings of berthed vessel slack or not tended; poor deck watch; Tidal surge; High wind; Wash from passing craft;	Minor damage	Serious injuries; Major damage; Some spillage of cargo; Media interest;	0	0	0	0	3	5	3	3	2.14	Cemsea III broke away from berth (Feb 14).
67	3	Plymouth Sound	Contact - Berthing	Nuclear submarine contact berthing at 'Z's; Berth	Nuclear submarine in contact berthing on buoys D or E.	Nuclear Submarine	Admiralty Pilots, CHC HM, QHM, Royal Navy / RFA, Serco Denholm - Port Ops, Sutton Harbour HM	Master / Pilot error; Mechanical defect / failure; Adverse weather / tidal conditions; Restricted visibility; Tug mechanical failure / defect; Heavy traffic	Minor damage to submarine / buoy	Moderate damage to submarine / buoy; Media interest with concerns raised over safety of nuclear vessel operations	0	0	2	2	0	1	3	3	2.01	Only D & E berths suitable for submarines.
68	46	Cattewater & Sutton Harbours	Grounding	Vessel grounds in Sutton Lock	A fishing; charter or recreational vessel runs aground in the Sutton Lock or approach;	Fishing Vessel	CHC HM, Fish Market, QHM, Relevant Harbour Authority, Sutton Harbour HM	Skipper error; Mechanical defect / failure; Fishing vessel excessively loaded; Negative tidal surge; Incorrect depth information provided to users; Heavy traffic	Minor damage	Major damage; Vessel sinks and obstructs lock; Sutton Harbour business severely disrupted; Media interest	0	0	0	0	2	2	4	4	1.89	Sutton Harbour control the entry/exit of all vessels using lock. Margaret od Ladram grounding incident 2009. Vessels declare draft on arrival. .5M under keel clearance added (2017).
69	24	Port Approach, Western Channel, Eastern Channel, Plymouth Sound	Contact - Navigation	Small vessel contact with fishing apparatus	Small fishing or recreational vessel contacts crab pots, marker buoys or nets crossing Sound	Leisure	CHC HM, Emergency Responders, Plymouth City Council, QHM, Relevant Harbour Authority	Pots / nets not marked. Fishing apparatus laid outside authorised areas. Vessel operating in area subject to pot fishing; inexperience / lack of local knowledge / not using up-to-date navigational information.	Vessel disabled requiring tow	Major damage; Media interest.	0	0	0	0	0	3	3	3	1.5	