



**ENVIRONMENT BAY OF PLENTY  
REGIONAL COUNCIL AND WHAKATANE DISTRICT  
COUNCIL**

**EASTERN BAY OF PLENTY HARBOURS  
NAVIGATIONAL RISK ASSESSMENT**

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Whakatane District Council  
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**Environment Bay of Plenty  
Eastern Bay of Plenty Harbours  
Navigational Risk Assessment**

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## EXECUTIVE SUMMARY

This document records a marine risk assessment for the Eastern Bay of Plenty Harbours (Whakatane, Thornton, Ohiwa, and Opotiki), as part of the introduction of the New Zealand Port and Harbour Marine Safety Code to the Bay of Plenty Region. It was undertaken in March and April, 2006 and included a number of consultation meetings with key stakeholder groups in each of the Bar harbours considered.

The hazard identification process derived 24 hazards, which were described at an overview level, allowing a wide range of associated causes to be considered against each hazard. The risk scoring process determined that significant risks are being managed at some bar harbours although Thornton bar in particular experiences a regular rescue response. The risk assessment also identified that marking a key rock at the entrance to Whakatane would reduce a high frequency of impacts. Swimming and diving at launching ramps in the path of craft is a general problem in the harbours and is a matter of concern. There are a large number of risk control options associated with this study and these are presented at Annex E. The selected Risk Control Options will be taken forward in the Harbour Safety Plan for the Navigational Safety Management System under the NZ Port and Harbour Safety Code. Conclusions from this risk assessment study are recorded below:-

- 1) The Eastern Bay of Plenty harbours make a significant contribution to the overall navigational risk profile for the area. Loss of life has occurred in the past and this study has determined that significant risk levels are apparent at some bars. Using the Risk Criteria defined for this study suggests that a risk management policy should be introduced within two years.
- 2) The Regional Council as Harbour Authority is recommended to consider remote condition monitoring of the condition of all bars in the Bay of Plenty Region, by camera (webcam). The more hazardous bars (e.g. Thornton) may additionally be appropriate candidates for thermal imaging camera monitoring (infra red).
- 3) Overturning of craft at Thornton Bar has provided the highest placed hazard of the risk assessment. This is due to the frequency of the event. The incident response at Thornton is reliant on a voluntary rescue service that is funded and manned by a local resident and his son. Although it appears this is highly effective, a longer term strategy is recommended for safety management at Thornton Bar. Search and Rescue is not a core duty of a Council and the solution to this may include involvement of the coast guard.

- 4) Grounding (or striking) Mussel Rock at Whakatane features significantly in the risk assessment, due to the frequency of occurrence of incidents involving damage. Consideration should be given to installing a permanent day mark on Mussel Rock.
- 5) Minors swimming and jumping off launching ramps is a common safety problem throughout the Eastern Bay harbours and a similar problem exists at Tauranga. Serious concern of potential injury was expressed by Stakeholders consulted. There are no simple solutions as reasons for this may be different in each location. However a policy of general education in schools and throughout the community is worthy of consideration.
- 6) With reference to section 7.5, the Regional Council is recommended to define a navigation area where directions for entry and exit can be specified in Bylaws, which are relevant to the Eastern Bay bar harbours. This would recreate local harbour limits, which mariners from any part of the world can readily identify with and understand.

## 1 INTRODUCTION

This document provides the initiating report for introduction of a navigational safety management system encompassing the Eastern Bay of Plenty Harbours (Whakatane, Thornton, Ohiwa, and Opotiki), as part of the introduction of the New Zealand Port and Harbour Marine Safety Code (the Code). It describes a marine risk assessment and its findings in summary form in accordance with the requirements of the Code. The risk assessment has been undertaken on behalf of Environment Bay of Plenty Regional Council and Whakatane District Council. The Opotiki entrance and harbour has been included within this assessment, recognising that Opotiki District Council is an important Stakeholder in this area.

This document is intended to be a complete report, with risk management options and recommendations. It can be used as a basis to develop a Harbour Safety Plan and ongoing Harbour Safety Management System (SMS) as required by the Code.

Authors would like to sincerely thank all stakeholders and independent contributors who provided input into this large Risk Assessment and its outcomes.

### 1.1 PURPOSE AND SCOPE

The purpose of the assessment was to identify key hazards associated with navigation of vessels and smaller craft in the area bounded by the harbour and pilotage limits. After ranking these in order of relative risk, measures for management of higher levels of risk were then derived.

The scope of the risk assessment also included consideration of:

- a) Incident data and near-miss reports;
- b) The views of relevant harbour stakeholders about navigational safety;
- c) The varying commercial and leisure activities occurring in Harbours within The Eastern Bay of Plenty Region;
- d) The varying conditions associated with Bar Crossings;
- e) The organisational structure available (within Environment Bay of Plenty Regional Council and the District Council) to manage any identified risks of significance.

There are a number of small bar harbours in the Eastern Bay of Plenty area. Although this risk assessment covers the larger of these, the hazards are relevant to all.

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## 1.2 PREVIOUS RISK ASSESSMENTS OF RELEVANCE

There have been previous harbour management plans made by Whakatane District Council, for Whakatane Harbour and there is also a Recreational Harbour Management Plan available for Ohiwa. Numerous studies have been made into the environmental effects at the Whakatane Bar with a view to determining a solution to its changing nature and the depth of water across it. However, no risk assessments considering navigational safety have been undertaken. There has been much work undertaken nationally to address the issue of safety in the crossing of Bars at Harbours in New Zealand.

## 1.3 CODE APPLICATION ASSESSMENT FINDINGS

The Harbours considered by this risk assessment lie fully within the Environment Bay of Plenty Harbour Jurisdiction and therefore Bylaw limits. Vessels and craft using the Harbour are all under the MNZ national pilotage limit (Directions affecting pilotage in an annex to Bylaws refer to Tauranga harbour only). With Bar clearances in the order of two metres, vessels subject to national pilotage limits could not provide sufficient under keel clearance to make the crossing.

The Code Application Assessment provided conclusion that although the smaller harbours in the Eastern Bay of Plenty Region lay within jurisdiction, the Bylaws did not consider general limiting parameters for the smaller harbours, with the exception of Whakatane where limits on coincident crossing at the entrance were in place. When the old Harbour limits were extended no specific navigational extents for harbours were created and therefore, the extent of navigation control around the Whakatane, Ohiwa and Opotiki Harbour entrance was difficult to clearly establish from Bylaws. These aspects were taken forward for consideration in the risk assessment.



## 2 METHODOLOGY

This section of the report describes in an overview how the risk assessment project was undertaken.

The methodology used followed the New Zealand Risk Assessment and Safety Management System Guidelines<sup>1</sup>. The criteria used for the risk assessment scoring were taken from the guidelines, but modified to suit the requirements of the harbours in the area. This was done to reflect the smaller range of navigational services that operate from the smaller Bar Harbours in the region. The risk criteria are attached at **Annex A** for ease of reference. Additional information about how the criteria have been applied for risk management purposes is recorded in Section 3.

The methodology deployed is intentionally practical and used experience drawn from port and harbour risk assessment as well as the marine experience provided by representatives from the harbour regulator and key harbour users. The methodology also considered the incident background of the area. It thus provides the widest possible input of hazards for consideration by the risk assessment. However, the Regional Council, in its role as Harbour Authority and a District Council in its role of Wharf Owner/Operator should expect to introduce ongoing hazard identification and review to ensure that all relevant hazards have been considered and accurately assessed.

### 2.1 INTERVIEWS AND FAMILIARISATION TRIPS

The District Council Harbour Superintendent provides management of the Whakatane Wharves operation and some aspects of management of a safe access to the Harbour. The Regional Council Harbourmaster role for the Eastern Bay of Plenty Region is undertaken by those managing the Harbourmaster's department, including the Harbourmaster his Deputy. The Harbourmaster's role is to ensure regulation of the Bylaws and determine the condition of the various entrances for transit. Input and interview with those having experience of both roles was important to the risk assessment. It thus formed the basis of preliminary interviews and their input continued throughout the risk assessment.

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<sup>1</sup> The methodology follows the guidance provided by the Australian and NZ Standard 4360 and the NZ Port and Harbour Marine Safety Code.

All Bar Harbours were visited, both to understand the topography and to meet with users. The Whakatane Bar and Ohiwa Bar were crossed in the Eastern Bay of Plenty Harbourmaster's craft. Ohiwa Harbour was also visited on water.

Most stakeholders were represented in person or by organisation at Hazid meetings. Separate meetings were held with others, (e.g. Thornton Rescue). A list of key stakeholder types invited to input into the assessment (whether by participation in meetings or from invited feedback) is attached at **Annex B**.

### 2.1.1 Risk Consultation Input

For stakeholder consultation, organised groups and yacht clubs were written to by Environment Bay of Plenty Regional Council. Mooring users were written to separately and other Groups invited via the Coastguard network system. A series of evening consultation meetings were held at each Bar harbour in March 2006. Consultation meetings were held with the Whakatane and Regional Council harbour teams. Hazard Identification mostly involved those with close understanding of craft and vessel/craft movements in each Bar Harbour. Consultation was made with the local Maritime New Zealand MSI.

## 2.2 INCIDENT DATA AND DOCUMENT REVIEW

Obtaining accurate records of incident data for small harbours is a challenging subject, which has not yet been fully resolved. The Coastguard holds much information, but is in a conflict of interest with what it may view as passing on negative information on about its members. The harbourmaster retained records of incidents, but stakeholders contributing to the project were keen to reference incidents not formally recorded. This is a common problem in small harbours that enjoy mainly leisure or commercial leisure activities. It was clear from consultation with stakeholders that incident data in the national MNZ database and the Tauranga Harbourmaster's database did not have contributions reflecting the level of incidents being experienced on the harbour Bars of the Eastern Bay of Plenty.

Records were informally available from the Whakatane Coastguard record. Non contributory data extracted by a Coastguard representative is shown in **Table 1**, below. This references two years of records taken from operators at Whakatane, monitoring VHF.

Incident Type	Whakatane Bar	Thornton Bar	Ohiwa Bar	Opotiki Bar
Craft Aground	1,1		1	
Craft Overturned		1,1,1,1,1,1,1,1	1,1,1,1	1
Waka Overturned	1			
Vessel Overturned			1,1	
Hull Holed	1 keel lost		1	
Broaching	4			
Persons swept out to Sea	2, 2		5 Persons	
Debris on Bar				1
Man Over Board on Bar	1			

**Table 1 –Incidents Recorded Locally - March 2004 to March 2006**

**Table 1** shows that reported overturning incidents at Thornton Bar were more frequent than at any other Bar in the area. However, in reviewing this data, local coastguards were able to advise that there were 16 incidents on Whakatane Bar alone during a fishing contest in February 2006<sup>2</sup>. This was supported by rescue expertise based at Thornton Bar, which referenced 38 rescues in one year. Thus at an early stage in this risk assessment, stakeholder input strongly suggested that incident data records were erroneous. However although erroneous in quantum, the incident data did suggest that there were significantly more cases of over-turned craft on Thornton Bar. This shows how useful such data can be, even when significantly incomplete.

Given the findings from incident data review, it was used as a guide for frequency and consequence estimations. More emphasis was thus placed on the expertise of local Stakeholders, the EBOP Harbourmasters and Coastguard or Thornton rescue representatives to populate the risk database. This risk assessment has therefore relied on a mix of expert judgement and data.

Publications and various documents relating to navigation and its history within the harbour area were provided by the Whakatane Harbourmaster.

### 2.3 HAZID MEETINGS AND WORKSHOPS

Hazard Identification commenced at an early stage, with a draft but mostly generic list being developed. The generic list represented most of the

<sup>2</sup> These incidents were mostly associated with craft broaching inbound or hull /running gear damage on crossing Mussel Rock

available and realistic accident scenarios given the type and mix of navigational traffic in any one area.

This was followed by the hazard identification meetings with harbour stakeholders. A series of evening meetings were held with local representatives or harbour personnel familiar with marine activities in each of the harbour and the various Bar crossings. These meetings were facilitated by Marico Marine, using the knowledge from previous stakeholder advices to take the discussion through previous incidents, issues and potential problems appropriate to the needs of the risk assessment, and the Eastern Bay harbour location being considered. A meeting was held that involved council representatives in Whakatane and Opotiki. A general public consultation meeting was held in Ohiwa. Although meetings held were relatively unstructured, it allowed members of the public to contribute to an open forum. Following each meeting, data was collated against standard accident categories used in a marine risk assessment and hazards generated from the information obtained.

Using the data obtained from interviews, familiarisation trips, document studies, HAZID meetings and workshops, the preliminary hazard list was focussed and further derived. A hazard database was constructed and populated in the Hazman software package. Consequence of hazard realisation and causation were considered alongside the developed hazards. Hazard identification was thus comprehensive, proactive, and not confined only to hazards that have materialised in the past.

A total of 24 hazards were identified as representing the pitfalls of navigational activities within the Bar harbours considered. These were developed into a format suitable for scoring by subsequent meetings.

## **2.4 RISK ASSESSMENT SCORING**

Meetings were held with those closely connected to the hazard identification process to consider the hazards and assess each one against the frequency and consequence criteria set for the study. This was achieved for both most likely and worst credible scenarios. Using risk ranking methodology, the hazards were ranked in risk order on the basis of the most likely and worst credible scoring. The scored hazard list is attached in ranked order at **Annex E**.

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## 2.5 IDENTIFICATION OF RISK CONTROL MEASURES

After the hazard list was generated and rationalised, a risk control meeting was held at the Eastern Bay of Plenty's Harbourmaster's Office. Existing Risk Control was recorded against each hazard scoring 4 and above (i.e. hazards ranked at the top end of the hazard list). This mapping is attached as **Annex F**.

The risk control is reviewed and discussed further in **Section 7**.

## 2.6 RISK MANAGEMENT SOFTWARE UTILISED

Authors used the HAZMAN Risk Assessment and Safety Management software package, developed by Marico Marine in consultation with Harbourmasters internationally. The program is a comprehensive tool facilitating port and harbour risk assessments, then helping with initiation and monitoring of a Navigational Safety Management System. HAZMAN is fully compatible with the New Zealand Port and Harbour Marine Safety Code.

A Hazard List and Hazard Ranking (see 3.1.1) are the key outputs to which risk control measures can be linked. The system also has a comprehensive audit trail, automatically recording all changes made to hazards and risk control barriers in place.

### 3 CRITERIA FOR DEVELOPMENT OF RISK MANAGEMENT

#### 3.1 RISK MANAGEMENT DEFINITIONS

Using the risk matrix (**Table 1**, below) taken from **Annex A**, each hazard was scored against a scale of 1 to 10 for each of the four consequence categories within the NZ Risk Assessment Guidelines, forming part of the Port and Harbour Marine Safety Code (i.e. impacts on: Life; Property; Environment; Harbour Stakeholders).

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**

Where:-

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

From the frequency and consequence data (see **Annex A**), risk scores were 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 was 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 case 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.

### 3.1.1 Hazard Ranking for Risk Mitigation Assessment – Hazman Software

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

- f) The average risk value of the four categories in the ‘Most Likely’ set.
- g) The average risk value of the four categories in the ‘Worst Credible’ set.
- h) The maximum risk value of the four categories in the ‘Most Likely’ set.
- i) 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 which 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 was 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 24 hazards, is attached as **Annex C**. This Ranked Hazard List describes the Risk Profile of the Eastern Bay of Plenty Bar harbours with regard to navigational activities.

The use of the Most-Likely and Worst-Credible approach is very useful in obtaining a transparent risk assessment in the eyes of practical stakeholders, and these abound around maritime activities. The most likely event references outcomes that those with professional experience of the harbour can relate to. The concept of the Worst-Credible event is a consequence of outcome that is a realistic worst accident outcome. This is differentiated from the Worst Case, which is often used by risk assessors with generic backgrounds, with disbelief from those with professional attachment to the subject being risk assessed. A Worst-Credible event of a small passenger vessel at a Bar Harbour entrance may involve loss of life of

25% of the complement, whereas a Worst Case is total loss of the vessel complement. The former is more realistic. The Most-Likely case occurs at a higher frequency (or probability) than the Worst-Credible case. The true level of risk lies somewhere between the extremes of the Most-Likely and Worst-Credible levels of risk, and opinions around the range are always available. The Hazman Software calculates a median average to take the middle ground between viewpoints at each extreme. The strength of this process is that the range becomes defined and where risk mitigation strategies are needed, the consensus achieved within those professionally involved makes the introduction of risk management more robust.

### 3.2 RISK MITIGATION ACTION CRITERIA

**Table 2**, below describes the approach that was taken to risk mitigation, based on the developed risk profile. The "As Low As Reasonably Practicable" (ALARP) principle of risk management has been used in the derivation of risk management recommendations. This can be applied for risks that should only be tolerated if the risk mitigation measures in place provide risk reduction into the ALARP region, and where they cannot be reduced further without grossly disproportionate cost or disruption.

For this risk assessment, the principles of reducing risk to ALARP need to be applied for the longer term to ensure that risk reduction measures are considered for all identified risks. However at this stage in the process of compliance with the Code, particular emphasis has been placed on identifying additional risk reduction measures for risks that are found to be "significant".



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	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.
6, 7 & 8	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.
9 &10	High Risk	An area where the Harbourmaster needs to recommend rapid action.

**Table 2 - Risk Management Action Criteria**

### 3.2.1 Use of the Concept of ALARP in this Risk Assessment

There needs to be a note of caution in using the criteria above. The application of the concept of ALARP should not fool those responsible for Harbour Navigation into thinking that little needs to be done if the overall risk lies within the ALARP range set. ALARP is only a concept and there are risks in any harbour which can result in loss of life. Consequence to people is only one scale used by the risk assessment, but it is a scale of priority in for Navigational safety, when compared with others. The risk assessment scoring overall can only take an average across risk categories and risk in an individual category may dictate the need for action. That need may also affect a hazard somewhat down the hazard list when ranked in order of risk.

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The NZ risk assessment guidelines recognise the existence of ALARP, but also recognise that risks need to be managed in a qualitative and comparative way in situations where the actual levels of risk can be difficult to determine. The use of ALARP in this study is therefore practical in nature, reflecting the practical problems that a small Harbour Regulator has in influencing the navigation of a small vessel that has a skipper who intends to cross the Bar irrespective of the advice given by the Harbourmaster.

## 4 OVERVIEW OF HARBOURS IN RISK ASSESSMENT

As the Bay of Plenty Harbour limits go out to the international limit (at 12 nautical miles offshore), supplying tailored requirements appropriate to some of the small harbours is difficult. None appear to have defined extents to which specified requirements could be (although it appears some remain gazetted from the Harbour Board days, these are not referred to in Bylaws).

Ohiwa, Opotiki and Thornton harbours are presently used almost exclusively for leisure purposes and each have shifting Bars at their entrances. Only the Whakatane Bar, which has regular charter and passenger traffic, is monitored.

Stakeholders consulted raised concern that loss of life is more likely around an unmonitored entrance and data obtained by the project suggested that incident rates varied, depending on the location of the Bar. The Thornton Bar appeared to stand head and shoulders above the others considered with respect to the record of incidents.

Standing advice is provided for users with no knowledge to use Whakatane, where advice and support can be given.

Bars in the area are categorised by the Eastern Bay of Plenty Harbourmaster as Workable, Workable with Caution or Unworkable. However advice given is based on conditions at the Whakatane Bar, with advice being given on the basis of likelihood that other Bars are in a similar condition. There is no monitoring in place at Ohiwa, Opotiki or Thornton Bars<sup>3</sup>.

White Island (Whaakari), an active volcano and tourist attraction, lies 27nmiles offshore. Whakatane is the closest harbour from which commercial passenger vessels can safely operate. Whale Island (Moutohora) lies 4.5nmiles north-northwest of Whakatane entrance, which is a sanctuary for Kiwi and Tuatara.

Thornton provides a closest point of water access for people living at Rotorua and is relatively quiet, with excellent launching ramps. It has an additional attraction of being the shortest sea transit distance from Whale Island, which lies about 5nmiles offshore. The area around Whale Island is reported to be an excellent fishing ground.

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<sup>3</sup> However Thornton Rescue Service does monitor leisure activities at Thornton Bar, to enable rapid response to a capsized.

Whakatane suffers from very high water flood volumes as the Whakatane River has an extensive catchment area. Opotiki can also have significant floods as two rivers (the Waioeka and the Otara) combine in the Opotiki estuary, but meet with 180 degree opposing flows. The level of flooding at Thornton is managed by a dam upstream on the Rangitaiki River, but extensive flooding can occur if the dam reaches capacity.

High flood volumes are much less likely at Ohiwa, where there is a relatively small river feeding a large harbour expanse.

The Eastern Bay area generally is always subject to swell conditions during the peak summer period, making it popular with surfers. Whakatane in particular has high quality surf adjacent to the Bar, created in part by the topography of the entrance,

#### 4.1 FUELLING FACILITIES AT EASTERN BAY HARBOURS

With the exception of Whakatane, harbours covered by this risk assessment have no dedicated fuelling facility – this is often achieved by hand using small containers. Operators out of Ohiwa Wharf used to use 208litre (45 gallon) drums, but this was suspended on advice by the Eastern Bay of Plenty Harbourmaster, due to concerns over loading on the old wharf structure. The structure has reportedly not been structurally surveyed for a considerable period of time, and is used only by pedestrians. Further information is available in the Ohiwa Harbour risk assessment area descriptions.

It appears that a considerable volume of fuel is supplied by small road tankers (6000ltr capacity), which service Whakatane, Ohiwa or any of the other harbours. There are some larger vessels kept at moorings in Ohiwa that may occasionally utilise this service.

There is a fixed marine fuelling stop at Whakatane adjacent to the launching area. There are two pumps, one gasoline and one diesel. Tier one response gear does not appear to be close by, although a stockpile of response equipment is maintained at the Harbourmaster's office. During an inspection of the refuelling site by Authors an outside electrical cabinet door was noted to be unlocked, with internal access available to any member of the public. Refuelling pumps were located at the Whakatane Wharf edge with no save-all or other methods of containing small fuel spills. **Figures 1 and 2** provide an overview of the facility at Whakatane.



**Figures 1 and 2 : Views of the fuel supply station at Whakatane.**

**Entry of fuel into the water following even a minor spill is inevitable unless some form of drip-trays are considered. Emergency Shutoff is remote from the fuel delivery. Electrical Cabinet (arrowed) was unlatched and open – a notable public safety hazard. It was latched on inspection, but remained unlocked.**



## 5 HARBOUR DESCRIPTIONS

### 5.1 WHAKATANE HARBOUR

Whakatane is a river estuary port, located in the Eastern Bay of Plenty region having a significant Bar at its entrance. There is a small commercial wharf area primarily serving passenger services to White Island (27nm offshore) and charter vessels. The harbour is located close to rich inshore fishing grounds, and a large number of recreational fishing craft are launched from a boating ramp in the Harbour.

Harbour limits used to extend from the Tarawera River bridge (meaning “burnt spears”) seaward to the western tip of Whale Island, thence from the eastern tip of Whale Island to a point adjacent to the Maraetotara Stream<sup>4</sup>. The Harbour has since been incorporated into the Bay of Plenty Regional Council overall area of jurisdiction.

The Whakatane side of the estuary has wharves along most of its banks, which are regularly used by passenger services to White Island, and charter vessels, which are hired for fishing in the offshore area. The harbour has a single sailing club, which has a number of moorings within its basin. Small dinghy sailing is popular in the river adjacent to the yacht club (lasers and optimists). A number of fishing events are held each year and Whakatane is the favoured location for Yellow-Fin tuna fishing competitions. A general view of Whakatane is shown in **Figure 3**.



**Figure 3:**

**A general view of Whakatane Harbour, showing the entrance and looking across the main wharf area.**

<sup>4</sup> The Maraetotara Stream lies approximately mid way along Ohope Beach

A Coastguard communications centre is located near to the Harbourmaster's current office and at the harbour entrance. It is manned by a communications officer 08:00 to 18:00 daily. Response personnel are on VHF or pagers (four six-man crews are available in Whakatane). A response time of 45 mins is reported to be realistic, although this is likely to be less for response to a serious event. Coastguard call-out is understood to be first fed to a marine advisor, who often goes to investigate the conditions – a supervisor may place crew on standby, but call-out occurs after advice from the marine advisor. Whakatane Bar can have a 5 minute response time if the District Council craft and staff are available (a robust catamaran capable of towing most craft using Whakatane entrance).

The Whakatane Port operator operates the wharves and is an extensive land owner in the commercial area. The Whakatane District Council inherited the port assets and wharf areas at the time of port reorganisation – thus becoming the beneficial owner of the Port Company. There have been a number of commercial retail developments on the land, providing significant benefit to Whakatane District Council and the local community. Like many harbour areas, the utility of waterfront land in this attractive area has increased the real estate value considerably. This provides a common problem of the income from the land assets far outweighing income from the wharves. However, it should not be forgotten that the Harbour Board system was originally endowed with significant waterfront land in order to raise the funding needed to facilitate harbour development. In this respect the old harbour limits (inshore and offshore) at Whakatane closely follow a Harbour Model, originally of circa 1850-70s design from UK – it allowed a Trust Board (e.g. the NZ “Harbour Board”) to use land based assets to fund the development of a harbour infrastructure to facilitate trade. The design reflected 1860s thinking that a vibrant harbour interface brought much more than just vessels or craft into a harbour town, but the development cost to achieve this required other assets (land based) from which income could be derived to assist with the “undertaking”. In many respects the need for this concept in Whakatane remains true today.

Whakatane District Council produced a Harbour Management Plan in 1988, which on review comprises recognisable components of a fledgling Safety Management System (SMS).

### 5.1.1 User Activities and Traffic at Whakatane

There is 25m length limit for vessels but this is a rule provided by the Whakatane Port Operator to manage berthing limitations. This is presumably managed by the process of Harbourmaster's advice and refusal to allow entry. It does not appear to be a Bylaw requirement and on the basis that 25m is a practical length limit for vessels using Whakatane bar, consideration should be given to addressing this.

There are 23 dedicated charter vessels (10 to 23 metres length) operating out of Whakatane. There are 52 permanent moorings, 19 of which are attached to the local sailing club, the remainder being swing moorings in the river. Sailing is generally restricted to the area around the yacht club although a number of keelers take part in a weekly regatta outside the harbour entrance. **Figure 4** shows a view of the estuary, looking upstream from the Whakatane Wharves to the yacht club and adjacent pontoons.



**Figure 4:** View of Yacht Club Area and adjacent Pontoons (Yacht Club Arrowed). Yacht Club Stakeholders reported a difficulty of accessing pontoon berths and moorings in the area due to accretion on one side and rocks on the other.



Large RIBS and catamarans (up to 9m length) operate commercially to the White Island area, with transit speeds of 39knots reported to be common. Dolphin excursions, fishing and dive charters are offered. It is common for passenger complements to include a portion of elderly people.

There are around six commercial fishing vessels, operating out of Whakatane (four long-liners, two cray, two net). There are also occasional itinerant fishing vessels calling into the Harbour to discharge their catch.

There are approximately 15,000 trailer launchings per annum involving craft under 10m length. Launchings are reported to Council monthly, from counts undertaken by the Harbour Superintendent on a daily basis. Leisure traffic levels can vary significantly year on year. Jet skis are launched at the ramp and transit through the Harbour to operate in the surf at the entrance.

There are a large number of kayaks within the Harbour itself and these do transit the Bar and operate in the coastal area in the approaches.

A large number of organised events occur within or from the Harbour each year. These are mostly fishing events, each of which last up to four days, with up to 160 craft involved in each tournament. There are Waka-Ama regattas held in the river, at least three per year. A ceremonial Waka is based at Whakatane, which occasionally takes to the river, but is also transported to other locations in New Zealand for ceremonial events.

There is a sole concessionaire for landing rights at White island. Pee Jay Tours Ltd., operate the concession and the island owner is reported to donate income to charitable beneficiaries. Two vessels are in service, each over 20m. Vessels have capacity for 78 persons on one vessel and around 40-50 for the second, smaller vessel.

The Harbourmaster reported that in general commercial pressure to cross the Bar can be considerable if passengers have committed to a motel visit/trip to White Island. Although this view is not supported by operators, reports that one of the larger vessels operating out of Whakatane had broached when crossing the Bar, but without adverse outcome was confirmed informally by sources close to coastguard.

There used to be an annual jet boat event on the Whakatane River (further upstream), but this has not occurred since local opposition was tabled.

The Whakatane harbour entrance has been the subject of previous civil engineering works to improve the flow of water over the bar, and thus move the accretion area further out to sea. Groynes have being installed, which

obviously influences the water flow, but the Bar itself appears to be constantly shifting and dependent on river floods to move debris into deeper water to keep the Bar navigable by relatively large craft.

### 5.1.2 Fishing Competitions

Fishing competitions are a major attraction at Whakatane and have been occurring for a considerable period. They do occur elsewhere, but not with the same attendance levels as at Whakatane, where a competition can involve up to 600 anglers and around 160 craft. They generally appear to be very well managed and all contributing stakeholders provided consistent feedback that navigational behaviour during events was generally good. When the bar is designated as Unworkable, events are postponed and craft already out generally return immediately. However fishing event organisers do not always notify the Harbourmaster and as there are around 20 events per year, this would be advisable.

### 5.1.3 Surfing

Whakatane Harbour entrance is a popular destination for surfers due to the quality of its surf, formed by the topography of the entrance. The topography of the entrance provides a “right-hand break”, which is less common in New Zealand. This configuration, combined with offshore breezes against incoming swells, creates the high quality rolling surf favoured by surfers. Conflict with transiting vessels is, on occasion, inevitable. However there have been numerous occasions when surfers have provided rescue resource to craft having broached or capsized on the Bar.

Surfers can swim across the Bar on their way to the surfing area. If surf gets too large for crossing, surfers can get taken out and have been taken across the face of the rocks at the entrance. When conditions are rough, surfers can also swim across the dinghy channel after walking down the Groyne to cross the Harbour away from the entrance. At the same time, charter vessels may use the dinghy channel to transit out by the side of the Bar.

Swimmers are prevented from approaching within 50m of a vessel that is intending to berth at a launching ramp (or wharf) by Bylaw. However surfers are not specifically referenced.

Surfers and users both reference good relationships and it is recognised that surfers can and do provide the first response to a craft in difficulty on the Bar. There have been occasions when a sand bank has formed on the Bar in

the line of the leads, placing surfers and transiting craft in the same area of rough sea. Conflict at such times does occur.

However a number of stakeholders referenced recreational craft being placed on intentional collision courses with surfers in the water, with avoiding action being taken at the last minute.

#### **5.1.4 Flooding at Whakatane,**

Serious flooding at Whakatane (town flooded) is reported to occur about once every five years. Large floods generally result from north or north-easterly weather conditions. These can be relatively short periods of poor weather, which result in conditions at the Bar improving relatively soon after. However the increase in river flow appears about 15 hours later, creating currents of up to 20knots in the main channel. A waterfall of up to two metres high can form at the harbour entrance, adjacent to the signal station. These conditions carry significant debris load onto the Bar and to some users, the Bar can appear to be workable. There is no monitoring of the river flow rate, but the port has been closed by the Eastern Bay of Plenty Harbourmaster during these conditions.

Storm conditions from the northeast reportedly pass through more rapidly, but these also bring likelihood of heaviest rains. The Bar will settle down and be navigable often a number of hours before serious flooding commences, making the danger much less apparent to the unwary. The flooding brings with it debris in the form of large logs, through to whole tree trunks, which appear at a time when some users have intent to commence Bar transit. Household debris, such as freezers and farm animals are also common.

When flooding occurs, the Harbour Superintendent facilitates the removal of craft at moorings to the Wharves<sup>5</sup>. Owners are contacted to obtain authority and vessel/craft are towed by the Harbour Superintendent to the wharf and stacked two-up alongside. In the 2004 floods (an exceptionally large flooding event), the wharf (with craft alongside it) was submerged. Moorings lines were too tight to loosen off, but floods subsided before any parted.

The Otuawhaki jetty is a pontoon held in place by piles and rings. A flood in 1998 almost lifted the jetty and attached vessels off the piles. Piles have since been extended (**Figure 5**).

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<sup>5</sup> An annual charge is made by the District Council to provide this service, although the cost may outweigh the income.



**Figure 5:** Otuawhaki jetty, whose piles have been extended to prevent it lifting off during a flood event.

Jetties were designed to withstand what at the time was a 100 year flood event. Data following a series of flood events determined that designs reflected an event with only a 30 year return period.

Flooding also affects the surrounding inshore area off Whakatane. Six craft were reported to have been severely damaged or lost in one week due to contact with debris, following a large flood event<sup>6</sup>.

## 5.2 WHAKATANE - RISK ASSESSMENT AREAS

### 5.2.1 Area A – Whakatane Approaches

To the west of the entrance there is a dedicated jet ski area, with a second area adjacent to the harbour providing surfer's with priority.

There are a number of rocks on each of the approach channel and safe passage is provided by fixed leads. These are lit by red neons at night and are particularly easy to locate when inbound. The leading lights have a five mile range and make a significant contribution to the safe passage of vessels across Whakatane Bar. These bring vessels across the Bar and into the

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<sup>6</sup> This reportedly occurred in the sea area between White Island and Whale Island.

centre of the river, where inner channel green neon lead lights provide guidance for safe passage to the wharf area. Leads are ultimately backed up by a generator, should there be a power failure. One of the leads is now stationed on land owned by a developer and formal access rights are needed (wayleave).

The Whakatane approaches and entrance suffers from pressure waves when wind-over-tide conditions occur. The worst case is a northwest wind combined with a strong spring ebb.

#### **5.2.1.1 Secondary Entrance Channel**

There is a second (informal) entry channel into Whakatane, which bypasses the Bar. The transit has many rocks, both in the channel and along the sides is tight (even for small vessels). Part of the transit is narrow, but deep, whilst the depth changes in another section of the transit. It is not promoted by the Harbourmaster as a navigable channel, but charter vessels up to 16m in length do use this when the Bar is unworkable. It is termed the “Dinghy Channel”.

A third option (the Western Channel) once existed, which was used when the main channel filled with sand<sup>7</sup>. When the groynes were upgraded and a spit wall was installed (the wall is a second groyne that was installed to help manage a focussed flow across the Whakatane Bar), the Western leads were removed as the Western Channel no longer formed.

Backlighting is not a problem for navigation, with lights in the area having been intentionally obscured by planting trees or building bunds. However reports of skippers experiencing loss of situational awareness when inbound due to car headlights at night were provided by stakeholders. Transiting craft have ending up on Groynes on either side of the approach channel.

Any increase in buildings in this area requires close scrutiny to ensure navigation marks are not impacted by lighting etc.

#### **5.2.2 Area B – Whakatane Bar and Harbour Entrance**

The harbour entrance is about 80m width, and about 35m in navigable width. There are Groynes on both east and west, constructed from rock originally taken from Whale Island.

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<sup>7</sup> When the main channel became very shallow, it was common for a second channel to form to the west.

The Bar lies close to the entrance and naturally rises and falls throughout the season, moving inshore when flows are low and moving offshore (or deepening) when flows are high. The Bar is at its shallowest in February and March, after lower summer water flows. This coincides with the time of greatest usage, both by commercial and leisure users. A view across the bar is shown in **Figure 6**.



**Figure 6:-**  
A view of surf breaking over the Whakatane Bar

In the summer of 2006, the Whakatane Bar was the shallowest it had been in five years, with at one stage only 0.3m depth above chart datum being available at low tide. Around 2.5 metres was available at high tide (2006). The Whakatane Bar has always been a single Bar and its location can range from the entrance to 50m or more beyond. A significant flood can move the Bar overnight from an entrance location up to 80m from the entrance.

A large flood exiting the harbour removes the Piripai Spit (which is a sandbank which forms naturally opposite the Harbourmaster's office). Sand is deposited at the Bar and depth becomes unknown. Craft or vessels have continued to operate before the Harbourmaster has re-sounded the Bar. There is pressure to get the information to users as rapidly as possible and commercial operators were reported to commence working regardless.

The Whakatane Bar is declared Un-Workable on average only four times each month. The designation Workable-With-Caution is regularly applied.

A satellite overview of Whakatane Harbour entrance and bar, supplied by Whakatane District Council is shown in **Figure 7**.



**Figure 7:-** Overview of Whakatane River Mouth. The location of the Bar can be appreciated from the discoloured water at the harbour entrance.

#### 5.2.2.1 Incidents and Issues at Whakatane and its Bar

This section references incidents and feedback from stakeholders about the Whakatane Bar.

Broaching at the Bar is common. Whakatane Coastguard maintains records of incidents which are passed to MNZ on a monthly basis. These records have been used to inform this risk assessment. However, as discussed in Section 2.2, feedback suggested that the true incident rates are significantly in excess of the record.

There have been some significant incidents: in 1993, a skipper with 22 people onboard with no night time experience was involved in an incident while crossing the Whakatane bar and two lives were lost.

Commercial operators are reported to not always prepare their vessel properly for the Bar crossing and stakeholder feedback suggested that passengers can often be standing when crossing the Bar, wishing to see “the

action". Anecdotal advice suggests that a number of minor injuries have occurred.

Coastguard radio operators at Whakatane have in the past congratulated craft crossing the Bar during marginal Bar conditions. Encouragement was thus given to others to attempt crossing when the Bar was designated as Unworkable. Lessons have been learned in this regard.

Debris can create a significant hazard. In 1998, the entrance to Whakatane was clogged with debris from a storm, which was then released as a large "raft", taken offshore and remained as a hazard to navigation in offshore waters.

During floods, large volumes of weed can also appear at the Whakatane harbour entrance. This may originate from weed clearing activities inland.<sup>8</sup>

The moving of craft from moorings due to a flood event is a hazardous activity. Floods bring significant debris. Attending owners have fallen into the water whilst attempting to board or release their craft from moorings after crossing the flow in small craft and craft have been lost during flood events.

Moving craft alongside during a flood event could be a serious problem if it occurred during a large fishing tournament. There would not be the wharf area available to place the moored craft alongside.

There is a significant conflict between land based fishing activities and craft entering or departing the Harbour after crossing the Bar at speed. Fishing takes place into the main navigational channel from the rock groynes and lines that are not retrieved are often picked up by vessel propellers and shafts. Tackle, including rods are lost. Friction can occur between fishermen and leisure users.

Surfers are known to cross the entrance at the Bar, swimming across the navigable channel. Those with local knowledge tend to keep to the beach surf, but visiting surfers have been known to surf in breaking seas on the Bar.

Whakatane Coastguard sometimes wish to provide training to staff when the Bar is un-workable. This can occur without liaison with the harbour system and provides incentives for others to commence Bar transits when the Bar is unsuitable for all be the most experienced.

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<sup>8</sup> An action was taken by the Regional Council Harbourmaster to investigate weed-cutting activities undertaken by EBOP



### 5.2.2.2 Mussel Rock

Mussel Rock lies adjacent to the Whakatane Bar and lies almost at chart datum, but can emerge during heavy swells. It is located just north-east of the entrance beacon. It is exposed at low water springs (breaks surface) and is visible at other times in the normal swell at the Bar. The rock lies in line with nos. 2 and 4 beacon. Its approximate location can be appreciated from **Figure 7**.

In a north-easterly it is possible for a craft in difficulty to be thrown onto Mussel Rock (this is reported to have occurred on a large number of occasions). This occurs because to counter a set from the north-east a craft will steer further to the east, placing the sea on the shoulder to provide for a smoother passage across the Bar. If not carefully executed, the craft ends up over Mussel Rock and is then bounced across it in the fall associated with the swell. This has occurred more than once in the past, with a relatively large vessel recorded as being thrown over Mussel Rock.

Mussel Rock is reported by stakeholders to be even more of a hazard to outbound vessels or craft as on clearing the entrance, a tendency to take a short cut exists before clearing the line of the leads.

There are a large number of craft that end up on Mussel Rock each year, but most of the reports are anecdotal in nature. Damage to hulls and running gear is reported to range from minor embarrassment for the skipper to significant damage to both hull and running gear. As a large number of events are minor, they are not formally reported. However Mussel Rock appears to stand out as the most struck object in all of the Bar harbours considered by this risk assessment. This type of event certainly occurs more than once each year<sup>9</sup>. This is more likely to occur when the Bar is shallow, which has the effect of skippers taking a course more to the east, as the western side of the entrance is shallower (skippers seeking clearest water path through the Bar).

Mussel Rock is marked temporarily during fishing competitions, but is not marked permanently.

### 5.2.3 Area C – Whakatane Main Channel

The Whakatane main channel connects the entrance to the wharfs and mooring areas. A launching ramp allows small craft to be launched directly into the main channel. The launching ramp is a popular site for diving and

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<sup>9</sup> Groundings on Mussel Rock are reported to occur sometimes twice a month

swimming by local children. A raised area was provided adjacent to the ramp, which was designed to allow children to swim in relative safety and away from craft wanting to use the ramp. However, children diving in front of boats wishing to use the ramp and swimming in the path of craft around the ramps was reported to be a persistent problem. This rated as the most important issue facing the Harbour during an open forum consultative meeting.

The Whakatane main channel fluctuates in depth between the entrance and the boat ramp, but is relatively stable. In the past, bedrock has been removed to provide a clear main channel by blasting. This has facilitated a growth in harbour users, but bedrock outside the channel remains. Storm events provide a flushing of the river bed, which has in the past maintained channel depth. Whakatane Port Operator attempts to maintain 2.5m depth below chart datum in the channel and 2m below datum at the berths. Undermining of jetty piles would be likely if greater depths were wanted.

The main issue associated with the main channel is debris after a flooding event. Another issue reported by sailing stakeholders was the ability for sailing cruisers to exit the channel and access moorings or the pontoons adjacent to the sailing club. This is reportedly due to accretion on one side and rocks at the channel sides on the other (see Section 5.2.4 for further information).

Dredging of the channel by the District Council was suspended following feedback from a local stakeholder<sup>10</sup>. Navigation marks had been removed prior to the dredge, before suspension occurred. At time of the risk assessment the situation with channel markers was not clear as marks could not be replaced until target datum for the channel had been defined once more. Stakeholders (especially recreational) provided comment that it was not possible to establish the channel location any longer, making navigation difficult.

#### **5.2.4 Area D – Whakatane Mooring and Berthing Area**

The mooring and berthing area has open access to it from the public thoroughfare and problems associated with uncontrolled or unmonitored access were reported. Children jumping off the wharf as a larger vessel is berthing appears to be a common problem. During evening hours, youngsters are reported to board vessels. Alongside the reports of

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<sup>10</sup> It is not known if the stakeholder represented dredging expertise.

youngsters diving and swimming in way of craft at the mooring ramp, the problems at the wharf provided a similar feedback.

There is a significant problem of vandalism reported at the wharf. Craft and large vessels have been let free and have ended up at sea. Security cameras are planned and a security company is reported to check lights and wharves outside working hours. One vessel let free suffered around \$80,000 of damage, ending up on Coastlands Beach, having exited the entrance. A second ended up on Whale Island, five miles offshore. Others have been intercepted before damage has occurred. Small craft have been similarly affected at moorings or alongside. Some mooring failures have occurred which were not attributable to vandalism.

Recreational users accessing the sailing club area or moorings reported problems of access because of the rocks in the river. Rocks were cleared down to 2.5 metres below chart datum in the main navigation channel providing a clear channel. Explosives were used. Bed rock remains in the accesses to mooring areas and the access to the sailing club mooring basin is hampered by a silt sand bank, which would have normally been removed by maintenance dredging (see section 5.2.3 above with respect to the status of maintenance dredging). Stakeholders reported this to be compounded by the location of one of the moorings.

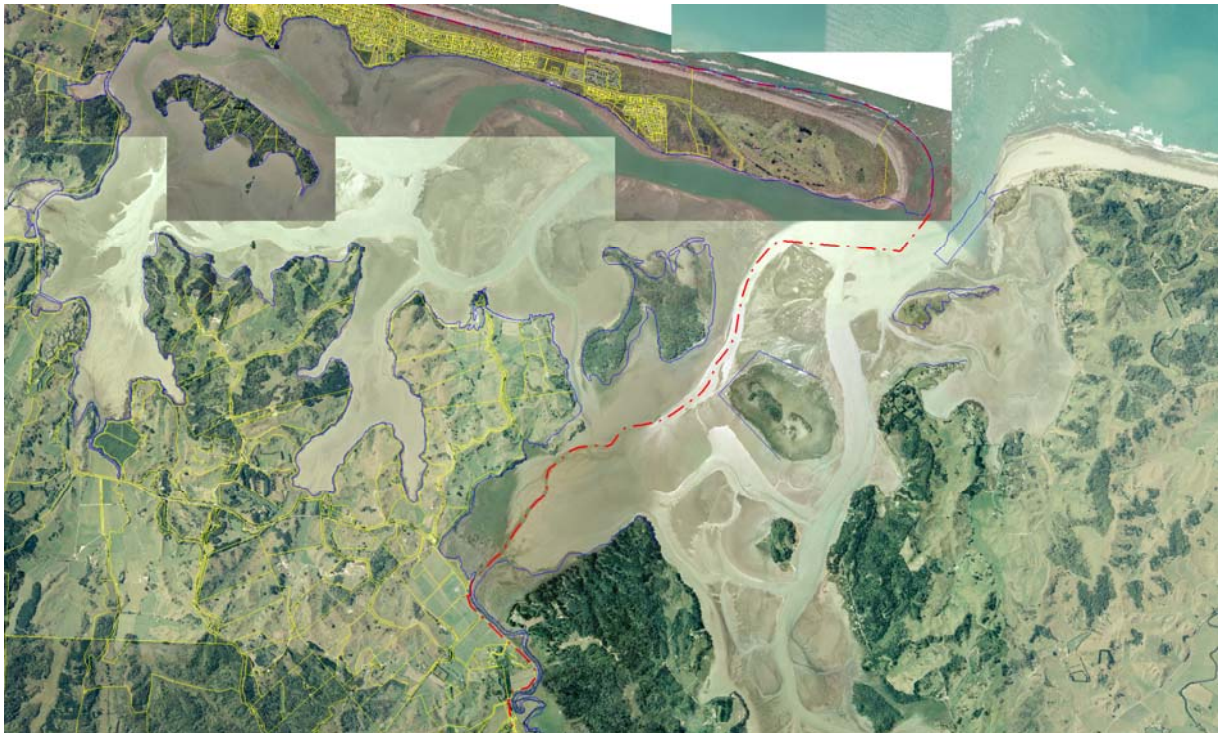
### 5.3 OHIWA HARBOUR

Ohiwa is a large expanse of water, most of which is too shallow for navigation by larger vessels. It is a popular harbour for all forms of recreational boating (e.g. Kayaking, windsurfing, sailing, skiing, personal watercraft). A harbour recreational management plan designates different areas for differing activities. There is an active sailing club, which sails mainly small centreboard yachts and catamarans. There are around 40 moorings in the harbour, with around a dozen in the sailing club area, but only a few are attached to the yacht club.

The entrance channel lies between two spits, which also form the harbour – the Ohope spit to the west and the Ohiwa spit to the east. The Ohope Spit has been growing in recent years. This can be appreciated from **Figure 8**, which is an aerial view of Ohiwa harbour.

Main Channel markers have been installed adjacent to the entrance, but posts once used as references for the Bar have been removed. Water-Ski access lane markers have ended up on the spit.

There is no Coastguard presence at Ohiwa, with a response being provided jointly from Whakatane and Opotiki<sup>11</sup>, particularly when a sea search is involved (normally initiated by a capsized).



**Figure 8:** Aerial view of the extent of Ohiwa Harbour

There are a number of commercial marine farms operating in the area (Oysters). Pipis, cockles, scallops and mussels occur naturally throughout the harbour. The harbour would have low tolerance to an oil spill event. Ohiwa was declared un-navigable in 1981 by the Marine Division of the Ministry of Transport (pre-runner to MNZ) due to ongoing accretion.

## **5.4 OHIWA RISK ASSESSMENT AREAS**

### **5.4.1 Area E - Ohiwa Approaches and Bar**

The Ohiwa Bar lies to the east at Ohiwa and a strong westerly causes mounting seas at the Ohiwa Bar. The Bar is sandy on either side and lies around one mile offshore. After floods or storms, a second Bar is reported by some to form inshore. Ohiwa Bar is shallow with only around 2.5m depth at high water. It is also reported to be continually shifting. Approaching from Seaward, there are two houses on the hill directly behind the entrance, whose roofs can be approximately lined up to provide a transit.

There are no aids to navigation to assist in identification of the approximate Bar location, but as there are continual movements in the Bar, marking

<sup>11</sup> Opotiki Bar is only navigable without grounding around one hour either side of high water (see section 5.6.1).

would be difficult to achieve and inappropriate. Ohiwa Bar is not monitored and its remoteness makes it difficult to do this by persons ashore.

Stakeholders report that there used to be railway irons installed close to the entrance along the main channel (possibly from an old structure). These were removed for safety reasons, but it appears some used them as reference marks for the Bar approach.

It appears to the inexperienced that one Bar exists, but advice suggests there are normally two Bars at this entrance, providing unexpected conditions even for a normal transit. Once the Bar is crossed, deep water is available at the harbour mouth.

Local knowledge is recommended as essential for the Bar transit at Ohiwa as the time to cross is significantly greater than that for the other Bars in the Eastern Bay of Plenty area.

Significant tidal flows are present (as the harbour volume is large), particularly during the ebb, when large pressure waves make the approaches and Bar transit difficult. Even regular harbour users with experience of this Bar have reported experiencing difficulty in Ohiwa Bar transit during adverse conditions.

#### **5.4.1.1 Known Ohiwa Bar Incidents**

There is little recorded about incidents on the Ohiwa Bar, although anecdotal evidence suggests that broaching is common. Helicopter rescues have occurred, as it is not possible to get access across the Bar to assist craft in difficulty in adverse conditions. Numerous craft have been anecdotally reported lost over a 20 year period.

#### **5.4.2 Area F - Ohiwa Main Navigational Channel and Wharf**

The primary Ohiwa channel runs approximately parallel to the Ohope Spit. A secondary channel extends from the entrance across the harbour to an old wharf site at Kutarere. The Kutarere Wharf was once a major trading point for both Maori and early European settlers.

Significant commercial development occurred in the 1950s at the inside of the eastern spit (northern side of the Harbour), including a wharf complex. The Bar became unreliable and produce has been railed to Tauranga ever since. This is now a harbour reserve area and opportunities to develop the area are being sought. The wharf is still maintained and is used mostly for fishing (off the wharf). There is a sailing club (the Port Ohope Yacht Club), which now owns the Western shed for its club room and storage area.

The channel depth varies between 4m to 9m, although there is a constraint where the Kutarere channel meets the main channel. The opposing currents reduce overall flow rate, creating bottom accretion.

## 5.5 OPOTIKI HARBOUR

Opotiki is a recreational port, formed by the combined estuarial discharge of the Waioeka and Otara rivers. The rivers meet at the town of Opotiki, with their flows in almost direct opposition, producing a complex flow into the single channel exiting into the estuary mouth. The location where the rivers joined is reported to have changed from the past and the direct opposition of the river flows cause a general slowing of the discharge to sea.

A piled wharf exists adjacent to the ramp and although this is in a state of disrepair, it is reported to be structurally suitable for refurbishment to facilitate harbour development. Opotiki District Council has plans to develop a commercial port in the harbour, serving potential offshore marine farms<sup>12</sup>. These plans have been in place for some time. A view of the Wharf Apron is shown in **Figure 9**.

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<sup>12</sup> Resource consent applications have been lodged with Environment Bay of Plenty Regional Council



**Figure 9:** A view of the Old Wharf Apron at Opotiki, looking up the Otara River. The launching ramp is located at the far end of the Wharf Apron.

The Opotiki Bar is exceptionally shallow and it is not possible to cross without grounding in some form in all but high water. Installation of groynes to improve flow over the Bar, with a view to deepening it once again is planned as part of the offshore development.

A Coastguard building is located close to the boat ramp and a rescue boat is stationed on site beneath the Coastguard Headquarters. Reasonable investment has been made by the local Council to install a boat ramp and associated parking area for trailers. There is also a Waka-Ama club (established one year ago) that deploys teams on the rivers. This is well supported. **Figure 10** shows a Waka team training.



**Figure 10:** Waka-Ama training at Opotiki

## **5.6 OPOTIKI RISK ASSESSMENT AREAS**

### **5.6.1 Area G - Opotiki Approaches and Bar**

Opotiki Bar is shallow and has become difficult to cross outside the times of high tide – Coastguard report around an hour either side. After that the Bar is passable using the intermittent lift available from incoming swell.

As times of flood the Bar is reported to be full of debris.

Like many uncontrolled Bars, there are no aids to navigation in the approaches. However local users are known to install informal leading marks. Approaching from seaward is difficult as the entrance and Bar are hard to locate or identify and local knowledge is essential before using this entrance.

There are reports of recreational craft, broaching, swamping and capsizing at Opotiki. Loss of life has occurred and craft have been lost.

### **5.6.2 Area H - Opotiki Entrance Channel**

The entrance channel is reported to be difficult and littered with obstructions in the form of tree trunks, concrete slabs (once used to line the banks), and railway iron. Navigational marks (unlit) have been installed by the Regional Council, to identify where the deeper water lies and where crossing the river



can be undertaken relatively safely. These were updated in 2005 (starboard marks replaced and port marks added, with navigation safety advice notices placed in carparks).

### **5.6.3 Area I - Opotiki Wharf and Ramp Area**

This is located where the two rivers meet. The ramp presently has a relatively low use, this being confined mostly to local residents. Fishing tournaments are held a number of times per year. Stakeholders advise this involves many locals, but people also travel from outside the area to participate.

Problems common with other harbours in the area are apparent. Children diving into water in the path of berthing craft at the launching ramp are reported. The launching ramp appears to be a focal point for youngsters.

Loss of fishing tackle in propellers and shafts of craft transiting past the old wharf apron also reportedly occurs.

## 5.7 THORNTON HARBOUR (RANGITAIKI RIVER)

Thornton is exclusively used by trailer craft and is a popular recreational destination. There is a spit at the river mouth, which is reported to be stable and there are high quality sandy beaches formed on the spit. **Figure 11**, below, shows an aerial view of the Thornton entrance.



**Figure 11 Aerial view of Thornton Bar and the Rangitaiki River Mouth. The Location of Launching Ramps is shown by an Arrow. The Bar formation can be seen at the top of the view**

There is an active Waka Ama group at Thornton. In 2005 the Whakatane District Council installed a new launching ramp (separate from the existing boat ramp) hard standing and storage racks for the Wakas. This, combined with the excellent parking area adjacent to the ramps makes Thornton an attractive launching site. It is possible to head out to sea or up the Rangitaiki River from the launching ramps, or out to sea. Jet Boat events are held in the river annually<sup>13</sup>, which is both wide and straight upstream for

<sup>13</sup> The annual Jet Boat event is in aid of a charity for child cancer sufferers.

a considerable distance inland. The Thornton River mouth is a very popular fishing surfcasting area. The Kahawai fish run up the river on a regular basis and beach casting into the surf appears to occur daily.

Thornton Rescue service is based at Thornton Bar. This is a privately delivered, voluntary surf rescue service, the rescue craft and equipment having been purchased by a local resident and his son. The ongoing cost of delivering the service is estimated at around \$10K annually. They also provide fuel and bear the running costs of the craft. Stakeholders advise that the service has a two to ten minutes call out time, as the owner lives in a location overlooking the Bar. Advice taken from Thornton Rescue strongly suggests that the rapid call out provided is the difference between life and death for many of the small craft that capsize on the Bar.

Thornton is in a strategically useful location for residents of Rotorua. It is the closest launching point from Rotorua. It additionally provides the closest launching point for a fishing visit to the waters around Whale Island. Locals suggest that the fuel savings when compared to launching at Whakatane can be \$60-\$80. Thornton also provides further advantage in that it is a quiet beach away from a built up area. The capacity of the two launching ramps combined would also remove any queuing for ramp access, which might occur elsewhere. There are obviously strong drivers for users (especially those based in the Rotorua area) to make a decision to launch at Thornton and cross the Bar for a day out fishing.

Kayakers are reported to be common at Thornton Bar, especially those capable of long line fishing. These launch at and return to Thornton.

## **5.8 THORNTON HARBOUR – RISK ASSESSMENT AREAS**

### **5.8.1 Area J - Thornton Approaches and Bar**

The flow of water through Thornton Bar is guided by a Groyne on the eastern side. The Bar is shallow and indefinable, is constantly shifting and difficult to read without experience. There are no aids to navigation in the area and the Bar is not normally monitored. The Bar is reported to generally be located at the interface between the discharging river mouth and the sea.

The Thornton entrance appears to run particularly fast as the Groyne on the eastern bank produces a shallow bend, with a well defined and deep channel at the river mouth. In heavy swell conditions, the Bar can be particularly rough and conditions change rapidly with the state of the tide. Loss of life is reported to have occurred on a number of occasions. The Bar is said to be located at the mouth of the river and craft are propelled from the fast flowing water stream immediately into rolling swells and confused water.



**Figure 11:-**  
A view of Thornton Bar, which commences immediately adjacent to the river mouth.

#### 5.8.1.1 Incidents and issues at Thornton Bar

Thornton Rescue advised the swell pattern is affected by Whale Island (lying 5nm offshore to the northeast). The Bar can have very little swell on it but as the tide changes (or gets later into its cycle) conditions at the Thornton Bar can change from benign to extremely dangerous, with large surge swells being intermittently delivered. Swell patterns need to be carefully read and craft are often observed having entered the Bar (i.e. committed), when large “roosters” are forming 100m off. The craft, in rough swell has no opportunity to turn and needs to transit the mounting seas ahead. Many craft are reported to make an attempt to power into the crest, but are unable to clear the face of the wave. They fall back, sometimes recovering, but sometimes enter the water at the base of the wave by the transom. The breaking wave additionally spins the craft about its length. A large (but undefined) number of craft are reported to be seriously damaged at Thornton each year. Thornton Rescue advise that 2-3 rescues per week are to be expected in the summer season. Kayaks with occupants in difficulty having capsized up to three miles offshore are reported to be on the increase in recent years.

The Thornton Bar has more reports of incidents than other Bars in the area. These are mostly capsizing, broaching or flooding incidents, involving broken windscreens. Stakeholders reported that there has been regular loss of life at the Bar over the years.

Another significant hazard reported at Thornton involves the indiscriminate setting of fishing “set nets” across the entrance. These can be illegally placed and cause fouling of propellers of craft heading out in the fast current into the Bar.

Stakeholder meetings indicated that weed could also be a particular problem at Thornton, during and following a flood event and this was noted to be present during a site survey. The source of weed may be from cutting operations to maintain flow upstream – weed may be extracted to the bank, but be taken by the current when the river is in a flooded condition.

### 5.8.2 Area K - Rangitaiki River (Launching Ramp)

The Rangitaiki River is long and relatively shallow, providing conditions making it attractive for recreational use. Further inland, there are commercial jet boat activities on the river.

The Thornton launching ramp is well designed and exits into a wide area of relatively safe water, formed by the spit at the river mouth. Accordingly it is an attraction to swimmers, with the ramp providing a convenient platform for diving. Reports of conflict with swimmers and craft attempting to use the ramp were provided by stakeholders, this being a common problem reported at all launching sites in the Eastern Bay of Plenty Harbours. Similar reference to swimming and craft conflict was made in Tauranga by vessels or craft using Salisbury Wharf.



**Figure 12:** Two views of the launching ramp at Thornton and a view up the Rangitaiki River

## 6 KEY RISKS - THE RISK PROFILE FOR EASTERN BAY HARBOURS

There are 24 hazards in the Hazman database relating to navigation and bar crossing in the Eastern Bay harbours. It is thought that the risk profile has been adequately represented, but by necessity, hazards have been identified and scored at the overview. This helps the future safety management system (SMS) and hazard review. The full ranked hazard list for the Eastern Bay Harbours containing cause and consequence information is attached as **Annex E**. **Annex E** should be reviewed in total as the records for individual risk categories are sometimes elevated in one consequence category. Ongoing hazard identification and review of this should form a natural part of the Safety management System to be introduced in the next stage.

### 6.1 KEY RISKS – INTERPRETING THE RISK ASSESSMENT

The risk profile for the Bar harbours is quite complex and it is clear that each pose different levels of risk, related to both the geography of each bar harbour as well as the volume of traffic in each area. Risk scores of 1.3 to 6.6 (on a scale of 1-10) were found across the 24 hazards in the database as a whole. **Table 3**, over the page, references a ranked summary of the hazards in the database. The table presents the overall risk score, followed by risk in each individual Most Likely and Worst Credible categories. Reference is also made to section 3.1, which references the risk criteria for this assessment. For ease of reference, a relevant section is repeated below (**Table 2**), but note the advice in Section 3.2.1 with reference to the use of ALARP.

Risk Score	Categorisation	Treatment
4, 5	Risk Assessed in the ALARP region of the risk matrix.	Risk control reviewed or improved.
6, 7, 8	Significant Risk.	New Risk Control introduced in two years.
9 & 10	High Risk	

**Table 2 – Summary of Risk Assessment Criteria**

As can be appreciated from **Table 3**, the risk profile for the Eastern Bay Harbours suggests that there are risks which score on the borderline between as significant and the end of the ALARP region arising out of the study. The top two risks (Thornton Bar and Grounding on Mussel Rock at

Whakatane) show significant readings in the individual consequence categories.

## 6.2 SUMMARY RANKED HAZARD LIST

Rank No.	Hazard Reference	Hazard Title	Hazard Detail	Risk By Consequence Category								Risk Overall
				M L				W C				
				People	Property	Environment	Stakeholders	People	Property	Environment	Stakeholders	
1	20	Overtuning or Broaching of Craft Under 10m - Thornton Bar	Overtuning, Broaching or swamping of Craft at Thornton Bar	6	8	0	6	7	6	3	6	6.62
2	10	Grounding on Mussel Rock	Vessel or craft crossing the Whakatane Bar grounds on Mussel Rock. This could occur after an initial Broaching and the rock is struck at a speed of at least 17 knots. Failure of Leads or other key aids to entry at Whakatane (vessel or craft in rough seas off the correct track, which causes initiation of the event leading to Grounding).	6	8	0	6	7	6	2	4	6.33
3	21	Broaching of Craft of length 10-20m - Whakatane Bar Transit	Broaching or swamping of larger pleasure or small charter vessel (over 10m) but under 20m) when transiting the Whakatane Bar. Vessel of this size range does not have the stability reserve or freeboard of vessels over 20m.	6	6	0	6	7	7	4	7	5.93
4	12	Swimming and Diving at Wharves and Ramps	People diving off wharves, pontoons and launching ramps into the path of berthing vessels. Alternatively diving into the path of craft approaching the boat ramp. Avoiding action necessary.	6	6	0	9	6	0	0	6	5.91
5	22	Broaching of Craft Under 10m - Bar Transit Whakatane Bar	Broaching or swamping of Craft or small charter vessel (under 10m) when transiting the Bar at Whakatane.	6	6	0	6	6	6	2	6	5.33
6	6	Reducing Water Depth at Bars	Vessel or craft grounds when crossing any of the Bars.	6	6	0	6	6	6	0	6	5.18
7	16	Towing Across Bar	Vessel or craft towing another across Bar in marginal conditions by Coastguard or Harbourmaster. Snatching of the tow causes surging of the towed craft. People fall in water at the Bar. Alternatively towing across the Bar by inexperienced member of public (good deed).	6	6	0	0	6	6	2	6	4.96
8	2	Broaching of Craft Over 10m During Bar Transit - Ohiwa	Broaching or swamping of larger pleasure or small charter vessel (over 10m) when transiting the Bars at Ohiwa.	6	3	0	0	6	6	4	6	4.94
9	3	Broaching of Craft Over 20m During Bar Transit	Broaching or swamping of large vessel (over 20m) when transiting the Whakatane Bar.	3	0	0	3	6	7	4	7	4.58

Rank No.	Hazard Reference	Hazard Title	Hazard Detail	Risk By Consequence Category								Risk Overall
				M L				W C				
				People	Property	Environment	Stakeholders	People	Property	Environment	Stakeholders	
10	5	Extreme Flood Flow in Harbour Entrance	Vessel or craft crosses a workable Bar and enters a flood rate in the main channel greater than or close to the speed capability of the vessel. Resulting loss of control.	4	4	0	2	6	6	2	6	4.56
11	7	Collision in Narrows or at Bar	Two vessels transit entrance or Bar at once. One affected by bar swell loses control and veers off track. Collision possible. Alternatively one vessel inbound meets vessel outbound at Bar.	6	0	0	0	5	5	2	6	4.42
12	13	High Flood Waters at Whakatane.	Debris during large flooding event collects around swing moorings and moored craft in danger of being swept to seaward. Hazard scenario due to flow rate alone or by debris contacting mooring or moored craft. People accessing craft by small service craft in heavy flood conditions to move these from moorings in danger of entering water.	6	6	0	3	5	5	0	2	4.38
13	9	Contact with Vessel or Wharf when Berthing	Vessel or craft coming alongside wharf loses control and either lands heavily on wharf structure or contacts another vessel alongside.	3	3	0	3	6	6	2	6	4.27
14	4	Contact with Debris at Bar	Contact with debris occurs whilst transiting the Bar after heavy rains in Whakatane river catchment area.	0	6	0	6	4	4	0	2	4.04
15	23	Fuel Spill During Refuelling	Refuelling of recreational craft or commercial vessel at Whakatane results in Diesel fuel entering water.	0	0	6	0	2	2	3	5	3.82
16	24	Placing of Nets At Thornton	Nets placed across the Rangitaiki river mouth and left. Contacted by transiting craft.	0	3	0	3	6	4	0	4	3.72
17	17	Contact with Fishing Lines	Persons Fishing on Groynes at Whakatane or at the Thornton Bar river (Rangitaiki River) have lines in the main channel. Transiting craft keep to east to stay in the main channel and lines become entangled in craft running gear.	0	6	0	0	3	3	3	3	3.6
18	15	Man Overboard at Bar	Persons sat or stood on transom or foredeck as vessel or craft takes large waves at the Bar.	3	0	0	3	6	0	0	6	3.53
19	1	Broaching of Craft Under 10m During Bar Crossing - Opotiki / Ohiwa	Broaching or swamping of Craft or small charter vessel (under 10m) when transiting e Bars at Ohiwa or Opotiki.	3	3	0	3	5	3	2	2	3.5
20	11	Swamping of Waka-Ama or Kayaks	Organised Waka-Ama event crossing a Bar (or entering surf if Bar is closed) loses control in swell conditions. Swamping and capsize.	2	0	0	0	4	4	0	6	3.16
21	8	Surfers on the Bar in channel in conflict with transiting craft.	Surfers cross the path of an inbound or outbound vessel crossing the Bar. Alternatively Surfers swim across the entrance using the dinghy channel, on their way to the surfing area.	3	0	0	3	5	0	0	5	3.13
22	19	Grounding at Opotiki or Ohiwa Bar	Vessel or craft grounds when crossing the Bar at Opotiki or Ohiwa	0	0	0	0	6	6	0	4	2.5
23	14	Grounding on Remote Rocks in Sailing Club Area	Recreational craft grounding at Whakatane in estuary North of Sailing Club on unmarked rocks outside channel.	0	3	0	3	1	3	1	1	2.49



Rank No.	Hazard Reference	Hazard Title	Hazard Detail	Risk By Consequence Category								Risk Overall
				M L				W C				
				People	Property	Environment	Stakeholders	People	Property	Environment	Stakeholders	
24	18	Grounding In Ohiwa Harbour Area	Recreational craft grounding in Ohiwa Harbour (inside Ohiwa Bar)	0	0	0	0	3	2	0	2	1.32

**Table 2: Ranked Hazard List**

## 7 EASTERN BAY HARBOURS - REVIEW OF RISK CONTROL

### 7.1 INTRODUCTION

Risk Control options considered during the study are presented in a mapped table format in **Annex D**. These are in a format allowing consideration as risk control candidates during the introduction of the Navigational Safety Management System. The risk control to be implemented can be finally selected by decision-makers as the harbour safety plan is developed.

This section highlights findings of the risk assessment associated with the upper end of the ranked hazard list and the risk control available. It also makes recommendations.

### 7.2 THORNTON BAR

The risk assessment findings show that Thornton Bar presents the most significant risk of all the harbours in the area. The incident rates<sup>14</sup> appear to centre around the overturning of craft, but it appears to have the worst record of any Bar in the area.

Thornton has been the subject of District Council investment into launching facilities, which are both attractive and served by a good parking area. As it provides the closest point of sea launching to residents of Rotorua wishing to fish around Whale Island, as well as providing the shortest water transit to the Island, it has significant economic attraction to the leisure user. However, with a dangerous bar at its entrance the risk management system needs to be considered.

Thornton Rescue is a voluntary surf rescue service, the equipment for which has been provided by a long term resident of Thornton and his son, including fuel for the boat and its running costs (the cost can amount to around \$10K annually). It has a claimed two to 10 minute call-out period and advice taken from Thornton Rescue suggests that rapid call-out to overturned craft in heavy surf provides a difference between positive and negative outcome of the rescue.

When this is compared to the 1994 Coastguard Operations Manual defined response times:

Marine SAR Advisor/Marine Controller	10 mins
Communications Stations manned and operating	15 mins
Rescue Craft under way	30 mins

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<sup>14</sup> For the record, incident data at Thornton was provided mostly by local stakeholder knowledge.

The Whakatane Coastguard reported call out times appear to be around 30 mins to attend their rescue craft, with attendance to the casualty varying dependent on the nature of the call. Maintaining an effective rescue service that can provide call-out in 10mins to Thornton Bar would mean a dedicated crew on site during busy periods.

A rescue call-out<sup>15</sup> reported to occur on average once a weekend in the summer months. This data needs to be verified and a dialogue facilitated to provide Thornton Bar with a long term rescue service solution and permanent rapid deployment of an experienced team into the surf. The response is being managed at present by a capable and independent self funded team, but this cannot be expected to go on indefinitely. The signs are that further loss of life on Thornton Bar may be inevitable without actions to mitigate hazards and reduce risk.

The upgrading of signage at Thornton warning of the dangers of Bar crossings was initiated by the Eastern Bay of Plenty Harbourmaster during the risk assessment.

### **7.2.1 Monitoring of Bars in the Bay of Plenty Region**

The Bay of Plenty has a number of bar harbours within its jurisdiction. With the exception of Whakatane, monitoring is not undertaken (nor is it practicable). General advice is issued about bar conditions, based on the condition of Whakatane Bar.

A general recommendation is made for the Regional Council to consider remote monitoring of Bar conditions by webcam in all of the Bar harbours in its region. This appears to be particularly appropriate at Thornton, where the condition of the Bar is reported to rapidly change with the influence of the tide. Use of the infrared spectrum at dangerous bars is an option.

### **7.3 WHAKATANE**

Whakatane retains a Harbourmaster function at its entrance and there is little doubt this role is key in the risk management achieved at Whakatane. Loss of life is low, yet bar incidents are relatively common. The Harbourmaster's office and home is at the Bar. Whilst this is not technically necessary nor common for regulatory management, it does provide significant benefits to the function and to port management at Whakatane. The Harbourmaster at Whakatane is very aware of local vessel movements and the sea and weather conditions in the area.

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<sup>15</sup> It is understood from Thornton Rescue that self call-out is often the case as craft get into difficulty.

There is an ongoing local issue of the Harbourmaster's advice about the Bar to be informative and many vessels are reported to proceed. This includes charter vessels that can carry significant passenger complements. A process of education is always an option, no matter how experienced the operator.

### **7.3.1 Mussel Rock**

Mussel Rock appears to rank highly as a hazard to navigation and has been struck on many occasions, even causing damage to the larger vessels engaged in passenger or charter services.

It is therefore recommended from this risk assessment priority be given to installing a permanent mark on this rock.

### **7.3.2 Soundings on the Bar**

The Whakatane Harbourmaster/Superintendent sounds the Bar following a major storm event. Delivery of information about the changing Bar conditions is required rapidly, especially after a storm or flood event. The Port Company needs to provide this service as much as the wider Harbour Regulator as it has an obligation to provide a safe means of access to facilitate its operations.

The present craft is suitable for working on the Bar, also when the Bar is in marginal condition. It was procured for this purpose and satisfies the wharf operators need to provide a means of safe access for vessels using its services. In this instance, the role of the Regional Harbour Regulator is to disseminate information about the Bar, but both the Port Company function and the Harbourmaster function need a craft although their needs could be quite different. It is worthwhile considering a joint SMS policy towards the long term replacement of the craft.

### **7.3.3 Pilotage Advice and Towing Assistance**

On request the Whakatane Harbour Superintendent has in the past led skippers through the Bar. Assistance has also been given to tow craft into Whakatane that have got into difficulty, but mostly this is a Coastguard role. Although towing by the Superintendent is of benefit to the community, there is a question of liability should things go wrong. There does not appear at present to be a system obtaining acceptance by the craft owner that services being freely given (or at modest cost) are being provided under no liability conditions. This could be in the form of a standard declaration notice given to the launch owner and followed up by short VHF. This recommendation has little effect on safety, but is prudent liability mitigation.

Craft in difficulty have been towed across a Bar declared to be Unworkable in the past. A Coastguard member has also advised once taking a large charter vessel in tow (“accepted the risk”). Similar assistance has been given by the Harbourmaster. Consideration should be given to developing safety policy for taking vessels in difficulty to Whale Island and a sheltered anchorage and limiting the size of vessel taken under tow. It is much safer for a large vessel to be towed to Tauranga than being towed locally over a bar in marginal condition. A large vessel can be removed from danger and held hove-to until an appropriate towing vessel can be engaged and the vessel towed to Tauranga Harbour or anchorage.

#### **7.3.4 Fishing Competitions**

It appears from feedback at Whakatane that contact with the Harbourmaster’s Office is minimal during some fishing events and the flow of valuable information can be disconnected. Although there are exceptions to this, it appears that event organiser liaison with the Harbourmaster’s Office can be improved. Where information flow is poor, there are always underlying safety issues associated with confusion by individuals or groups taking part. The Regional Council as Harbour Authority is recommended to set a general policy for organised event liaison at Whakatane, Opotiki, Ohiwa and Thornton. Feedback should be given by the Harbourmaster to event organisers that simply turn up! This is said to occur and event organisers need to be influenced to produce and share safe operational plans at an early stage, allowing fair harbour usage requirements to be input into these.

#### **7.4 SWIMMING AT LAUNCHING RAMPS**

There was a common theme of stakeholder feedback referencing problems with children swimming at launching ramps. This hazard has ranked no.4 overall, but has a score of 9 in the stakeholder category. The score reflects the strength of feedback provided, with reports that action is needed urgently before a youngster got hurt. There are obvious underlying factors that are associated with children’s attraction to launching ramps, but every bar harbour visited referenced children jumping into the path of craft approaching launching areas. This feedback was also reflected in Tauranga where Salisbury Wharf had a similar problem. There may be no easy answers to this, but to receive a score of 9 on a scale of 10 in any of the risk assessment categories suggests that consideration is given to making improvements. Education and community liaison may be appropriate actions.

## 7.5 CODE APPLICATION ASSESSMENT

As referenced in the Code Application Findings (Section 1.3) the Regional Council has Bylaw jurisdiction extending out to the 12nmile international limit. This is useful given the small size of craft able to access White Island from most of the harbours in the Bay of Plenty area. However, the area of this jurisdiction is large and a balance does need to be struck between the utility of what were originally intended to be Harbour Bylaws (with limited enforcement utility) and the need to manage bylaws affecting smaller harbours in the Bay of Plenty region. To assist with this it is suggested that the harbours be given defined extents for navigational regulation. Whakatane has a length limit for entry to the harbour of 25m. This is based on availability of wharf space, but realistically it is a size limitation related to the entrance and harbour topography. It is managed effectively by the local Harbourmaster, in a combined Port Manager/Harbourmaster role. However if the Eastern Bay of Plenty Harbourmaster was to move over to a Regional Council role, consideration should be given to referencing the maximum length of vessel able to use Whakatane entrance in Bylaws relating to that harbour (and possibly also Opotiki if development of the harbour progresses).

## 7.6 LICENSING OF PASSENGER OPERATIONS

Like other parts of New Zealand, licensing of commercial operations in the Bay of Plenty area is regulated by the Safe Management Certificate. This provides assurance that the vessel is carrying sufficient equipment for the area in general, is maintained, and that the skipper is generically qualified for the vessel and the area. However the Bay of Plenty is a large area and other factors may become relevant to the fair regulation of a commercial operation. Adherence to bar safety advice at Whakatane may be more relevant to a passenger operation, where passengers are reliant on the judgement and experience of the skipper.

Local licensing of commercial operators by the Regional Council as Harbour Authority may be worth considering, provided this complies with the legislation. This is raised as much because of the sheer area of the harbour managed by the Bylaws. Licensing would provide a focus on the responsibilities of commercial operators and begin to underpin the need for Harbourmaster's advice to be mandatory with respect to critical safety advice, such as hazard management for a bar crossing. An alternative to this are explicit requirements of underwriters.

## 8 CONCLUSIONS AND RECOMMENDATIONS

1. There are a large number of risk control options associated with this study and these are presented at **Annex E**. Key recommendations are reflected in this section.
2. The Eastern Bay of Plenty harbours make a significant contribution to the overall navigational risk profile for the area. Loss of life has occurred in the past and this study has determined that significant risk levels are apparent at some bars. Using the Risk Criteria defined for this study suggests that a risk management policy should be introduced within two years.
3. The Regional Council as Harbour Authority is recommended to consider remote condition monitoring of the condition of all bars in the Bay of Plenty region, by camera (webcam). The more hazardous bars (e.g. Thornton) may additionally be appropriate candidates for thermal imaging camera monitoring (infra red).
4. Reviewing the options to gain an improvement in the recording of bar incidents should be considered. This information forms a key component of a navigational safety management system.
5. Overturning of craft at Thornton Bar has provided the highest placed hazard of the risk assessment. This is due to the frequency of the event. The event response at Thornton is reliant on a rescue service that is funded and manned by a local resident and his son. Although it appears this is highly effective, a longer term strategy is recommended for safety management at Thornton Bar.
6. Grounding (or striking) Mussel Rock at Whakatane features significantly in the risk assessment, due to the frequency of occurrence of incidents involving damage. Consideration should be given to installing a permanent day mark on Mussel Rock.
7. Minors swimming and jumping off launching ramps is a common safety problem throughout the Eastern Bay harbours and a similar problem exists at Tauranga. Serious concern of potential injury was expressed by Stakeholders consulted. There are no simple solutions as reasons for this may be different in each location. However a policy of general education in Schools and the community is worthy of consideration.
8. With reference to section 7.5, the Regional Council is recommended to define a navigation area where directions for entry and exit can be specified in Bylaws, which are relevant to the Eastern Bay bar harbours. This would recreate local harbour limits, which mariners from any part of the world can readily identify with and understand.



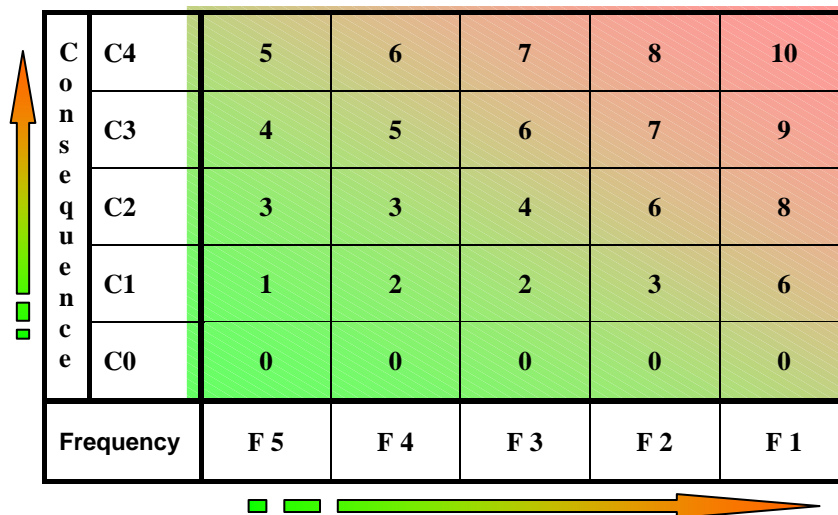


**ANNEX A**  
**RISK CRITERIA USED FOR THE ASSESSMENT**

The risk assessment criteria used for this risk assessment is as follows:

Category	Description (AS/NZS 4360)	Definition	Operational Interpretation
F1	Frequent	An event occurring one or more times per month (i.e. in the range once a week to once a month).	Monthly
F2	Likely	An event occurring in the range less than once per month to one or more times in a season.	Annually
F3	Possible	An event occurring in the range 1 to 10 years (or seasons).	1 - 9 years
F4	Unlikely	An event occurring in the range less than once in 10 years.	>10 years
F5	Rare	An event occurring in the range less than once in 100 years.	100 years

**Suggested Frequency Matrix Scales**



**Risk Matrix Used to Score This Risk Assessment**

Scale	People	Property	Environment	Harbour Stakeholders (Social Impact)
<b>C0</b>	<b>Insignificant</b> Possible very minor injury (e.g. bruise).	<b>Insignificant</b>  (NZ\$0-100).	<b>Insignificant</b> Negligible environmental impact. Tier 1 may be declared but criteria not necessarily met.  (NZ\$0-100).	<b>Insignificant</b> No notable effect.  (NZ\$0-100).
<b>C1</b>	<b>Minor</b> Slight injuries (possibly requiring medical attention).	<b>Minor</b>  (NZ\$100-5000).	<b>Minor</b> Tier 1 to Tier 2 criteria reached. (small operational spill).  (NZ\$100-5000).	<b>Minor</b> Bad local publicity or short-term social impact, etc.  (NZ\$100-5000).
<b>C2</b>	<b>Moderate</b> Major injury (especially involving leisure craft).	<b>Moderate</b>  (NZ\$5K-50K).	<b>Moderate</b> Tier 2 Spill criteria Reached, capable of being limited to immediate area within harbour or port zone. Tier 3 threshold reached at \$250K. (NZ\$5K-50K).	<b>Moderate</b> Bad widespread publicity, temporary suspension of Bar Transit or damage to wharf.  (NZ\$5K-50K).
<b>C3</b>	<b>Major</b> Multiple major injuries or up to two fatalities.	<b>Major</b>  (NZ\$50K-500K).	<b>Major</b> Lower Tier 3 criteria immediately reached, with pollution outside harbour or port zone expected. Chemical spillage or small gas release. Potential loss of environmental amenity. (NZ\$50K-500K).	<b>Major</b> National Publicity Harbour faces Bar Closure for several days - craft stuck at entrance). National publicity. Alternatively loss of use of a key wharf for repairs. Loss of income effect on local business. (NZ\$50K-500K).
<b>C4</b>	<b>Catastrophic</b> Multiple fatalities involving Charter vessel with passengers.	<b>Catastrophic</b>  (over NZ\$500K).	<b>Catastrophic</b> 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. (over NZ\$500K).	<b>Catastrophic</b> International media publicity. Harbour closes, navigation seriously disrupted for an extended period. Serious and long term loss of utility. (over NZ\$500K).

### Consequence Matrix

**ANNEX B**  
**STAKEHOLDERS CONSULTED**

Stakeholders Consulted:

1. Commercial and Leisure users of Whakatane Harbour.
2. The Bay of Plenty Region Coastguard (Whakatane Branch).
3. Thornton Rescue.
4. Commercial and leisure users of Ohiwa Harbour.
5. Commercial and Leisure users of Opotiki Harbour.
6. Sample users of Thornton Bar.
7. Whakatane Harbourmaster.
8. Whakatane District Council.
9. Opotiki District Council.
10. Environment Bay of Plenty Regional Council Harbourmaster.
11. Maritime New Zealand (local nautical inspector).

## ANNEX C

### RANKED HAZARD LIST

Rank No.	Hazard Reference	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)	M L		W C							
											People	Property	Environment	Stakeholders			People	Property	Environment	Stakeholders
1	20	Thornton Approaches & Bar	Broaching / Swamping	Overtuning or Broaching of Craft Under 10m - Thornton Bar	Overtuning, Broaching or swamping of Craft at Thornton Bar	Powered Craft Under 10M, Vessel over 20m	Bay of Plenty Regional Council , Department of Conservation, Fishing Interests, General Public, Leisure users, Vessel Skippers / Crew, Whakatane District Council	Skipper Over Confidence; Skipper Misjudgement; Skipper not seeking information; Transit decision by Skipper when Bar advised as unworkable. Backlighting from vehicle headlamps on the beach (fishing at entrance), loss of situational awareness. Breaking Seas over Bar. High Flood Current against incoming Tide. Bar advice provided remotely becomes inappropriate (rapidly changing conditions). Inability to provide accurate Bar Advice (Bar not monitored). Sudden Course deviation due to Debris in water at Bar. Mechanical Failure (Steering or Propulsion)	Broaching and recovery when inbound. Occupants thrown and minor injuries (bruising, possible minor broken bone). When outbound, broken windscreen and partial swamping.	Broaching leads to capsize when inbound; engine swamped. Outbound - Craft and engine swamped, possibly stern first as craft fails to climb wave. Capsize. Occupants in water in rough seas with undertow. Up to four fatalities possible if at night. Hypothermia to be expected.	6	8	0	6	7	6	3	6	6.62	<p>Thornton Rescue advised that an incident of some form occurs every weekend throughout the year. Thornton Bar is not monitored, although the Thornton Rescue service is resident and a house overlooks the Bar, with the service provider recognising craft getting into difficulties as this occurs. Capsize or significant flooding appears to be a twice monthly event. Loss of life has regularly occurred at Thornton and many events are responded to by Thornton Rescue, financed and run by a 68 year old and his Son. Like Whakatane a broken windscreen can be expected around once a month and swamping is the most likely event outbound. Engines have been inundated with Water. Broaching from nose diving into a trough and then lifting by a following swell is the most likely event inbound. Capsize is equally reported to be a most likely event. Large fishing events provide a considerable number of skippers who are inexperienced at Bar transit.</p> <p>Thornton is a quiet launching point and is reported to be the shortest distance from Rotorua to gain access to the water and to provide the shortest distance to Whale island (fuel savings of around \$65 are reported). Small pleasure craft are more likely to wear lifejackets and experience is that this is also improving - four occupants are common onboard pleasure craft. A survey by EBOP HM (In Tauranga) found that 99.5% of pleasure craft were carrying appropriate lifejackets. The worst credible scenario of four fatalities is much more likely at night. Rescue of even a small craft in difficulty at a Bar is a difficult exercise for any rescue team.</p>

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2	10	Whakatane Bar	Grounding	Grounding on Mussel Rock	Vessel or craft crossing the Whakatane Bar grounds on Mussel Rock. This could occur after an initial Broaching and the rock is struck at a speed of at least 17 knots. Failure of Leads or other key aids to entry at Whakatane (vessel or craft in rough seas off the correct track, which causes initiation of the event leading to Grounding).	All Craft Crossing Bar (up to 25m), Dry Cargo	Bay of Plenty Regional Council, Environmental Interests, Fishing Interests, Leisure users, Passengers, Vessel Owners, Vessel Skippers / Crew, Whakatane District Council, Whakatane Port Interests	Inexperienced Skipper inbound approaching from the east and cutting corner instead of lining up on leads. Misjudgement. Lack of local knowledge. Bar condition is flat due to flow of exiting water resulting in misjudgement of Conditions (Serious). Vessel changes course to the east to early after clearing channel entrance. Broaching craft takes shear and runs across Mussel rock.	Vessel lands heavily on rock causing damage to rudder, propeller or hull. Glancing grounding most likely. Vessel disabled and requires towing. Personal injury from heavy landing.	Landing on rock in heavy swells in marginal conditions. Sinking of craft or large vessel possible as vessel runs on into deeper water. Loss of life likely. Possible to block the channel if vessel is large (20-25m).	6	8	0	6	7	6	2	4	6.33	Mussel rock lies just north east of the entrance beacon. It is exposed at low water springs (breaks surface). It is visible at other times in the normal swell at the Bar. Mussel rock is reported to be more of an outbound hazard but is being struck regularly by vessels or craft after Broaching inbound. It is in line with no.s 2 and 4 beacon and is presently normally unmarked. Landings on Mussel rock have occurred on a number of occasions. More likely to occur when the Bar is shallow, which has the effect of skippers taking a course more to the east because the western side of the entrance is shallower (skippers seeking clearest water path through the Bar).



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3	21	Whakatane Bar	Broaching / Swamping	Broaching of Craft of length 10-20m - Whakatane Bar Transit	Broaching or swamping of larger pleasure or small charter vessel (over 10m) but under 20m) when transiting the Whakatane Bar. Vessel of this size range does not have the stability reserve or freeboard of vessels over 20m.	Powered Craft over 10m, Under 20m, over 10M, Vessel over 20m	Bay of Plenty Regional Council, Businesses associated with Tourism, Department of Conservation, Fishing Interests, General Public, Leisure users, Passengers, Vessel Owners, Vessel Skippers / Crew, Whakatane District Council, Whakatane Port Interests	Skipper Over Confidence. Skipper Misjudgement. Skipper not seeking information. Backlighting from vehicle headlamps, loss of situational awareness. Breaking Seas over Bar. High Flood Current against incoming Tide (Whakatane especially). Transit Decision by Skipper when Bar Advised as unworkable by Harbourmaster. Sudden Course deviation due to Debris in water at Bar. Mechanical Failure (Steering or Propulsion). Commercial pressure from paying passengers having booked passage. Vessel underpowered to transit the bar for its size. Human error in changing from flying bridge to wheelhouse control. Failure of Leads or other key aids to entry at Whakatane (vessel or craft in rough seas).	Broaching and recovery when inbound. Occupants thrown and minor injuries (bruising, possible minor broken bone). When outbound broken windscreens and flooding of cabin. Potential injury to occupants.	Broaching leads to flooding into a cabin when inbound; engine fails. Vessel strikes one of the groynes and has hull damage. Outbound vessel swamped, windscreen failure, floods and contacts Groyne. Potential for capsizing. Occupants in water in rough seas (up to 10 people and fatalities possible, especially during darkness). Minimum of broken bones and hypothermia to be expected.	6	6	0	6	7	7	4	7	5.93	An 18m vessel suffered broken windscreen s (three) and cabin flooding when transiting the bar outbound. Lost electrical equipment. Another incident involved an 18m vessel ending up on eastern Groyne caused by human error in changing from flying bridge to wheelhouse control. Local experience suggests that broaching and recovery occurs around six times a year for vessel of 10-20m. A capability for 18 knots is considered necessary for a large vessel to cross the Bar in marginal conditions. Medium sized charter vessels carry up to 10 people (eight passengers and two crew). When Conditions at the Bar are marginal, around 6 broaches can occur in a week. A broken windscreen can be expected around once a month. Engines have been inundated with Water. Broken windscreen is the most likely event outbound. Broaching is the most likely event inbound. Charter vessels regularly transit the bar during evening, but have a lower incidence rate than small pleasure craft. Charter hire periods are 24, 48, 72 or 96 hours. Smaller charter craft do half or full day tours. Coastguard volunteers' response time is around 45mins. The maximum of four fatalities is much more likely at night. Rescue of a vessel at the bar is a difficult exercise for any rescue team. In 1993, a skipper with 20 onboard a six metre craft (two more being towed in a craft) with no night time experience crossed the bar, failed to make the turn and capsized immediately. 2 infants died. Lifejackets are not worn by charter
4	12	Whakatane Main Channel, Whakatane Mooring and Berthing Area, Ohiwa Main Channel and Wharf, Opotiki Wharf and Ramp Area, Rangitaiki River (Thornton Ramp)	Personal Injury	Swimming and Diving at Wharves and Ramps	People diving off wharves, pontoons and launching ramps into the path of berthing vessels. Alternatively diving into the path of craft approaching the boat ramp. Avoiding action necessary.	All vessels and craft, Vessel over 20m	Bay of Plenty Regional Council, Fishing Interests, Leisure users, Vessel Owners, Vessel Skippers / Crew, Whakatane Port Interests	High Spirits. Wilful intent to cause conflict from harbour users. Lack of education as to potential consequences. Encouragement by peers.	Vessel or craft using ramp takes successful avoiding action. Frustration and some minor damage from deviation into structure.	Skipper loses temper after a long history of problems and carries on with manoeuvre. Youngster unable to clear out of way. Contact or crushing. Likely fatality (single). Alternatively serious injury from propellers.	6	6	0	9	6	0	0	6	5.91	Stakeholders report serious problems in all Harbours with youngsters jumping off wharves or jetty piles into the path of vessels, or using berthed vessels as a platform to dive from. At Whakatane a platform adjacent to the launching ramp was constructed by the district council to provide a venue for swimming, but this is now used to harass small craft approaching the ramp. Frustrations run high. Many stakeholders predicted that someone is going to be seriously hurt and widespread concern reported.

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5	22	Whakatane Bar	Broaching / Swamping	Broaching of Craft Under 10m - Bar Transit Whakatane Bar	Broaching or swamping of Craft or small charter vessel (under 10m) when transiting the Bar at Whakatane.	Powered Craft Under 10M, Vessel over 20m	Bay of Plenty Regional Council , Businesses associated with Tourism, Department of Conservation, Environmental Interests, Fishing Interests, Leisure users, Passengers, Small Craft Owners, Whakatane District Council	Skipper Over Confidence; Skipper Misjudgement; Skipper not seeking information. Failure or inability of skipper to read the Bar. Backlighting from vehicle headlamps, loss of situational awareness. Breaking Seas over Bar High Flood Current against incoming Tide Transit decision by Skipper when Bar advised as unworkable by Harbourmaster. Sudden Course deviation due to Debris in water at Bar Mechanical Failure (Steering or Propulsion) Local Coastguard VHF response congratulating dangerous crossings (Encourages others). Failure of Leads or other key aids to entry at Whakatane (vessel or craft in rough seas off the correct track, which causes initiation of the event).	Broaching and recovery when inbound. Occupants thrown and minor injuries (bruising, possible minor broken bone). When outbound, broken windscreen and partial swamping.	Broaching leads to immediate swamping when inbound; engine swamped and fails. Outbound Craft swamped, windscreen failure and capsizes Occupants in water in rough seas. Up to four fatalities possible if at night. Minimum of broken bones and hypothermia to be expected.	6	6	0	6	6	6	2	6	5.33	Broaching and recovery involving craft under 10m length occurs at least twice per month at Whakatane alone. When Conditions at the Bar are marginal, around 6 broaches can occur in a week. A broken windscreen can be expected around once a month and swamping is the most likely event outbound. Engines have been inundated with Water causing loss of propulsion. Broaching from nose diving into a trough and then lifting by a following swell is the most likely event inbound. Large fishing events provide a considerable number of skippers who are inexperienced at Bar transit. Small pleasure craft are more likely to wear lifejackets and experience is that this is also improving - four occupants are common onboard pleasure craft. A survey by EBOP HM (In Tauranga) found that 99.5% of pleasure craft were carrying appropriate lifejackets. Coastguard volunteers' response time is around 45mins. The worst credible scenario of four fatalities is much more likely at night. Rescue of even a small craft in difficulty at a Bar is a difficult exercise for any rescue team. Whakatane Bar is accessible for equipment, whereas Ohiwa Bar is remote. In 1993, a skipper with 20 onboard and two in a towed dinghy with no night time experience crossed the Whakatane Bar inbound in darkness, failed to make the turn and capsized immediately. 2 infants died. Only Whakatane Bar is monitored by a Harbourmaster, advice is given to assume that other Bars will be unworkable if Whakatane Bar status is declared unworkable.
6	6	Whakatane Bar , Ohiwa Approaches & Bar, Opotiki Approaches and Bar, Thornton Approaches & Bar	Grounding	Reducing Water Depth at Bars	Vessel or craft grounds when crossing any of the Bars.	All Craft Crossing Bar (up to 25m), Dry Cargo	Bay of Plenty Regional Council , Fishing Interests, Leisure users, Passengers, Small Craft Owners, Vessel Owners, Vessel Skippers / Crew, Whakatane District Council, Whakatane Port Interests	Skippers pushing the available working time envelope of the Bar to obtain greater operational flexibility. Available time envelope is limited due to decreasing depth at Bar. Operator or skipper elects not to heed Harbourmaster advice (reported to be widespread). Inexperience and not reading Bar correctly (lack of local knowledge). Skipper not seeking information at Bar.	Vessel or craft suffers bounce grounding on bar. Damage to propeller or steering. Passengers thrown across vessel (possibly standing).	Large high speed RIB or catamaran crosses Bar at high speed at low water. Rapid stop. People thrown out of craft or vessel. People in water at low tide in breaking sea conditions. Fatalities possible.	6	6	0	6	6	6	0	6	5.18	The Bar is at its shallowest in February and March after lower summer water flows. This coincides with the time of greatest usage. Large flood exiting the harbour removes the Pirapai Spit (which forms normally at Harbourmaster's office). Sand is deposited at the Bar and depth becomes unknown. Craft or vessel have continued to operate before the Harbourmaster has re-sounded the Bar. There is a pressure to get the information to users as rapidly as possible and commercial operators commence working regardless. Worst credible scenario involves a 9m length cat, where passengers are standing, which is known to occur. These have a 39knot capability.

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7	16	Whakatane Bar , Ohiwa Approaches & Bar, Opotiki Approaches and Bar, Thornton Approaches & Bar	Broaching / Swamping	Towing Across Bar	Vessel or craft towing another across Bar in marginal conditions by Coastguard or Harbourmaster. Snatching of the tow causes surging of the towed craft. People fall in water at the Bar. Alternatively towing across the Bar by inexperienced member of public (good deed).	Powered Craft over 10m, Under 20m, over 10M, Vessel over 20m	Bay of Plenty Regional Council , Fishing Interests, Leisure users, Vessel Owners, Vessel Skippers / Crew, Whakatane District Council	Skipper Over Confidence; Tow line too short or too long for conditions. Inexperience by towing and towed craft Towed craft or towing craft/vessel not properly prepared. Transit decision by towing Skipper when Bar advised as unworkable by Harbourmaster. Mechanical Failure (Steering or Propulsion).	Towline parts, towed vessel disabled on Bar with one aboard. Inexperience on towing craft: panic and tow released. Minor injuries from snatching tow.	Towed craft broaches into towing craft at speed. Two craft sink at Bar. Multiple persons in water. Loss of life likely. Alternatively charter vessel being towed across Bar by undersized towing craft. Loss of control and broaching of an unpowered vessel with passengers on board. Capsize or landing on rocks. Loss of life.	6	6	0	0	6	6	2	6	4.96	This hazard scenario has occurred. Whakatane Harbourmaster recommends towed craft are unmanned. Present Coastguard practice is to place one person onboard a towed craft. Short tows are normally used when towing across the Bar, especially in rough sea conditions. In rough conditions there is an emergency mooring off Whakatane (Otarawairere).
8	2	Ohiwa Approaches & Bar	Broaching / Swamping	Broaching of Craft Over 10m During Bar Transit - Ohiwa	Broaching or swamping of larger pleasure or small charter vessel (over 10m) when transiting the Bars at Ohiwa.	Powered Craft over 10m, Under 20m, over 10M, Vessel over 20m	Bay of Plenty Regional Council , Department of Conservation, Environmental Interests, General Public, Passengers, Vessel Owners, Vessel Skippers / Crew, Whakatane District Council	Skipper Over Confidence. Skipper Misjudgement. Skipper not seeking information. Breaking Seas over Bar. Transit decision by Skipper when Bar advised as unworkable. Inability to provide accurate Bar Advice (Bar not monitored). Bar condition advice given remotely is inaccurate (due to rapidly changing conditions) Mechanical Failure (Steering or Propulsion). Vessel underpowered to transit the Bar for its size. Human error in changing from flying bridge to wheelhouse control	Broaching and recovery when inbound. Occupants thrown and minor injuries (bruising, possible minor broken bone). When outbound broken windscreens and flooding of cabin. Potential injury to occupants.	Broaching leads to immediate swamping when inbound; engine swamped and fails. Outbound vessel swamped, windscreen failure, flooding. Potential for capsize. Occupants in water in rough seas (up to 10 people and fatalities possible, especially during darkness). Minimum of broken bones and hypothermia to be expected.	6	3	0	0	6	6	4	6	4.94	An 18m vessel suffered broken windscreen s (three) and cabin flooding when transiting the Whakatane Bar outbound - if this occurred at Ohiwa, the same result is inevitable. In 2003, a 40ft sailing vessel was a total loss on the Ohiwa Bar after striking the channel edge and loosing the keel (transit attempted against local Harbourmaster's advice). Ohiwa is primarily a recreational Harbour generally used by trailer craft, but there are a number of larger craft on moorings. The Ohiwa Bar is remote and the level of incidents is not fully known. Commercial craft have in the past diverted to Ohiwa harbour if the Whakatane Bar was closed - this being on the basis that the sandy bottom posed less damage consequence to charter vessels. A capability of 18 knots is considered necessary for a large vessel to cross the Bar in marginal conditions. Medium sized charter vessels carry up to 10 people (eight passengers and two crew). Broken windscreen is the most likely event outbound. Broaching is the most likely event inbound. Coastguard volunteers' response time is around 60mins to Ohiwa Bar from Whakatane. A response from Opotiki can be achieved in 30mins if their craft can cross the Bar.

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											People	Property	Environment	Stakeholders			People	Property	Environment	Stakeholders
9	3	Whakatane Bar	Broaching / Swamping	Broaching of Craft Over 20m During Bar Transit	Broaching or swamping of large vessel (over 20m) when transiting the Whakatane Bar.	Vessel over 20m, Vessel over 20m	Bay of Plenty Regional Council, Businesses associated with Tourism, Department of Conservation, Environmental Interests, Fishing Interests, General Public, Passengers, Vessel Owners, Vessel Skippers / Crew, Whakatane District Council, Whakatane Port Interests	Skipper Over Confidence. Skipper Misjudgement. Skipper not seeking information. Backlighting from vehicle headlamps, loss of situational awareness. Breaking Seas over Bar. High Flood Current against incoming Tide (Whakatane especially). Transit Decision by Skipper when Bar Advised as unworkable by Harbourmaster. Inability to provide accurate Bar Advice (Bar not monitored). Sudden Course deviation due to Debris in water at Bar. Mechanical Failure (Steering or Propulsion). Commercial pressure from paying passengers having booked passage. Human error in changing from flying bridge to wheelhouse control. Failure of Leads or other key aids to entry at Whakatane (vessel or craft in rough seas off the correct track, which causes initiation of the event leading to Grounding).	Broaching and recovery when inbound. Occupants thrown and minor injuries (bruising, possible minor broken bone). When outbound breaking seas on the deck.	Outbound vessel in large swell, loss of forward windows. Inbound vessel Broaches leading to loss of control and vessel landing on Groyne. Occupants thrown around cabin. Broken bones involving up to 2/3 of vessel complement. Serious damage to vessel in way of keel. Fatalities in this size of vessel unlikely if power appropriate. Fatalities possible if vessel on Groyne suffers structural failure from heavy pounding on Groyne.	3	0	0	3	6	7	4	7	4.58	Vessels over 20m only operated from Whakatane. A considerable number of passengers are retired people. Broaching and recovery occurs regularly by vessels of this size. Can have up to 78 persons on board (68 passengers and 10 crew). There is no history of fatalities in records amongst the 20-25m size category. Larger vessels in service generally have enough power to recover from a broaching situation. The power required is reported to be equivalent of that providing an 18knot service speed. A broken windscreen is the most likely event outbound. Broaching is the most likely event inbound. Coastguard volunteers' response time is around 45mins, even to the Whakatane Bar. This is likely to be less in a life and death situation. Rescue of a vessel at the bar is a difficult exercise for any rescue team.
10	5	Whakatane Bar, Whakatane Main Channel	Grounding	Extreme Flood Flow in Harbour Entrance	Vessel or craft crosses a workable Bar and enters a flood rate in the main channel greater than or close to the speed capability of the vessel. Resulting loss of control.	All Craft Crossing Bar (up to 25m), Dry Cargo	Bay of Plenty Regional Council, Businesses associated with Tourism, Environmental Interests, Fishing Interests, Leisure users, Passengers, Vessel Owners, Vessel Skippers / Crew, Whakatane District Council, Whakatane Port Interests	Extreme flood flow following heavy rain in Whakatane catchment area. Operator elects not to heed Harbourmaster advice. Bar condition is flat due to flow of exiting water resulting in misjudgement of Conditions (Serious). Over confidence.	Loss of control occurs after crossing the Bar as vessel enters the entrance restriction and is unable to make headway and loses control of steerage (disorientation). Vessel unable to turn is swept back out to sea. Craft or vessel lands on either Groyne at high speed, suffers structural damage. Alternatively, vessel is swept back to sea and situation is recoverable.	Vessel takes a shear across the entrance due to the flow of water and capsizes at Groyne or entrance rocks. Occupants in water. Fatalities likely. Alternatively, casualties are carried out to sea rapidly.	4	4	0	2	6	6	2	6	4.56	Serious flooding at Whakatane occurs once at least once per year An 18m vessel has entered the Whakatane Bar in flood conditions and managed to reach the wharf after transiting against the flow in the harbour for one hour (entrance to berth). Vessel was almost overcome by tide Large flood exiting the harbour removes the Pirapai Spit (which forms normally at Harbourmaster's office). Sand is deposited at the Bar and depth becomes unknown. If worst case scenario occurs, and casualties are carried out to sea, the only realistic response is by helicopter. Helicopter call out would require Police sanction (who are budget holders).

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11	7	Whakatane Approaches, Whakatane Bar, Whakatane Main Channel	Collision	Collision in Narrows or at Bar	Two vessels transit entrance or Bar at once. One affected by bar swell loses control and veers off track. Collision possible. Alternatively one vessel inbound meets vessel outbound at Bar.	All Craft Crossing Bar (up to 25m), All Craft Crossing Bar (up to 25m)	Bay of Plenty Regional Council, Businesses associated with Tourism, Environmental Interests, Fishing Interests, Leisure users, Passengers, Small Craft Owners, Vessel Owners, Vessel Skippers / Crew, Whakatane District Council, Whakatane Port Interests	Operator elects not to heed Harbourmaster advice or Bylaws. Vessel or craft transiting at too high a speed. Loss of control. Inexperience. Inappropriate navigation or failure to use or monitor VHF. Vessel outbound and inbound fail to make a VHF call advising of Bar transit. Stream of vessel crossing the Bar not allowing enough sea room between transits. Transiting during darkness without Navigation Lights. Failure of leads or other key aids to transit at Whakatane (vessel or craft off the correct track, which contributes to initiation of the event)	Last minute avoiding action. Possibility of people or passengers thrown across craft. Potential for minor injury.	Vessel or craft inbound broaches in the path of an outbound (or following) vessel. T Bone collision. Struck vessel rolls from collision momentum and capsizes. Alternatively, vessel ends up aground on Groyne on either side. Loss of life likely.	6	0	0	0	5	5	2	6	4.42	This hazard has not occurred in practice. However, there are numerous near misses, especially at night without navigation lights. If conditions are calm, craft do pass at the Bar and do transit in tandem. Bylaws prevent more than one vessel or craft transiting a Bar at any one time. Reports suggest that this does however still occur. Most vessel or craft are reported to call Whakatane Coastguard to advise when crossing a Bar at any of the Bar harbours in the area. Craft do transit the bar in a constant stream when busy and are reported to sometimes follow too close. There is a maritime rule (22) and Bylaw requirement for 50m separation between inbound transiting vessels.
12	13	Whakatane Main Channel, Whakatane Mooring and Berthing Area	Contact Navigation	High Flood Waters at Whakatane.	Debris during large flooding event collects around swing moorings and moored craft in danger of being swept to seaward. Hazard scenario due to flow rate alone or by debris contacting mooring or moored craft. People accessing craft by small service craft in heavy flood conditions to move these from moorings in danger of entering water.	All Craft Crossing Bar (up to 25m), Dry Cargo	Bay of Plenty Regional Council, Leisure users, Small Craft Owners, Vessel Owners	Extreme flood flow following heavy rain in Whakatane catchment area. Operator or owner elects not to heed Harbourmaster advice and leaves craft on mooring too long and craft in high flood flow area. Cut logs stored close to river banks.	Mooring gets taken away and craft ends up aground on the Bar. Loss of craft inevitable. Alternatively one more persons enter water attempting to board craft needing to be removed from mooring.	Mooring gets taken away and connects with other moored craft and a number get swept out to the Bar. A number of craft end up aground on the Bar. Loss of all inevitable. Persons accessing moored craft in dinghy capsize, end up in flood waters and taken towards the Bar. Fatalities likely - up to two.	6	6	0	3	5	5	0	2	4.38	Serious flooding at Whakatane (town flooded) occurs around once every five years. Heavy flooding occurs more than once a season. There is a requirement to remove craft from moorings during a heavy flood event as all would get taken away. There have been times when the Met service has missed forecasting of the event and craft have needed to be removed at very short notice. A person ended up in the water attending his craft to move it along side in a flood event. Luckily individual was swept under his own boat but managed to hold onto mooring downstream until rescued from the water by the Harbourmaster. Two persons have entered water in the past. One craft has been lost after owner turned up too late and flood waters had risen to high. Storm conditions from the Northeast pass through rapidly, but these also bring likelihood of heaviest rains. The flooding brings with it debris in the form of large logs through to whole tree trunks. Household debris, such as freezers and farm animals are also common. Debris can create a "raft", which presents a hazard to any craft remaining on a mooring.

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											People	Property	Environment	Stakeholders	People	Property	Environment	Stakeholders			People	Property	Environment	Stakeholders	People	Property	Environment	Stakeholders
13	9	Whakatane Main Channel, Whakatane Mooring and Berthing Area, Ohiwa Main Channel and Wharf, Opotiki Wharf and Ramp Area, Rangitaiki River (Thornton Ramp)	Contact Berthing	Contact with Vessel or Wharf when Berthing	Vessel or craft coming alongside wharf loses control and either lands heavily on wharf structure or contacts another vessel alongside.	All Craft Crossing Bar (up to 25m), Dry Cargo	Bay of Plenty Regional Council , Environmental Interests, Fishing Interests, General Public, Leisure users, Opotiki District Council, Passengers, Small Craft Owners, Vessel Owners, Vessel Skippers / Crew, Whakatane District Council, Whakatane Port Interests	Berthing in inappropriate conditions (wind/tide). Berthing when flood conditions make this inadvisable. Loss of control. Misjudgement. Inexperience. Steering or propulsion failure. Small craft launched at ramp take off with full power, creating wash affecting other craft alongside. Transiting too close to moored vessels. Human error in changing from flying bridge to wheelhouse control and skipper being unable to control engines.	Light to moderate structural damage to vessel or craft. Damage to floating pontoons and launching ramp side structures (Beltings and woodwork). Alternatively commercial vessels most likely to contact another commercial vessel alongside wharf - hull damage.	Loss of control and large vessel strikes vessel by the bow when planning to turn. Extensive damage to wharf or another vessel alongside. Extensive damage to striking vessel. Passengers on board thrown across cabin. Broken Bones and elderly passengers seriously injured. Loss of life possible. Damage to wharf piles and structural problems to wharves.	3	3	0	3	6	6	2	6	4.27	This hazard has occurred regularly at Whakatane. There are reports of sailing craft striking moored craft at Ohiwa. Hulls have been holed. No reports are available Thornton or Opotiki. Problems with wash and transiting past moored vessels too fast are ongoing problems. Damage to vessels and wharf structure piles occurs regularly.								
14	4	Whakatane Bar , Opotiki Approaches and Bar	Contact Navigation	Contact with Debris at Bar	Contact with debris occurs whilst transiting the Bar after heavy rains in Whakatane river catchment area.	All Craft Crossing Bar (up to 25m), Dry Cargo	Bay of Plenty Regional Council , Leisure users, Vessel Owners, Whakatane District Council, Whakatane Port Interests	Extreme flood flow following heavy rain in Whakatane catchment area. Operator elects not to heed Harbourmaster advice (significant advice). Inbound skipper not anticipating the volume of debris that is present.	Small craft strikes debris, resulting in hull damage or damage to propeller and/or steering.	Vessel or small craft strikes large trunk or debris (e.g. chest freezer) at or close to Bar, is deviated off course and grounds on Groyne. Alternatively this could occur in the entrance area at speed if the Bar remains advised as workable.	0	6	0	6	4	4	0	2	4.04	Serious flooding at Whakatane (town flooded) occurs once every five years. Large flood exiting the harbour removes the Pirapai Spit (which forms normally opposite the Harbourmaster's office). Sand is deposited at the Bar and depth becomes unknown. Craft or vessel has continued to operate before the Harbourmaster has re-sounded the Bar. There is a pressure to get the information to users as rapidly as possible and commercial operators commence working regardless. Storm conditions from the Northeast pass through rapidly, but these also bring likelihood of heaviest rains. The Bar will settle down and be navigable often a number of hours before serious flooding commences. The flooding brings with it debris in the form of large logs through to whole tree trunks. Household debris, such as freezers and farm animals are also common. Debris can create a "raft", which presets a hazard to navigation offshore. A small craft needs to travel 600m to get access to the slip if holed, but does have an option to beach adjacent to the entrance.								

Rank No.	Hazard Reference	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)	M		L				W		C	
											People	Property	Environment	Stakeholders			People	Property	Environment	Stakeholders
15	23	Whakatane Main Channel, Whakatane Mooring and Berthing Area	Pollution	Fuel Spill During Refuelling	Refuelling of recreational craft or commercial vessel at Whakatane results in Diesel fuel entering water.	All vessels and craft, Dry Cargo	Bay of Plenty Regional Council , Environmental Interests, Fishing Interests, Leisure users, Passengers, Small Craft Owners, Vessel Owners, Vessel Skippers / Crew, Whakatane District Council, Whakatane Port Interests	Incorrect refuelling procedure. Inability to stop refuelling local to point of delivery (increase in size of spill). Inattention to refuelling hose. Lack of save-all around fuelling equipment. Lack of immediate response materials.	A series of small spills.	Small road tanker supplying fuel, hose leaks at tanker. Up to 200L diesel spill. Tidal flow disperses spill in the Harbour and its entrance.	0	0	6	0	2	2	3	5	3.82	Fuelling equipment at Whakatane was found with electrical panels unlocked and doors unsecured. Refuelling location at edge of refuelling berth with no means of preventing even small spills from entering the water. Spills in other harbours in this assessment considered to be less than the worst credible at Whakatane. Fuel delivery nozzles can be latched open.
16	24	Thornton Approaches & Bar, Rangitaiki River (Thornton Ramp)	Contact Navigation	Placing of Nets At Thornton	Nets placed across the Rangitaiki river mouth and left. Contacted by transiting craft.	All Craft Crossing Bar (up to 25m), Dry Cargo	Bay of Plenty Regional Council , Fishing Interests, Leisure users, Small Craft Owners, Whakatane Port Interests	Anglers not realising a craft is entering harbour or that craft need to stay to the eastern side. Craft coming too close to channel sides.	Net gets tangled in craft propeller and damages shaft seals.	Net disables craft at the Bar. Capsize on the Bar, loss of life likely.	0	3	0	3	6	4	0	4	3.72	This scenario is reported to have occurred. A person retrieving a net at Thornton was drowned in 2006. Management of anglers and transiting craft is reported to be a headache in a number of harbour entrances. A Whitebaiter using butterfly nets got carried away by current with waders full of water. Was saved by someone diving in.
17	17	Whakatane Bar , Whakatane Main Channel, Whakatane Mooring and Berthing Area, Ohiwa Main Channel and Wharf, Opotiki Wharf and Ramp Area, Thornton Approaches & Bar, Rangitaiki River (Thornton Ramp)	Contact Navigation	Contact with Fishing Lines	Persons Fishing on Groynes at Whakatane or at the Thornton Bar river (Rangitaiki River) have lines in the main channel. Transiting craft keep to east to stay in the main channel and lines become entangled in craft running gear.	All Craft Crossing Bar (up to 25m), Dry Cargo	Bay of Plenty Regional Council , Fishing Interests, Leisure users, Small Craft Owners, Whakatane Port Interests	Anglers not realising a craft is entering harbour or that craft need to stay to the eastern side. Craft coming too close to channel sides. Fishing activities obstructing the channel in an unexpected location. Failure of Leads or other key aids to entry at Whakatane (vessel or craft off the correct track, which causes conflict with persons fishing).	Lines get broken and lost. Minor injuries. Damage to craft shaft seals. Alternatively an enraged Angler looses line and rod. Takes issue with Craft skipper after berthing. Persons thrown into water.	Inbound vessel with passengers on board notices lines in water adjacent to Groynes. Takes avoiding action and gets into difficulty. Strikes groyne, hull damaged. Persons onboard thrown across cabin.	0	6	0	0	3	3	3	3	3.6	This scenario is reported to have occurred and management of anglers and transiting craft is reported to be a headache.

Rank No.	Hazard Reference	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)	M		L				W		C	
											People	Property	Environment	Stakeholders			People	Property	Environment	Stakeholders
18	15	Whakatane Bar , Ohiwa Approaches & Bar, Opotiki Approaches and Bar, Thornton Approaches & Bar	Personal Injury	Man Overboard at Bar	Persons sat or stood on transom or foredeck as vessel or craft takes large waves at the Bar.	All Craft Crossing Bar (up to 25m), Vessel over 20m	Bay of Plenty Regional Council , Businesses associated with Tourism, Fishing Interests, Leisure users, Opitiki District Council, Passengers, Small Craft Owners, Vessel Owners, Vessel Skippers / Crew, Whakatane District Council, Whakatane Port Interests	Skipper Over Confidence; No safety advice for passengers to be seated. Crew setting poor example by standing during Bar crossing, lead followed by passengers. Slack procedures on charter vessels in preparing for Bar Crossing. Skipper not seeking information. Transit decision by Skipper when Bar advised as unworkable by Harbourmaster. Sudden Course deviation due to Debris in water at Bar Mechanical Failure (Steering or Propulsion). Towing over Bar. Failure of Leads or other key aids to entry at Whakatane (vessel or craft in rough seas off the correct track, which causes initiation of the event).	Broaching and recovery when inbound. Occupants thrown and minor injuries (bruising, possible minor broken bone). When outbound, heavy pitching throws someone across craft. Person in water recovered.	Person thrown off transom and strikes head. No lifejacket & unconscious. Fatality likely. Alternatively, vessel or craft aborts transit to help and gets into trouble at Bar.	3	0	0	3	6	0	0	6	3.53	Minor injuries have regularly occurred. Passenger carrying charter vessels are observed standing on forecastle or transom areas. Coastguard volunteers response time is around 45mins. The worst credible scenario of four fatalities is much more likely at night. Rescue of even a small craft in difficulty at a Bar is a difficult exercise for any rescue team. Whakatane Bar is accessible for equipment, whereas Ohiwa Bar is remote. Only Whakatane Bar is monitored by a Harbourmaster, advice is given to assume that other Bars will be unworkable if Whakatane Bar status is declared unworkable.
19	1	Ohiwa Approaches & Bar, Opotiki Approaches and Bar	Broaching / Swamping	Broaching of Craft Under 10m During Bar Crossing - Opotiki / Ohiwa	Broaching or swamping of Craft or small charter vessel (under 10m) when transiting Bars at Ohiwa or Opotiki.	Powered Craft Under 10M, Vessel over 20m	Bay of Plenty Regional Council , Environmental Interests, Leisure users, Opitiki District Council, Small Craft Owners, Vessel Owners, Vessel Skippers / Crew	Skipper Over Confidence; Skipper Misjudgement; Skipper not seeking information. Loss of situational awareness. Breaking Seas over Bar. High Flood Current against incoming Tide. Transit decision by Skipper when Bar advised as unworkable. Inability to provide accurate Bar Advice (Bar not monitored). Bar position changed from when craft leaves and returning. Inability to provide leads due to constantly shifting Bar. Failure or inability of skipper to read the Bar. Sudden Course deviation due to Debris in water at Bar Mechanical Failure (Steering or Propulsion)	Broaching and recovery when inbound. Occupants thrown and minor injuries (bruising, possible minor broken bone). When outbound, broken windscreen and partial swamping.	Broaching leads to immediate swamping when inbound; engine swamped and fails. Outbound Craft swamped, windscreen failure and capsizes Occupants in water in rough seas. Up to four fatalities possible if at night. Minimum of broken bones and hypothermia to be expected.	3	3	0	3	5	3	2	2	3.5	Broaching and recovery involving craft under 10m length occurs around twice per month at Whakatane alone. When Conditions at the Bar are marginal, around 6 broaches can occur in a week. A broken windscreen can be expected around once a month and swamping is the most likely event outbound. Engines have been inundated with Water causing loss of propulsion. Broaching from nose diving into a trough and then lifting by a following swell is the most likely event inbound. Fishing events do occur at Ohiwa and Opodiki around once or twice per year. Provide a considerable number of skippers who are inexperienced at Bar transit. Small pleasure craft are more likely to wear lifejackets when crossing the Bar and experience is that this is also improving. Four occupants are common onboard pleasure craft. A survey by EBOP HM (In Tauranga) found that 99.5% of pleasure craft were carrying appropriate lifejackets. Coastguard volunteers' response time at Opotiki is around 30mins. The worst credible scenario of four fatalities is much more likely at night. Rescue of even a small craft in difficulty at a Bar is a difficult exercise for any rescue team. Ohiwa and Opodiki Bars are remote for access and have low transiting numbers. Harbourmaster advice is given to assume that other Bars will be unworkable if Whakatane Bar status is declared unworkable.



Rank No.	Hazard Reference	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)	M L				W C					
											People	Property	Environment	Stakeholders	People	Property	Environment	Stakeholders		
20	11	Whakatane Bar , Opotiki Approaches and Bar, Thornton Approaches & Bar	Swamping	Swamping of Waka-Ama or Kayaks	Organised Waka-Ama event crossing a Bar (or entering surf if Bar is closed) loses control in swell conditions. Swamping and capsize.	Kayak / Waka, Vessel over 20m	Bay of Plenty Regional Council , Leisure users, Vessel Owners, Vessel Skippers / Crew	Organisers or skipper over confidence or inexperience; Inability to turn Waka-Ama once underway (committed to Bar Transit) Organisers not seeking information about Bar conditions. Organisers under event pressure for those attending to provide a competition. Transit decision by Skipper when Bar advised as unworkable by Harbourmaster. Inability to provide accurate Bar Advice (Bar not monitored in some Harbours). Failure of lashings supporting outrigger.	Waka-Ama capsizes. Crew in water (six man or two man). Alternatively Kayak is capsized.	Event involving a number of Waka-Amas. All capsize. Up to 60 persons in water in rough seas, at Bar or in Surf. Hypothermia at minimum. Difficult rescue and fatalities possible. Damage to Waka -Ama	2	0	0	0	4	4	0	6	3.16	Waka-Ama's have capsized after Whakatane Harbourmaster had closed the Whakatane Bar and decision taken by organisers to launch into surf outside the Bar. Waka-amas normally have a crew of six persons. Only Whakatane Bar is monitored by a Harbourmaster, advice is given to assume that other Bars will be unworkable if Whakatane Bar status is declared unworkable. Up to 10 Wakas participate in events locally. There are not many Kayak events but there are a number of lone Kayakers.
21	8	Whakatane Bar , Whakatane Main Channel	Collision	Surfers on the Bar in channel in conflict with transiting craft.	Surfers cross the path of an inbound or outbound vessel crossing the Bar. Alternatively Surfers swim across the entrance using the dinghy channel, on their way to the surfing area.	All Craft Crossing Bar (up to 25m), Swimmer or Surfer	Bay of Plenty Regional Council , General Public, Leisure users, Passengers, Small Craft Owners, Vessel Owners, Vessel Skippers / Crew, Whakatane District Council	Surfers do not heed Harbourmaster advice or Bylaws. Loss of control. Surfers fail to note the presence of a vessel about to cross the Bar. Inexperience by a group of visiting surfers - although most are from the area through to Tauranga. Vessel outbound and inbound fail to make a VHF call to Coastguard advising of Bar transit, Coastguard thereby unable to advise of surfer's presence. Sandbank forming in the line of the leads influences transiting craft to conflict with surfers in the same area. Broaching craft taken across surfers. Failure of the lit leads or other key aids to entry at Whakatane (vessel or craft in rough seas off the correct track, placing them in conflict with surfers).	Last minute avoiding action. Persons onboard thrown across craft or vessel.	Vessel or craft strikes surfer in swells at the Bar. Injury with potential for loss of life.	3	0	0	3	5	0	0	5	3.13	Whakatane is a very popular surfing destination due to the quality of its surf, formed by the topography of the entrance. Swimmers are prevented from approaching within 50m of a vessel wishing to use a wharf structure by Bylaw. However surfers are not specifically referenced and do not swim within 50m of a wharf structure. Surfers can swim across the dinghy channel, the entrance channel or the Bar on their way to the surfing area. If surf gets too large for crossing, surfers can get taken out and have been taken across the face of the rocks at the entrance. Surfers can also swim down the main channel to cross the Harbour away from the entrance. Most vessels at Whakatane call Coastguard to seek advice about surfers on or around the Bar. Sandbanks have formed across the line of leads, attracting surfers to surf on the Bar, but this usually only last for short periods. Recreational craft skippers have intentionally transited through or close to surfers. Moving them on the bow wave. Surfers have in the past regularly been the first to respond to a craft in trouble of capsized.

Rank No.	Hazard Reference	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)	M L				W C					
											People	Property	Environment	Stakeholders	People	Property	Environment	Stakeholders		
22	19	Ohiwa Approaches & Bar, Opotiki Approaches and Bar	Grounding	Grounding at Opotiki or Ohiwa Bar	Vessel or craft grounds when crossing the Bar at Opotiki or Ohiwa	Powered Craft Under 10M, Dry Cargo	Bay of Plenty Regional Council, Fishing Interests, Leisure users, Opitiki District Council, Small Craft Owners, Vessel Owners, Vessel Skippers / Crew	Available time envelope is limited due to decreasing depth over the Bar. Bar is naturally shallow. Inexperience Skipper not reading Bar correctly.	Craft bounce grounding.	Craft becomes stuck fast on Bar in surf conditions. Possibility of capsize as craft turned beam to mounting seas. Hypothermia at minimum. Potential loss of life.	0	0	0	0	6	6	0	4	2.5	Bars in the area are generally at their shallowest in February and March after lower summer water flows. This can coincide with the time of greatest usage. Opotiki Bar is very shallow, with around 0.7m of water available. Grounding on the Bar sand is common. The Coastguard launch can require a tractor to complete transit. As the Opotiki Bar is reportedly getting shallower the most likely event is a bounce grounding or becoming stuck fast on the Bar. Ohiwa Bar is 1km offshore, but the entrance can form two Bars. Grounding here also occurs on the entrance spit or channels adjacent to the entrance.
23	14	Whakatane Mooring and Berthing Area	Grounding	Grounding on Remote Rocks in Sailing Club Area	Recreational craft grounding at Whakatane in estuary North of Sailing Club on unmarked rocks outside channel.	Powered Craft Under 10M, Dry Cargo	Bay of Plenty Regional Council, Environmental Interests, Fishing Interests, Leisure users, Passengers, Vessel Owners, Vessel Skippers / Crew, Whakatane District Council	Lack of local knowledge. Build up of sediment in channel denies direct access to moorings. Access required over unfamiliar and unmarked hazards.	Sailing craft lands on rock causing damage to keel or hull. Glancing grounding most likely.	Vessel lands heavily on rock causing serious damage to hull. Flooding and possible loss. Hull requires removal or towing. Persons in water.	0	3	0	3	1	3	1	1	2.49	Moorings in this area were placed at users request in a part of the harbour designate as un-navigable. Whakatane District Council has suspended dredging operations and shallowing adjacent to the channel is reported to be slowly extending. The marking of rock outside the navigational channel is not generally undertaken. Historically, such marks are carried away during flood events. Flood events occur around once every two months. Small sailing craft have struck rocks at speed and drop keel smashed.
24	18	Ohiwa Approaches & Bar, Ohiwa Main Channel and Wharf	Grounding	Grounding In Ohiwa Harbour Area	Recreational craft grounding in Ohiwa Harbour (inside Ohiwa Bar)	Powered Craft Under 10M, Dry Cargo	Bay of Plenty Regional Council, Environmental Interests, Fishing Interests, Leisure users, Small Craft Owners	Lack of local knowledge. Ohiwa Harbour ongoing sediment accretion. Build up of sediment in channel denies direct access to moorings. Access required over unfamiliar and unmarked hazards. Moving Channel. Limited Navigational marks.	Craft becomes stuck on sandbank and needs to either wait for incoming tide or waits for assistance.	Craft or jet ski becomes stuck on sandbank after grounding at speed. Persons thrown into shallow water. Possibility of injury (head injury). Persons in water possibly unconscious.	0	0	0	0	3	2	0	2	1.32	Ohiwa Harbour is reported to be suffering increasing accretion, with the silt deposit being brought in from the Sea. The Harbour was declared un-navigable by the Government Agency then responsible in 1981. Large Sandbanks have formed, which are partly exposed at low tide. Channels presently only have limited marks, but edges shift.

## **ANNEX D**

### **RISK INPUT DATA**

### **FREQUENCY AND CONSEQUENCE**

Order No.	Hazard Reference	Accident Category	Hazard Title	Hazard Detail	Frequency and Consequence Data								Risk Overall		
					Most Likely				Worst Credible						
					Frequency	People	Property	Environment Stakeholders	Frequency	People	Property	Environment Stakeholders			
1	20	Broaching Swamping	Overtuning or Broaching of Craft Under 10m - Thornton Bar	Overtuning, Broaching or swamping of Craft at Thornton Bar	1	1	2	0	1	2	3	2	1	2	6.62
2	10	Grounding	Grounding on Mussel Rock	Vessel or craft crossing the Whakatane Bar grounds on Mussel Rock. This could occur after an initial Broaching and the rock is struck at a speed of at least 17 knots. Failure of Leads or other key aids to entry at Whakatane (vessel or craft in rough seas off the correct track, which causes initiation of the event leading to Grounding).	1	1	2	0	1	3	4	3	1	2	6.33
3	21	Broaching Swamping	Broaching of Craft of length 10-20m - Whakatane Bar Transit	Broaching or swamping of larger pleasure or small charter vessel (over 10m) but under 20m) when transiting the Whakatane Bar. Vessel of this size range does not have the stability reserve or freeboard of vessels over 20m.	1	1	1	0	1	3	4	4	2	4	5.93
4	12	Personal Injury	Swimming and Diving at Wharves and Ramps	People diving off wharves, pontoons and launching ramps into the path of berthing vessels. Alternatively diving into the path of craft approaching the boat ramp. Avoiding action necessary.	1	1	1	0	3	3	3	0	0	3	5.91
5	22	Broaching Swamping	Broaching of Craft Under 10m - Bar Transit Whakatane Bar	Broaching or swamping of Craft or small charter vessel (under 10m) when transiting the Bar at Whakatane.	1	1	1	0	1	3	3	3	1	3	5.33
6	6	Grounding	Reducing Water Depth at Bars	Vessel or craft grounds when crossing any of the Bars.	1	1	1	0	1	3	3	3	0	3	5.18
7	16	Broaching Swamping	Towing Across Bar	Vessel or craft towing another across Bar in marginal conditions by Coastguard or Harbourmaster. Snatching of the tow causes surging of the towed craft. People fall in water at the Bar. Alternatively towing across the Bar by inexperienced member of public (good deed).	1	1	1	0	0	3	3	3	1	3	4.96
8	2	Broaching Swamping	Broaching of Craft Over 10m During Bar Transit - Ohiwa	Broaching or swamping of larger pleasure or small charter vessel (over 10m) when transiting the Bars at Ohiwa.	2	2	1	0	0	3	3	3	2	3	4.94
9	3	Broaching Swamping	Broaching of Craft Over 20m During Bar Transit	Broaching or swamping of large vessel (over 20m) when transiting the Whakatane Bar.	2	1	0	0	1	3	3	4	2	4	4.58
10	5	Grounding	Extreme Flood Flow in Harbour Entrance	Vessel or craft crosses a workable Bar and enters a flood rate in the main channel greater than or close to the speed capability of the vessel. Resulting loss of control.	3	2	2	0	1	3	3	3	1	3	4.56
11	7	Collision	Collision in Narrows or at Bar	Two vessels transit entrance or Bar at once. One affected by bar swell loses control and veers off track. Collision possible. Alternatively one vessel inbound meets vessel outbound at Bar.	1	1	0	0	0	4	3	3	1	4	4.42
12	13	Contact Navigation	High Flood Waters at Whakatane.	Debris during large flooding event collects around swing moorings and moored craft in danger of being swept to seaward. Hazard scenario due to flow rate alone or by debris contacting mooring or moored craft. People accessing craft by small service craft in heavy flood conditions to move these from moorings in danger of entering water.	2	2	2	0	1	4	3	3	0	1	4.38
13	9	Contact Berthing	Contact with Vessel or Wharf when Berthing	Vessel or craft coming alongside wharf loses control and either lands heavily on wharf structure or contacts another vessel alongside.	2	1	1	0	1	3	3	3	1	3	4.27
14	4	Contact Navigation	Contact with Debris at Bar	Contact with debris occurs whilst transiting the Bar after heavy rains in Whakatane river catchment area.	1	0	1	0	1	3	2	2	0	1	4.04
15	23	Pollution	Fuel Spill During Refuelling	Refuelling of recreational craft or commercial vessel at Whakatane results in Diesel fuel entering water.	1	0	0	1	0	4	1	1	2	3	3.82
16	24	Contact Navigation	Placing of Nets At Thornton	Nets placed across the Rangitaiki river mouth and left. Contacted by transiting craft.	2	0	1	0	1	3	3	2	0	2	3.72
17	17	Contact Navigation	Contact with Fishing Lines	Persons Fishing on Groynes at Whakatane or at the Thornton Bar river (Rangitaiki River) have lines in the main channel. Transiting craft keep to east to stay in the main channel and lines become entangled in craft running gear.	1	0	1	0	0	4	2	2	2	2	3.6
18	15	Personal Injury	Man Overboard at Bar	Persons sat or stood on transom or foredeck as vessel or craft takes large waves at the Bar.	2	1	0	0	1	3	3	0	0	3	3.53
19	1	Broaching Swamping	Broaching of Craft Under 10m During Bar Crossing - Opotiki / Ohiwa	Broaching or swamping of Craft or small charter vessel (under 10m) when transiting Bars at Ohiwa or Opotiki.	2	1	1	0	1	4	3	2	1	1	3.5
20	11	Swamping	Swamping of Waka-Ama or Kayaks	Organised Waka-Ama event crossing a Bar (or entering surf if Bar is closed) loses control in swell conditions. Swamping and capsizing.	3	1	0	0	0	3	2	2	0	3	3.16
21	8	Collision	Surfers on the Bar in channel in conflict with transiting craft.	Surfers cross the path of an inbound or outbound vessel crossing the Bar. Alternatively Surfers swim across the entrance using the dinghy channel, on their way to the surfing area.	2	1	0	0	1	4	3	0	0	3	3.13
22	19	Grounding	Grounding at Opotiki or Ohiwa Bar	Vessel or craft grounds when crossing the Bar at Opotiki or Ohiwa	2	0	0	0	0	3	3	3	0	2	2.5
23	14	Grounding	Grounding on Remote Rocks in Sailing Club Area	Recreational craft grounding at Whakatane in estuary North of Sailing Club on unmarked rocks outside channel.	2	0	1	0	1	5	1	2	1	1	2.49
24	18	Grounding	Grounding In Ohiwa Harbour Area	Recreational craft grounding in Ohiwa Harbour (inside Ohiwa Bar)	1	0	0	0	0	4	2	1	0	1	1.32

**ANNEX E**  
**Mapping of Risk Control**  
**New Risk Control Options**

Rank No.	Hazard Reference	Hazard Title	Hazard Detail	Risk By Consequence Category								Risk Overall	Risk Control In-Place	Risk Control Options
				M L				W C						
				People	Property	Environment	Stakeholders	People	Property	Environment	Stakeholders			
1	20	Overtuning or Broaching of Craft Under 10m - Thornton Bar	Overtuning, Broaching or swamping of Craft at Thornton Bar	6	8	0	6	7	6	3	6	6.62	<ul style="list-style-type: none"> <li>Informal Bar Condition Reports, based on the condition of the monitored Bar at Whakatane.</li> <li>Thornton Rescue Service.</li> </ul>	<ul style="list-style-type: none"> <li>Improve Signage to warn about Dangerous Bar</li> <li>Install Web Camera at Bar to allow condition to be remotely monitored.</li> <li>Introduce daily condition report for Thornton Bar, including a signalling system.</li> <li>Introduce local monitoring of Thornton Bar (its condition changes rapidly).</li> <li>Liaise with Coastguard or other SAR providers re monitoring of Thornton Bar.</li> <li>Consider closing off launching ramps when Bar is unworkable. Alternatively close off the new ramp when Bar is dangerous and mark second ramp for use by craft deploying up river only.</li> <li>Introduce a navigation area for the extents of the harbour in Bylaw schedule to clarify extent of local Harbour Bylaws.</li> <li>Introduce Bar General Directions into Bylaws.</li> </ul>

Rank No.	Hazard Reference	Hazard Title	Hazard Detail	Risk By Consequence Category								Risk Overall	Risk Control In-Place	Risk Control Options
				M L				W C						
				People	Property	Environment	Stakeholders	People	Property	Environment	Stakeholders			
2	10	Grounding on Mussel Rock	Vessel or craft crossing the Whakatane Bar grounds on Mussel Rock. This could occur after an initial Broaching and the rock is struck at a speed of at least 17 knots. Failure of Leads or other key aids to entry at Whakatane (vessel or craft in rough seas off the correct track, which causes initiation of the event leading to Grounding).	6	8	0	6	7	6	2	4	6.33	<ul style="list-style-type: none"> <li>• Temporary marking installed during fishing tournaments or other such events.</li> <li>• Condition monitoring of Bar by Harbourmaster.</li> <li>• Daily advice provided by Harbourmasters directly to users - Key local knowledge of Bar conditions.</li> <li>• Bar Signalling System and promulgated advice from Harbourmaster to Local Community radio station and Coastguard.</li> <li>• Harbourmaster's Office situated near the Harbour.</li> <li>• Whakatane Coastguard located near the Whakatane Bar.</li> <li>• Leading marks and Leading Lights installed at Whakatane to provide for best Bar transit.</li> <li>• Coastguard Radio operators present on site 0800 to 1800. Passing on of Harbourmasters advice.</li> <li>• Local Coastguard Website</li> <li>• Bylaw 2.1.7 requires the use of lifejackets for pleasure craft in hazardous situations.</li> <li>• Maritime Rule Part 64 places obligation on a maritime certificate holder to not place passengers or crew into a hazardous situation.</li> </ul>	<ul style="list-style-type: none"> <li>• Remove Mussel Rock (considered impracticable).</li> <li>• Permanently mark Mussel Rock with a day mark and reflective tape.</li> <li>• Education.</li> <li>• Promulgate warning at Boat ramp.</li> <li>• Consider adding Bar transit management advice into the EBOP Aquatic guide. Promulgate to publishers of recreational guides or offshore cruising guides.</li> <li>• Advise LINZ to label Mussel Rock on Charts.</li> <li>• Require commercial operators to seat passengers and crewmembers when crossing the Bar (Bylaw).</li> <li>• Require commercial operators to properly prepare cabin and closing devices for Bar crossings (Bylaw)</li> <li>• Liaise with Safe Ship Management Companies (which may involve MNZ) to include in vessel's SOP appropriate Bar Crossing procedures, including passenger safety announcement. Alternatively require this by Bylaw.</li> <li>• Produce an advisory one page flier/poster to distribute to the local boat or yacht clubs.</li> </ul>

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3	21	Broaching of Craft of length 10-20m - Whakatane Bar Transit	Broaching or swamping of larger pleasure or small charter vessel (over 10m but under 20m) when transiting the Whakatane Bar. Vessel of this size range does not have the stability reserve or freeboard of vessels over 20m.	6	6	0	6	7	7	4	7	5.93	<ul style="list-style-type: none"> <li>• Condition monitoring of Bar by Harbourmaster.</li> <li>• Bar Signalling System and promulgated advice.</li> <li>• Daily advice provided by Harbourmasters directly to users - Key local knowledge of Bar conditions.</li> <li>• Bar Signalling System and promulgated advice from Harbourmaster to Local Community radio station and Coastguard.</li> <li>• Leading marks and Leading Lights installed at Whakatane to provide for best Bar transit.</li> <li>• Coastguard Radio operators present on site 0800 to 1800. Passing on of Harbourmasters advice.</li> <li>• Local Coastguard Website.</li> <li>• Safety briefings by Harbourmaster for fishing tournaments and events.</li> <li>• Harbourmaster's Office situated near the Harbour.</li> <li>• Whakatane Coastguard located near the Whakatane Bar.</li> <li>• Bylaw 2.1.7 requires the use of lifejackets for pleasure craft in hazardous situations.</li> <li>• Maritime Rule Part 64 places obligation on a maritime certificate holder to not place passengers or crew into a hazardous situation.</li> <li>• Commercial Skipper – Experience</li> </ul>	<ul style="list-style-type: none"> <li>• Education of users.</li> <li>• Development of safety DVD showing broaching incidents on local Bars and providing advice to small craft users in consultation with MNZ.</li> <li>• Require commercial operators to seat passengers and crewmembers when crossing the Bar (Bylaw).</li> <li>• Require commercial operators to properly prepare passenger cabins and closing devices for Bar crossings (Bylaw).</li> <li>• Advise commercial operators to offer passengers the opportunity to wear lifejackets crossing the Bar.</li> <li>• Liaise with Safe Ship Management Companies (which may involve MNZ) to include in vessels SOP appropriate passenger safety announcement content for Bar Crossings. Alternatively require this by Bylaw.</li> <li>• Introduce entrance navigation area in Bylaw schedule to clarify extent of local Harbour Bylaws.</li> <li>• Introduce Bar General Directions into Bylaws.</li> </ul>



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4	12	Swimming and Diving at Wharves and Ramps	People diving off wharves, pontoons and launching ramps into the path of berthing vessels. Alternatively diving into the path of craft approaching the boat ramp. Avoiding action necessary.	6	6	0	9	6	0	0	6	5.91	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Dedicated swimming area installed at Whakatane.</li> <li>• Harbour wardens present at launching ramps during summer months.</li> </ul>	<ul style="list-style-type: none"> <li>• Education at Schools by presentation.</li> <li>• Media Coverage.</li> <li>• Shock advertising.</li> <li>• Install dedicated swimming areas or pontoons at other launching ramps.</li> <li>• Liaison with community, police and Iwi. Initiate working groups to resolve issue.</li> <li>• Raise issue as a national problem with MNZ.</li> <li>• Introduce 24 hour monitoring at Whakatane wharves.</li> <li>• Introduce wardens or security to busy launching ramps for summer periods.</li> <li>• Introduce education of ramp protocol for users to clear launching ramps as rapidly as possible.</li> <li>•</li> </ul>

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5	22	Broaching of Craft Under 10m - Bar Transit Whakatane Bar	Broaching or swamping of Craft or small charter vessel (under 10m) when transiting the Bar at Whakatane.	6	6	0	6	6	6	2	6	5.33	<ul style="list-style-type: none"> <li>• Condition monitoring of Bar by Harbourmaster.</li> <li>• Bar Signalling System and promulgated advice.</li> <li>• Daily advice provided by Harbourmasters directly to users - Key local knowledge of Bar conditions.</li> <li>• Bar Signalling System and promulgated advice from Harbourmaster at Whakatane about the Bar to Local Community radio station and Coastguard.</li> <li>• Leading marks and Leading Lights installed at Whakatane to provide for best Bar transit.</li> <li>• Coastguard Radio operators present on site 0800 to 1800. Passing on of Harbourmasters advice.</li> <li>• Local Coastguard Website advice.</li> <li>• Safety briefings by Harbourmaster for marine tournaments.</li> <li>• Harbourmaster's Office situated near the Harbour.</li> <li>• Whakatane Coastguard located near the Whakatane Bar.</li> <li>• Bylaw 2.1.7 requires the use of lifejackets for pleasure craft in hazardous situations.</li> <li>• Maritime Rule Part 64 places obligation on a maritime certificate holder to not place passengers or crew into a hazardous situation.</li> </ul>	<ul style="list-style-type: none"> <li>• Education of users.</li> <li>• Development of safety DVD showing broaching incidents on local Bars and providing advice to small craft users in consultation with MNZ.</li> <li>• Require commercial operators to seat passengers and crewmembers when crossing the Bar (Bylaw).</li> <li>• Require commercial operators to properly prepare passenger cabins and closing devices for Bar crossings (Bylaw).</li> <li>• Advise commercial operators to offer passengers the opportunity to wear lifejackets crossing the Bar.</li> <li>• Liaise with Safe Ship Management Companies (which may involve MNZ) to include in vessels SOP appropriate passenger safety announcement content for Bar Crossings. Alternatively require this by Bylaw.</li> <li>• Introduce harbour navigation extents in Bylaw schedule to clarify extent of local Harbour Bylaws.</li> <li>• Introduce Bar General Directions into Bylaws.</li> </ul>

Rank No.	Hazard Reference	Hazard Title	Hazard Detail	Risk By Consequence Category								Risk Overall	Risk Control In-Place	Risk Control Options
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6	6	Reducing Water Depth at Bars	Vessel or craft grounds when crossing any of the Bars.	6	6	0	6	6	6	0	6	5.18	<ul style="list-style-type: none"> <li>Condition monitoring of Bar by Harbourmaster.</li> <li>Bar Signalling System and promulgated advice.</li> <li>Daily advice about the condition of the Bar provided by Harbourmasters directly to users - Key local knowledge of Bar conditions.</li> <li>Bar Signalling System and promulgated advice from Harbourmaster at Whakatane about the Bar to Local Community radio station and Coastguard.</li> <li>Leading marks and Leading Lights installed at Whakatane to provide for best Bar transit.</li> <li>Coastguard Radio operators present on site 0800 to 1800. Passing on of Harbourmasters advice.</li> <li>Safety briefings by Harbourmaster for marine tournaments.</li> <li>During period of shallowing, navigational use limitations placed by Whakatane Harbourmaster.</li> <li>Regular soundings of the Bar by Whakatane Harbourmaster, with results rapidly promulgated to users.</li> <li>Harbourmaster's Office situated near the Harbour.</li> <li>Whakatane Coastguard located near the Whakatane Bar.</li> <li>Bylaw 2.1.7 requires the use of lifejackets for pleasure craft in hazardous situations.</li> <li>Maritime Rule Part 64 places obligation on a maritime certificate holder to not place passengers or crew into a hazardous situation.</li> </ul>	<ul style="list-style-type: none"> <li>Education of users.</li> <li>Development of safety DVD showing broaching incidents on local Bars and providing advice to small craft users in consultation with MNZ.</li> <li>Require commercial operators to seat passengers and crewmembers when crossing the Bar (Bylaw).</li> <li>Require commercial operators to properly prepare passenger cabins and closing devices for Bar crossings (Bylaw).</li> <li>Advise commercial operators to offer passengers the opportunity to wear lifejackets crossing the Bar.</li> <li>Liaise with Safe Ship Management Companies (which may involve MNZ) to include in vessels SOP appropriate passenger safety announcement content for Bar Crossings. Alternatively require this by Bylaw.</li> <li>Introduce guidance for other Bars in the area to users.</li> <li>Introduce seasonal soundings to Ohiwa, Opotiki and Thornton.</li> <li>Review placement of Bar warning signs.</li> <li>Introduce entrance navigation area in Bylaw schedule to clarify extent of local Harbour Bylaws.</li> <li>Introduce Bar General Directions into Bylaws.</li> </ul>

Rank No.	Hazard Reference	Hazard Title	Hazard Detail	Risk By Consequence Category								Risk Overall	Risk Control In-Place	Risk Control Options
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7	16	Towing Across Bar	Vessel or craft towing another across Bar in marginal conditions by Coastguard or Harbourmaster. Snatching of the tow causes surging of the towed craft. People fall in water at the Bar. Alternatively towing across the Bar by inexperienced member of public (good deed).	6	6	0	0	6	6	2	6	4.96	<ul style="list-style-type: none"> <li>Bar Signalling System and promulgated advice from Harbourmaster at Whakatane about the Bar to Local Community radio station and Coastguard.</li> <li>Leading marks and Leading Lights installed at Whakatane to provide for best Bar transit.</li> <li>Towing normally limited to good Bar conditions.</li> <li>Option to place towed craft onto Otarawairere emergency mooring at Whakatane (if conditions are suitable – no use in conditions from north to east. Fall back option to take vessel to McEwans Bay, Whale Island.</li> <li>Safety briefings by Harbourmaster for marine tournaments.</li> <li>Harbourmaster’s Office situated near the Harbour.</li> <li>Whakatane Coastguard located near the Whakatane Bar.</li> </ul>	<ul style="list-style-type: none"> <li>Formalise criteria for Bar condition limitations for towing across the Bar.</li> <li>Require all tows to be reported in and handed over to approved operator for crossing the Bar, when required by the local Harbourmaster (subject to Bar conditions and no commercial implications).</li> <li>Introduce guidance for other Bars in the area to users.</li> <li>Introduce seasonal soundings to Ohiwa, Opotiki and Thornton.</li> <li>Review placement of Bar warning signs.</li> <li>Introduce Bar General Directions into Bylaws.</li> </ul>

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8	2	Broaching of Craft Over 10m During Bar Transit - Ohiwa	Broaching or swamping of larger pleasure or small charter vessel (over 10m) when transiting the Bars at Ohiwa.	6	3	0	0	6	6	4	6	4.94	<ul style="list-style-type: none"> <li>• Bar advice given by Whakatane based on observed condition of the Whakatane Bar.</li> <li>• Local advice given by Harbourmaster</li> <li>• Reasonable advice provided in NZ pilot for Ohiwa.</li> <li>• Bylaw 2.1.7 requires the use of lifejackets for pleasure craft in hazardous situations.</li> <li>• Maritime Rule Part 64 places obligation on a maritime certificate holder to not place passengers or crew into a hazardous situation.</li> <li>• Coastguard response – about one hour to Ohiwa or 30 mins from Opotiki if Bar transit possible.</li> <li>• Commercial Skipper – Experience.</li> </ul>	<ul style="list-style-type: none"> <li>• Introduce guidance for other Bars in the area to users.</li> <li>• Introduce monthly soundings to Ohiwa.</li> <li>• Review placement of Bar warning signs.</li> <li>• Introduce improved sailing directions in NZ Pilot or publications likely to be used by recreational users.</li> <li>• Install Camera to Ohiwa Bar.</li> <li>• Introduce leading marks for Bar transit (Day marks).</li> <li>• Introduce entrance navigation area in Bylaw schedule to clarify extent of local Harbour Bylaws.</li> <li>• Introduce Bar General Directions into Bylaws.</li> <li>• Introduce signage in relation to coastguard response times</li> </ul>

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9	3	Broaching of Craft Over 20m During Bar Transit	Broaching or swamping of large vessel (over 20m) when transiting the Whakatane Bar.	3	0	0	3	6	7	4	7	4.58	<ul style="list-style-type: none"> <li>Condition monitoring of Bar by Harbourmaster.</li> <li>Bar Signalling System and promulgated advice.</li> <li>Daily advice provided by Harbourmasters directly to users - Key local knowledge of Bar conditions.</li> <li>Bar Signalling System and promulgated advice from Harbourmaster at Whakatane about the Bar to Local Community radio station and Coastguard.</li> <li>Leading marks and Leading Lights installed at Whakatane to provide for best Bar transit.</li> <li>Coastguard Radio operators present on site 0800 to 1800. Passing on of Harbourmasters advice.</li> <li>Local Coastguard Website advice.</li> <li>Harbourmaster's Office situated near the Harbour.</li> <li>Whakatane Coastguard located near the Whakatane Bar.</li> <li>Maritime Rule Part 64 places obligation on a maritime certificate holder to not place passengers or crew into a hazardous situation.</li> <li>Commercial Skipper qualification- Experience.</li> </ul>	<ul style="list-style-type: none"> <li>Require commercial operators to seat passengers and crewmembers when crossing the Bar (Bylaw).</li> <li>Require commercial operators to properly prepare cabin and closing devices for Bar crossings (Bylaw)</li> <li>Liaise with Safe Ship Management Companies (which may involve MNZ) to include in vessels SOP appropriate passenger safety announcement content for Bar Crossings. Alternatively require this by Bylaw.</li> <li>Introduce entrance navigation area in Bylaw schedule to clarify extent of local Harbour Bylaws.</li> <li>Introduce Bar General Directions into Bylaws.</li> </ul>

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10	5	Extreme Flood Flow in Harbour Entrance	Vessel or craft crosses a workable Bar and enters a flood rate in the main channel greater than or close to the speed capability of the vessel. Resulting loss of control.	4	4	0	2	6	6	2	6	4.56	<ul style="list-style-type: none"> <li>Condition monitoring of Bar by Harbourmaster.</li> <li>Daily advice provided by Harbourmasters directly to users - Key local knowledge of Bar and river flood conditions.</li> <li>Coastguard Radio operators present on site 0800 to 1800. Passing on of Harbourmasters advice.</li> <li>Local Coastguard Website advice.</li> <li>Maritime Rule Part 64 places obligation on a maritime certificate holder to not place passengers or crew into a hazardous situation.</li> <li>Safety briefings/warnings by Harbourmaster for marine tournaments and events.</li> <li>Harbourmaster's Office situated near the Harbour.</li> <li>Whakatane Coastguard located near the Whakatane Bar.</li> </ul>	<ul style="list-style-type: none"> <li>Require commercial operators to seat passengers and crewmembers when crossing the Bar (Bylaw).</li> <li>Require commercial operators to properly prepare cabin and closing devices for Bar crossings (Bylaw).</li> <li>Formalise the ability to close the port by Harbourmasters Special Direction.</li> <li>Education to skippers</li> <li>Introduce entrance navigation area in Bylaw schedule to clarify extent of local Harbour Bylaws.</li> <li>Introduce Bar General Directions into Bylaws.</li> </ul>

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11	7	Collision in Narrows or at Bar	Two vessels transit entrance or Bar at once. One affected by bar swell loses control and veers off track. Collision possible. Alternatively one vessel inbound meets vessel outbound at Bar.	6	0	0	0	5	5	2	6	4.42	<ul style="list-style-type: none"> <li>• Leading marks and Leading Lights installed at Whakatane to provide for best Bar transit.</li> <li>• Education by Harbourmaster.</li> <li>• Bylaw 7.1.1 (General Directions). Prevents any craft from negotiating the Bar when another vessel is undergoing transit across Whakatane Bar.</li> <li>• Bylaw no.7, Whakatane General Directions.</li> <li>• Monitoring of Whakatane Bar by Coastguard radio operators.</li> <li>• Safety briefings by Harbourmaster for marine tournaments and events.</li> <li>• Harbourmaster's Office situated near the Harbour.</li> <li>• Whakatane Coastguard located near the Whakatane Bar.</li> </ul>	<ul style="list-style-type: none"> <li>• Introduce entrance navigation area in Bylaw schedule to clarify extent of local Harbour Bylaws.</li> <li>• Introduce Bar General Directions into Bylaws.</li> <li>• Education of recreational users.</li> </ul>



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12	13	High Flood Waters at Whakatane.	Debris during large flooding event collects around swing moorings and moored craft in danger of being swept to seaward. Hazard scenario due to flow rate alone or by debris contacting mooring or moored craft. People accessing craft by small service craft in heavy flood conditions to move these from moorings in danger of entering water.	6	6	0	3	5	5	0	2	4.38	<ul style="list-style-type: none"> <li>Harbourmaster's Office situated near the Harbour.</li> <li>Whakatane Coastguard located near the Whakatane Bar.</li> <li>Linkage to severe weather warnings.</li> <li>Annual fee paid to Whakatane Port Operator to provide an emergency wharf service. This includes contacting of mooring owners and moving of some boats.</li> <li>Vessel available that is designed for towing with appropriate power to achieve this.</li> <li>If a tournament, port manager can instruct visitors to vacate berths and proceed to shelter at Whale Island.</li> <li>Multiple Berthing</li> </ul>	<ul style="list-style-type: none"> <li>Planning for scenario of heavy floods when a fishing tournament is ongoing and deployment of craft alongside a limited number of berths is required at short notice due to local weather conditions deteriorating unexpectedly.</li> <li>Consider a requirement for out of town mooring owners to nominate a local contact/responsible person for mooring movement decision. This could be the port manager.</li> <li>Information relating to berth and mooring holders kept up to date.</li> </ul>
13	9	Contact with Vessel or Wharf when Berthing	Vessel or craft coming alongside wharf loses control and either lands heavily on wharf structure or contacts another vessel alongside.	3	3	0	3	6	6	2	6	4.27	<ul style="list-style-type: none"> <li>Skipper experience.</li> <li>Safe Ship Management for Commercial vessels.</li> <li>Port operator allocates berthing of vessels</li> </ul>	<ul style="list-style-type: none"> <li>Consider mandatory requirement for vessels or craft using the wharves to carry a minimum of third part liability insurance.</li> <li>Review the type and condition of fendering at wharves.</li> <li>Install monitoring cameras at wharves.</li> <li>Review the requirement for wreck removal insurance</li> </ul>

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14	4	Contact with Debris at Bar	Contact with debris occurs whilst transiting the Bar after heavy rains in Whakatane river catchment area.	0	6	0	6	4	4	0	2	4.04	<ul style="list-style-type: none"> <li>Condition monitoring of Bar by Harbourmaster.</li> <li>Bar Signalling System and promulgated advice.</li> <li>Daily advice about the condition of the Bar provided by Harbourmasters directly to users - Key local knowledge of Bar conditions.</li> <li>Bar Signalling System and promulgated advice from Harbourmaster at Whakatane about the Bar to Local Community radio station and Coastguard.</li> <li>Coastguard Radio operators present on site 0800 to 1800. Passing on of Harbourmasters advice.</li> <li>Harbourmaster's Office situated near the Harbour.</li> <li>Whakatane Coastguard located near the Whakatane Bar.</li> </ul>	<ul style="list-style-type: none"> <li>Environment Bay of Plenty to review recommendations made for the use of willows for bank retention on the basis that they are removed downstream at time of flood.</li> <li>Introduce regular bank or river edge monitoring for debris in way of river banks of adjacent areas (e.g. fridges, freezers, logs, rubbish, etc.).</li> <li>Review Environment Bay of Plenty policy towards removal of weed from rivers after cutting.</li> </ul>
15	23	Fuel Spill During Refuelling	Refuelling of recreational craft or commercial vessel at Whakatane results in Diesel fuel entering water.	0	0	6	0	2	2	3	5	3.82	<ul style="list-style-type: none"> <li>Experience of small tanker drivers and Tier 1 plans.</li> <li>In Bar harbours outside of Whakatane, fuel volumes taken are small.</li> <li>MNZ and Environment Bay of Plenty RC have Tier 2 response capability at Whakatane signal station (Harbourmaster's office) and trained responders.</li> </ul>	<ul style="list-style-type: none"> <li>Enforce Tier 1 spill response plan and consent conditions compliance.</li> <li>Introduce regular audit of fuel delivery systems and security of pumps and cabinets.</li> <li>Consider wider requirement for save-all's around wharf mounted fuel delivery sites (this is an EU requirement).</li> </ul>

