

PROJECT NO: 5002/02

# TOWNSVILLE OCEAN TERMINAL

&

# BREAKWATER COVE

5002/02  
R-KO0115- Rev 2  
July 2008

***IMPACTS ON MARITIME TRAFFIC***

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## **1.0 INTRODUCTION**

City Pacific lodged an EIS for the development of the Townsville Ocean Terminal and associated residential/commercial development in September 2007.

Responding submissions to the EIS were received from a number of government agencies, commercial organisations, clubs and private individuals.

This report documents the response to submissions regarding the impacts on maritime traffic including ship to ship interactions, navigational beacons/marks and recreational boat traffic.

## 2.0 BACKGROUND

The submissions and concerns regarding impacts of the project on maritime traffic are summarised in **Table 1**:

*Table 1: Summary of Submissions Relevant to Maritime Traffic Aspects of EIS*

Respondent	Summary of Concerns/Issues	Reference
Townsville Port Authority	Potential for vessels to back up into harbour whilst temporary bridge is closed.	6.3
	Potential for adverse impacts on navigation from lighting from night-time construction activities.	3.0
	Limited opening times of bridge may adversely impact access of deep draught boats due to limited ability to move a high tide only.	6.3
	EIS has not considered hydro-dynamic interactions between those vessels moored in ocean terminal and those leaving/entering harbour.	4.1
	Navigational modelling study would be required for vessels larger than 238m.	4.4
Townsville City Council	Proposed opening times of temporary bridge are unacceptably restrictive. Council considers hourly opening to be appropriate.	6.3
	Council considers 25m clear opening of bridge to be appropriate and expects consultation if a lesser option is envisaged.	6.3
	Council considers existing data should be notated or additional boat traffic count should be undertaken as boat traffic data was collected on days or poor weather or father's day.	6.1
	Access channel to existing marina will not be available during construction and this may limit access to larger vessels. A management strategy or creation of an alternative channel may be required to assure reasonable access.	5.0

	Navigation problems may be created due to waiting times for bridge opening and the limited ability for turning of craft in Ross Creek.	6.3
	Decorative lighting in development may inadvertently cause confusion or obscuring of lead lights thereby hampering navigation.	3.0
Various individual respondents	The required 100m clearance from a military ship berthed at cruise ship terminal will obstruct access to and from Cleveland Bay by boat users who presently use Ross Creek.	4.3
	Construction of bridge will cause safety hazard and inconvenience due to limitation of manoeuvrability and ability to maintain a holding pattern in a narrow waterway.	6.3
	Failure of opening mechanism would prevent all vessel passage in the creek during breakdown.	6.3
	No guarantees of punctuality of opening of bridge or additional restrictions imposed by developer.	6.3
	Counts of water craft appear to be non representative as undertaken on days of high wind warning or Fathers Day.	6.1
	Existing channel into breakwater marina will not be available during construction and there will be cumulative loss of utilisation of craft except in high part of tide.	5.0
	Construction site lighting is a possible source of interference with navigation lights.	3.0
	The development will result in increased demand for public boat launch facilities.	7.0

To address the impacts of Maritime traffic a meeting was held with Acting Harbour Master, John Finch, on 14 May 2008.. A record of the meeting is presented in **Appendix A – Meeting Minutes Acting Harbour Master.**

### 3.0 NAVIGATIONAL MARKERS AND BEACONS

Following a review of the proposal through discussion with the Pilots of the Port of Townsville, the Acting Harbour Master advised that there is not likely to be a significant impact on navigational markers and beacons arising from the development of the proposed cruise ship terminal and associated residential development.

There may be potential adverse impact of the high level of lighting on a cruise ship at berth on the luminescence of lead lights in the Platypus Channel. This is difficult to assess prior to operation of the cruise terminal and would need to be assessed once the facility is operational. The solution, if required, would be to shroud the lead lights, or install a new highly directional lead light, to reduce the impact of the cruise ship lighting on the luminescence of the lead light.

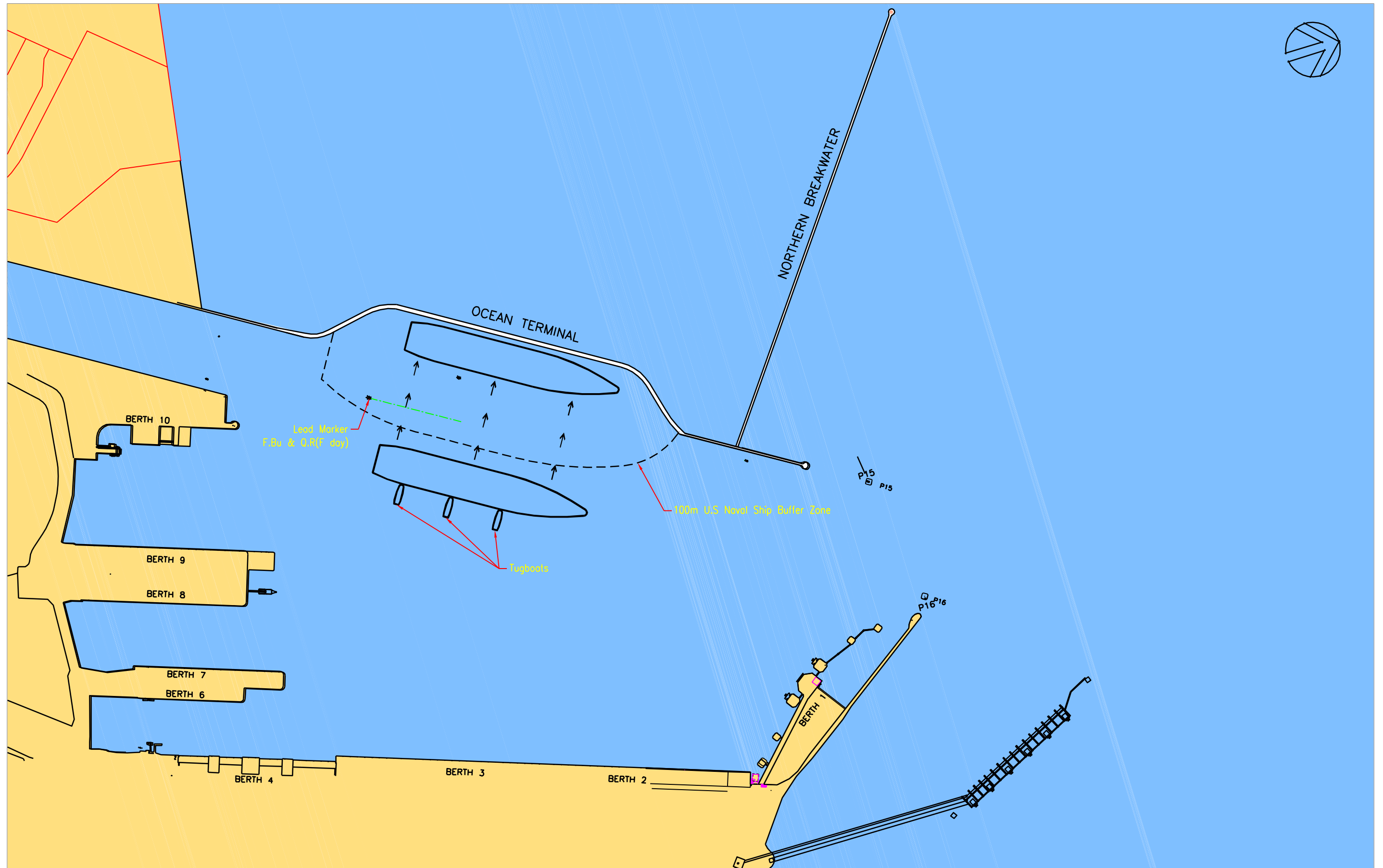
Potential lighting impacts from construction and/or the proposed residential development will be considered in the operational works and detailed design phases of the project. If the impacts cannot be mitigated through design, then a similar shrouding strategy would also be adopted to address the potential lighting impacts, which may arise, from construction lighting and/or from the proposed residential development.

Port and starboard markers in Ross Creek, at the location of the proposed opening bridge will need to be replaced. The replacement markers would be markers installed on both sides of the bridge delineating the opening section of the bridge.

No other navigational markers/beacons require removal or replacement.

In response to concerns regarding potential conflict of cruise ship berthing with the beacon located towards the southern end of the berth, the Pilots advised that berthing operations will involve tugs pushing the boat into the berth and consequently relocation of this beacon would not be required.

The location of the beacon relative to the berth and the direction of berthing **is shown in Figure 1: Ocean Terminal Berth.**



OCEAN TERMINAL  
Townsville Breakwater  
Figure 1

1:5000

## 4.0 SHIP TO SHIP INTERACTIONS

### 4.1 Impact of Ships on Berthed Cruise Ship

The Acting Harbour Master, and Pilots of Townsville Port, considered there was some risk of forward thrust being imposed on a berthed cruise ship from a ship heading out of port from berth 9 or 10. They considered that the force, at worst, would be low but stern and forward Springer bollards for the cruise ship terminal may need to be strengthened to allow for the potential forward thrust movement from a large passing ship. This was considered to be a detailed design issue and modelling should be undertaken, pre detailed design, to determine the magnitude of potential forward thrust. Appropriately sized bollards could then be designed.

The modelling should utilise the following data as the worse case scenario:

Current worse case: Handy max ship exiting from berth 10. With 190m length x 30m beam x 11.5m draft at 4-5 knots at a distance of 120-150m distance.

Potential future worst case: Panamax vessel is currently not an issue for the cruise ship terminal as it docks port side in at berth 9 and reverses out from the berth. As such, it does not have sufficient speed when it passes the proposed location of the cruise ship terminal to have any impact on a berthed cruise ship. However, it was envisaged that a Panamax vessel or large ship may dock at berth 10 in future and subsequently may leave berth 10 bow first and therefore have sufficient speed to impact a berthed cruise ship. The modelling for this scenario should allow for a vessel of: 225m length x 32m beam x 13m draft at 4-5 knots at 120-150m distance from the starboard side of the cruise ship.

### 4.2 Impact of Operational Dredging on Marine Traffic

The potential short term interference to port traffic during the operational dredging for the cruise ship terminal was not considered to be a marine impact issue. The port would warn users of the port, and control traffic by, a "Notice to Mariners" during operational dredging.



#### 4.3 Impact of Berthing of Navy Vessels on Marine Traffic

Concerns have been raised regarding access to/from Cleveland Bay for recreational and commercial vessels due to the need for a 100m buffer around U.S. Naval ships.

The Royal Australian Navy (RAN) determines, on a case by case basis, the force protection measures to be adopted by ships visiting Australian and Foreign ports. These measures are largely dependent on the assessed threat level and there are no specific stand off distances.

Under low threat levels the RAN normally seeks a 50m, but preferably 100m of clear or controlled space around ships at berth; and the main concern is the landside controlled space. At heightened threat levels, ships may be directed to alternate locations or may sail from berths if the assessed risks of remaining alongside are considered to be too high.

The State and City Pacific developed the project brief in close consultation with the Department of Defence. It was agreed that:

- A control space of 80-100m would be provided on the landside with control structures such as the berm, acoustic barrier, fencing and ram resistant gates;
- A control space would be provided on the seaside of a 45m berth pocket and a 46m control space to the centre of Platypus Channel.

It should be noted that the RAN and U.S. Navy currently utilise berth 10 (see Figure 1) which is in close proximity to Platypus Channel which is used by recreational and commercial vessels.

The State has been informed by the U.S. Navy that the ultimate discretion as to use a berth resides with the Captain of the ship. However, their requirements and assessment of processes are similar to that of the RAN.

**Figure 1: Ocean Terminal Berth** shows a 100m buffer line around a ship with a 300m length and 50m beam. Figure 1 demonstrates that recreational and commercial vessels can clear a berthed vessel berthed at the cruise ship terminal by at least 150m, although it would mean they would transgress into the Townsville Port Security Limit. The buffer zones for Naval ships are enforced by the presence of Water Police. As such, the transgression of recreational and commercial traffic into the Security Zone at police direction will not be problematic. It should also be noted that the level of commercial and recreational traffic is low as shown in Section 6.0 of this report.

#### 4.4 Maximum Size Limit of Port of Townsville

The proposed size of the berth for the cruise ship terminal is 300+m to allow for increasing size of cruise ships. The existing maximum length limit for the Port of Townsville is 238m.

Ships greater than this length must obtain approval from the Harbour Master before entering Port. This will entail development and approval of specific procedures and may entail modelling. Recently WASP Class Ships of 258m length have been permitted into the Port of Townsville.

The Harbour Master and Maritime Safety Queensland would need to assess the acceptance of cruise ships larger than 238m into the Port before the full proposed length of the cruise ship terminal berth could be utilised. This would entail a navigation study to obtain approval from Maritime Safety Queensland. The Acting Harbour Master indicated that the key issues of concern for acceptance of a larger cruise ship than 238m were:

1. Reduction of “bank effect” at the entrance to the Port. The width of the entrance to the port would need to be widened on the western side to reduce the potential impact of “bank effect”. This could be achieved by moving Navigational marker P15 and dredging the existing western bank at the entrance to the Port of Townsville. In addition, the northern extent of the western breakwater may need to be removed.
2. The curvature of the channel, in the vicinity of the intersection of the Platypus and sea channel, would need to be decreased and the channel realigned to allow for the reduced turning circle of a larger cruise ship.

Ship to ship and harbour interactions would need to be assessed using extensive modelling and simulation at a world class ship simulation facility.

## 5.0 EXISTING BREAKWATER MARINA ACCESS

The enclosure of the Future Development Area (FDA) will involve the diversion of exiting maritime traffic accessing/exiting the Breakwater Marina to the north of the existing access channel.

Soundings of sea bed depth north of the existing channel were undertaken at transects west of the western breakwater of the marina on 22<sup>nd</sup> April 2008 and west and across the potential alternate access to be utilized during construction. The survey was undertaken in the period between 9.30 am and 10.30 am which straddled the high tide. Tide charts indicated that the high tide on this date was a 2.5m AHD. The results of this survey have been recorded in **Appendix B Marina Access Survey Data**.

The survey data has been plotted on **Figure 2: Existing Marina Access** which shows a summary of data from the Brazier Motto survey (existing channel) and the FCG survey across the proposed temporary access route.

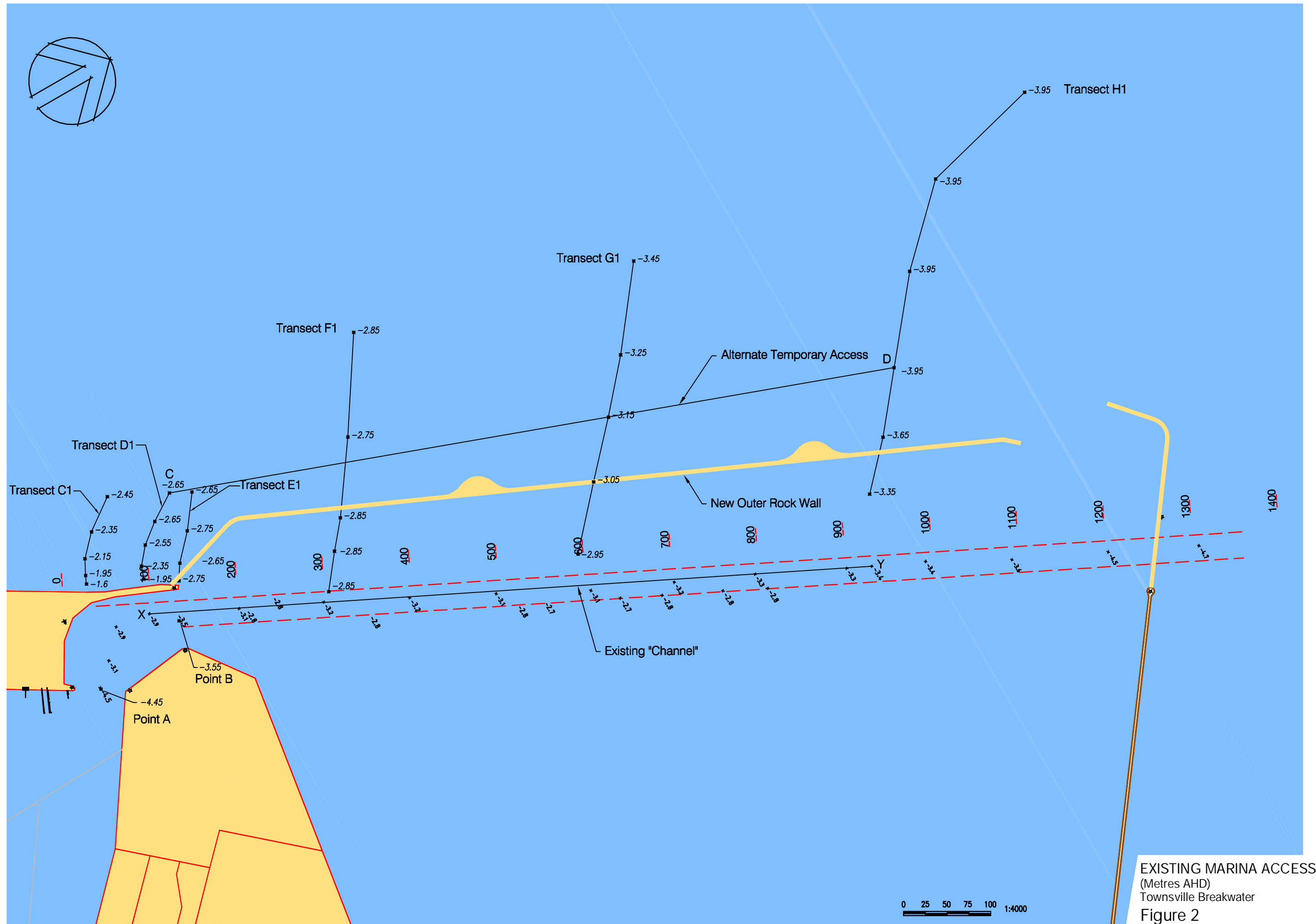
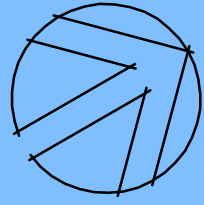
The relative minimum relative depths of the existing access and the alternative access are shown in Table 2: Relative Depths of Access.

*Table 2: Relative Depths of Existing and Alternative Access*

		0m	200m	450m	500m	550m	800m	840m
<b>Existing Channel</b>	Survey	-2.9	-3.2	-2.7		-2.7	-3.6	
	Interpolated				-2.7			
<b>Alternative Channel</b>	Survey	-2.7	-2.8		-3.2			-4.0
	Interpolated			-3.0		-3.4	-3.7	

*All depths in mAHD*

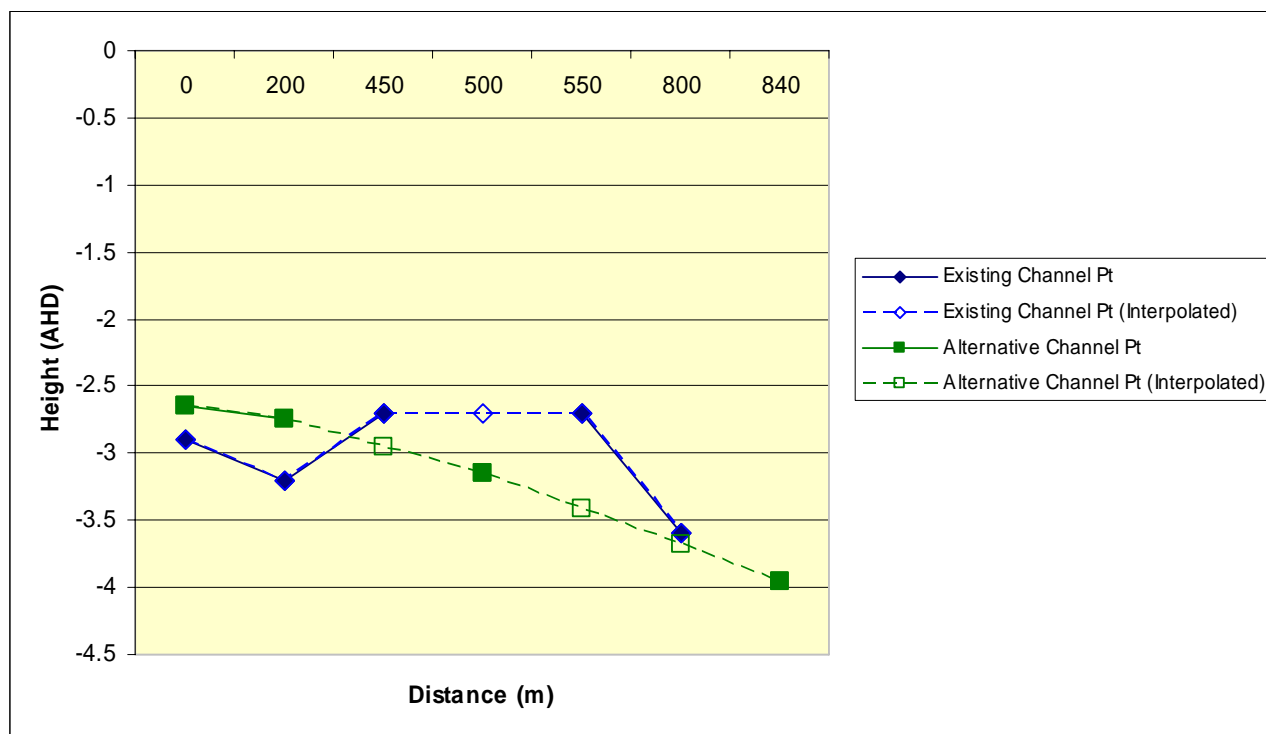
*Depths for Alternative Channel have been corrected by -1.45m with reference to calibration points A & B.*



EXISTING MARINA ACCESS  
(Metres AHD)  
Townsville Breakwater  
Figure 2

A graph showing relative minimum depth of the existing access channel and the proposed temporary access path is tabulated in Shown in Graph 1: Relative Depths of Existing and Alternative Access.

Graph 1: Relative Depths of Existing and Alternative Access



The proposed temporary access route has a slightly larger minimum depth as the existing access to the marina. As such, there is no reduced level of service to/from the current marina as a result of the proposed temporary access route.

Consequently there is no requirement for dredging of a temporary access channel to maintain the level of service to the existing marina during construction of the FDA.

## 6.0 ROSS CREEK MARINE TRAFFIC

### 6.1 Marine Traffic Survey, Ross Creek

A survey of all incoming and outgoing boat traffic in Ross Creek was undertaken from 6am to 6pm for the week Wednesday 14 May 2008 to Tuesday 20 May 2008. The survey was undertaken by austraffic at the location of the proposed temporary bridge at the south-eastern end of The Strand.

The weather report for wind from the Australian Government Bureau of Meteorology for May is presented in **Appendix C – Boat Traffic Survey, Ross Creek**. The data for the period 14 May 2008 to 20 May 2008 is summarised in **Table 3: Summary of Wind Data**.

*Table 3: Summary of Wind Data*

Date	9 a.m. Wind Speed (km/hr)	3 p.m. Wind Speed (km/hr)	Max Wind Gust (km/hr)
Wed, 14 May 2008	19	24	39
Thur, 15 May 2008	6	17	28
Fri, 16 May 2008	9	28	35
Sat, 17 May 2008	4	19	30
Sun, 18 May 2008	37	22	54
Mon, 19 May 2008	22	20	37
Tue, 20 May 2008	n/a	28	37

With the exception of the Sunday morning, and possibly Friday afternoon and Tuesday, wind conditions would be classed as light to moderate winds and ideal weather for sailing.

There were no “special events”, public holidays or other occurrence during the survey period which would be likely to result in a significant reduction or increase in marine traffic.

Given the prevailing weather conditions over the survey period and the absence of any special event or occurrence it is considered that the survey period represents “typical” week and the results are representative of the “normal” level of activity in Ross Creek.

The results of the marine traffic survey are presented in **Appendix C – Boat Traffic Survey, Ross Creek** and are summarised in **Table 4**:

*Table 4: Summary of Boat Traffic Survey, Ross Creek*

Day, Date Time	Total # Boats	# Boats > 0m	# Boats > +1m	# Boats > +2 m	Outgoing >0m	Incoming >0m
Wed, 14 May 2008 6am – 5 pm	8	3	2	2	3	0
Wed, 14 May 2008 5pm – 6pm	18	17	17	14	17	0
Thur, 15 May 2008 6am – 6pm	15	8	6	5	6	2
Fri, 16 May 2008 6am – 6pm	27	12	10	9	7	5
Sat, 17 May 2008 6am – 12 noon	20	11	8	7	9	2
Sat, 17 May 2008 12 noon – 6pm	41	22	19	15	10	12
Sun, 18 May 2008 6am – 6pm	35	18	14	13	7	11
Mon, 19 May 2008 6am – 6pm	18	4	4	4	2	2
Tue, 20 May 2008 6am – 6pm	13	10	6	5	5	5
7 Day Total 6am-6pm	195	105	83	74	66	39
# Boats During Haulage Hours	101	48	36	32	32	16

*Haul times are 6am -6pm Mon, Tue, Thur, Fri, 6am - 5pm, Wed, 6am – 12 noon, Sat*

*Survey results for non haul times are shown in Red*

*0 datum = level of south-eastern end of the Strand at Ross Creek*



The Marine Traffic survey of Ross Creek indicates that Ross Creek at the alignment of the southern end of the Strand is a relatively lightly trafficked waterway with 195 traffic movements recorded during the period from 6:00am to 6:00pm over 7 days

## **6.2 Impact of Haul Route Crossing of Ross Creek**

The EIS identified that the preferred route for the haulage of bulk earthworks material to the TOT and FDA areas involves a temporary crossing of Ross Creek aligned with the southern end of the Strand. The haul route crossing was proposed to consist of a temporary bridge structure which includes an operable span to allow passage of marine traffic in Ross Creek. The operable span was proposed to have a 25m opening to allow larger vessels (Sun ferries) access upstream.

The original proposal allowed for opening of the span from 7:00pm to 7:00am daily and at set times as follows:

Monday to Saturday (excluding Wednesdays)	8:00am, 11:00am, 2:00pm, 5:00pm and 7:00pm onwards
Wednesday	8:00am, 11:00am, 2:00pm and 3:00pm onwards
Sunday	All day

The operating regime allows for the bridge to be opened 29 times a week.

Notwithstanding the relative low volume of marine traffic, if the results of the marine traffic survey conducted from 14-20 May 2008 are accepted as typical marine activity in Ross Creek at the proposed bridge location, it can be concluded that the proposed operating regime for the bridge would cause significant disruption to marine traffic resulting in delays and queuing of vessels.

It is noted that standard operating procedures for the opening bridge at the Gladstone Port allows for opening the bridge on the hour and half hour if recreational traffic is waiting and provides priority opening to commercial traffic with perishable cargo (e.g. fishing trawlers).

The level of service to marine traffic currently provided in Gladstone would significantly exceed the level of service provided under the proposed operating regime for temporary bridge.

### **6.3 Mitigation of Impacts**

Changes to the operating regime and bridge configuration (increased clearance) can mitigate or minimise the impacts of the temporary haul route crossing on the existing marine traffic in Ross Creek

#### **6.3.1 Changes to the operating regime**

The Marine Traffic survey revealed a relatively low level of marine traffic during the survey period. Significant volumes of traffic occurs in the following periods:

- Wednesday evening after 5:00pm
- Saturday afternoons 12:00 noon to 6:00pm
- Sundays

Restricting haul operations to outside of these periods will significantly reduce the potential for impacts on marine traffic, in particular, recreational marine traffic. Based on the marine traffic survey results, leaving the operable span open during these periods will reduce the potential conflict from 195 vessels to 101 (approx 50%) reduction in potential conflict. Such a change would result in a net reduction in haul hours of 4 hours ( Loss of 6 hours on Saturday afternoons with an increase in two hours on Wednesday afternoons)

The marine traffic survey reveals that marine traffic during the proposed haul hours will typically require the Bridge to be opened 48 times during haul hours if an “on demand” regime applied. This is based on the underside of the bridge being at a level equivalent to the level at the Strand.

The “on demand” regime will give priority to maritime traffic. Haul trucks would be stopped and the bridge opened when required. This regime will require a full time operator to be present on the bridge at all times when the bridge is closed.

In addition, a contact number would be provided to owners of all vessels moored in Ross Creek, the motor/yacht club and commercial operators in Ross Creek. The contact number would also be clearly displayed from both sides of the bridge.

The operating mechanism for the bridge can be designed to allow for an opening cycle with 1 minute duration. Based on vessels travelling at 4 Knots in Ross Creek this will provide a trigger for opening the bridge when vessels approach within 120m of the bridge. Markers can be placed in Ross Creek to indicate to the operator when it will be necessary to halt haul traffic and open the span.

To avoid potential impacts on maritime traffic in the event of power failure or breakdown of the operating mechanism, the bridge can be designed with a counter weight to ensure that it can be opened in such circumstances. Such a design will involve the opening mechanism being designed to lift the counterweight in order to close the bridge rather than the converse where the operating mechanism is designed to lift the span.

The marine survey indicates that there is a relatively low probability of more than one vessel approaching the bridge at the same time or for opposed traffic movements occurring when the bridge is opened during haul hours. As a contingency to provide docking for queuing if required, berthing pontoons of 6m length should be installed on both approaches (upstream and downstream) to the bridge.

Alternately a “default open” regime could operate during haul hours. This would require the bridge to be closed every time a haul vehicle approached. The closure of the bridge would be subject to ensuring adequate clearance of all marine traffic. Marine traffic would need to be in excess of 360m from the bridge (based on 4 knots travel speed) to ensure that it could complete a 3min closing and opening sequence (60sec close, 60 secs haul, 60 secs open). There is inadequate sight distance in order to operate such a regime.

A default open regime would require the operation of the bridge at least 7 times/hour (. 70 times /day) to allow for a delivery vehicle and a coincident return empty vehicle. This would require significant cost and energy for little benefit to the marine traffic with no guarantee that such a regime would reduce conflict.

### 6.3.2 Increased Vertical Clearance

The Marine Traffic survey reveals that an increase in the vertical clearance of the bridge to +1metre above the level of the strand would reduce the impact of marine traffic and consequently the demand for opening of the span from 48 to 36 operations during haul hours. Increasing the clearance to +2 meters will reduced the demand for opening to 32 operations during haul hours. This compares with 29 operations of the bridge in the originally proposed operating regime. Consideration should be given during the detailed design of the bridge to the clearance to be provided to allow for the impacts on marine traffic to be minimised.

### 6.3.3 Horizontal Clearance

The current proposal allows for a 25 m clearance to be provided at the operable span. The marine traffic survey revealed that a very small number of vessels require clearance in excess of 12 m. As noted earlier the low traffic volume means that there is a low probability of opposed traffic. Notwithstanding this the provision of a wide clearance could encourage opposed traffic under the operating span with consequent increased risk (albeit small) of collision. The provision of docking for queuing via berthing pontoons of 6m length be installed on both approaches (upstream and downstream) to the bridge .to cater for opposed traffic means that the navigable channel under the operable span need only cater for one way traffic. Allowing for a clearance of 1.5m on either side an operable span of 15m would cater for the overwhelming majority of the current vessels accessing Ross Creek upstream of the proposed bridge location.

It is suggested that the proponent undertake to provide alternate mooring/berthing arrangements downstream of the bridge alignment for vessels requiring clearance of greater than 15m.

Navigating the one way traffic channel under the operable span with a clearance of 15m should be able to be managed by experienced mariners as it should present not greater challenge than berthing in a marina or accessing a mooring.

#### 6.4 Route Option 1A

In response to a number of submissions received on the EIS regarding the potential impacts of the temporary bridge crossing on Marine Traffic in Ross Creek the proponent has investigated alternate locations and methods of crossing Ross Creek.

Option 1A was discussed with the management of the Port, Port engineering and Captain John Preston the Regional Harbour Master (RHM). Both the Port and the RHM were comfortable with Option 1A in principle. Both alternatives will require formal approval of both the TPA and the RHM. Option 1A will be designed in detail and a submission made to the TPA and the assessment manager on Port land after the EIS is approved.

Route Option 1A Route could involve relocating the crossing of Ross Creek downstream towards the mouth and replacing the temporary bridge crossing of Ross Creek with a barge crossing. Materials can be delivered to the site by crossing Ross Creek by barge to an unloading facility adjacent to the materials handling area to be constructed at the end of Entertainment Road in the SE corner of the FDA site.

Two alternate locations for a downstream barge crossing have been identified including a barge loading facility at the corner of Lennon Drive east of the Harbour Masters office. This will involve the construction of a ramp to facilitate the loading and unloading of a barge or barges. The barge will then sail down the Ross Creek to the site where a ramp will be constructed within the site. That means that the ramp design will be such that the barge while loading/unloading will be well outside the Ross Creek channel.

An alternative location for this ramp has been identified with the Port and the Regional Harbour Master at the end of Berth 10. This location will allow a non motorised, chain driven barge to cross Ross Creek to the site, or alternatively a motorised barge. This alternative has still to be finally approved by the Port, but, has the advantage of being the shorter trip across Ross Creek.

## **7.0 INCREASED DEMAND FOR PUBLIC BOAT LAUNCHING FACILITIES FOR BREAKWATER COVE**

The proposed Breakwater Cove development is unlikely to increase demand on existing boat launching facilities in the vicinity of Breakwater Cove. The proposed Breakwater Cove residential developments will have access to private berthing facilities adjacent to the detached dwellings and a marina in close proximity to the higher density developments. The Breakwater Cove development will be self sufficient in boat launching facilities and therefore will not increase demand for public facilities. Any increase in demand for public facilities will more likely be a consequence of the general growth of Townsville and consequently will be unrelated to the Breakwater Cove development.

The fishing, recreational value and attraction of Ross Creek relative to Ross River, Magnetic Island and other nearby marine destinations is considered to be limited. In addition, there are no permanent public moorings or berths in Ross Creek. As such, any increase in boat traffic in Ross Creek emanating from the new marina berths in Breakwater Cove is likely to be very limited.

# Appendix A

## Meeting Minutes Acting Harbour Master

Our Ref: 5484/2  
FN-KO0122

20 May 2008

**MEETING MINUTES**  
**14 MAY 2008**

Present: John Finch (Acting Harbour Master, Port of Townsville)  
Kieran O'Neill (Flanagan Consulting Group)

At approximately 2.10 pm Kieran O'Neill met with John Finch at Maritime Safety Offices to discuss potential impacts on marine traffic from the proposed Cruise Ship Terminal. John Finch indicated the following views on the potential impacts and issues:

**Navigational Markers and Beacons**

John Finch had consulted with Port Pilots to discuss potential impacts on navigational markers and beacons resulting from operation of the proposed cruise ship terminal. The pilots considered there were no significant impacts on navigational markers and beacons but considered there was some risk that the high level of lighting on a cruise ship when berthed may adversely impact the efficiency of the lead lights in Platypus channel. It was considered this would be difficult to assess prior to operation of the cruise terminal and would need to be assessed on a trial and error basis. The solution, if required would be to shroud the lead lights to reduce the impact of the cruise ship lighting on the luminescence of the lead light. John indicated the cost of shrouding of the lead lights would be in the \$1000s but less than \$10,000.

John indicated that the port and starboard markers in Ross Creek at the location of the opening bridge would need to be replaced if this option for construction access was utilised. He suggested lit markers on the bridge marking the opening section would be sufficient.

**Impact of Bridge and Bridge Opening on Maritime Traffic**

John understood the original proposal was to have a 25 m opening to allow Sunferries access upstream and that the updated proposal was to have a 15 m wide opening with a default up strategy.

John approved of the default open strategy which is an improvement of service relative to the standard operating procedures of the opening bridge at the Gladstone Port. John stated that the opening bridge at the Gladstone Port opens on the hour and half hour if recreational traffic is waiting and provides priority opening to commercial traffic with perishable cargo (e.g. fishing trawlers).

Kieran indicated that due to low maritime traffic volumes that in practice the proposed opening bridge would probably develop into a remain down during operational hours of construction but



priority would be given to maritime traffic (i.e. trucks would be stopped and the bridge opened if required). Kieran indicated that should this be the adopted strategy that a full time operator would be present on the bridge at all times when the bridge was down. Kieran also indicated that it was intended to stop trucks late Wednesday afternoon due to higher maritime traffic flow resulting from the Wednesday twilight sailing from the motor/yacht club. Outside of construction hours the bridge would be default open.

John agreed that this was an adequate strategy and an improvement on the Gladstone SOPs but considered that there should be berthing pontoons on both approaches to the bridge as a contingency. He considered that a berthing capacity of two boats on each approach would be ideal but a single berth on each approach may suffice if it could be demonstrated that traffic numbers were such that the risk of two boats requiring berthing on either side awaiting bridge opening was low.

John expressed concern on the reduced width of the bridge opening. He recognised that a 15 m opening was sufficiently wide for recreational traffic. However, on the weekend he had viewed a Sunferries ferry berthed at Reef HQ. In his opinion, Sunferries would need to provide written agreement that they had an alternative berth and did not require access upstream of the bridge or the bridge would require a 25 m wide opening to provide equivalent access to the existing port conditions.

John also expressed concern at the impact of the opening bridge on the operations of the slipway. Kieran agreed it might limit the maximum height capacity of the slipway but he understood an agreement was in place but would follow up his concern with Emanate Legal.

### Port Size Limits

John indicated that the cruise ship terminal berth was larger than the maximum length limit of the Port of Townsville which was 238m. He considered the Port could be licenced to accept larger vessels but a navigation study would be required to obtain approval for an increase in maximum length. The key issues he considered would need to be addressed were:

1. The width of the entrance to the port would need to be widened on the western side to reduce the potential impact of “bank effect”. He indicated this could be achieved by moving Navigational marker P15 and dredging the existing western bank at the entrance to the Port of Townsville. In addition, the northern extent of the western breakwater may need to be removed.
2. To allow for a reduced turning circle of a larger ship, the curvature of the channel would need to be decreased and the channel realigned in the vicinity of the intersection of the Platypus and sea channel.
3. Any increase in vessel size will need to be extensively modeled and simulated at a world class ship simulation facility at no cost to MSQ

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## Ship to Ship Interactions

John indicated that he had consulted pilots on the potential for adverse impacts by large vessels on a berthed cruise ship. The pilots and John considered there was some risk there may be some forward thrust on the cruise ship arising from a passing ship heading out of port. They considered that the force, at worst, would be low but stern and forward springer bollards for the cruise ship terminal may need to be strengthened to allow for the potential forward thrust movement from a large passing ship. He considered this was a detailed design issue and that modelling should be undertaken pre detailed design to determine the magnitude of potential forward thrust. Appropriately sized bollards could then be designed. The modelling should utilise the following data as the worse case scenario:

Current worse case: Handy max ship exiting from berth 10  
190m length x 30 m beam x 11.5 m draft at 4-5 knots at a distance of 120-150m distance

Potential future worst case: Panamax vessel currently not an issue as port side in at berth 9 therefore reverses out. However, may be berth 10 in future:  
225m length x 32m beam x 13 m draft @ 4-5 knots at 120-150m distance

The potential short term interference to port traffic during the removal of a section of the Western Breakwater for the cruise ship terminal was not considered to be an issue. The port would warn users of the port and control traffic by issuing a “Notice to Mariners.”

The 100m buffer around U.S. Naval ships was not an issue as there was sufficient space for the largest ship to be at least 120m, probably 150m distance from naval vessel.

The anchoring area proximal to bridge is only a temporary service of Ross Creek as it is to be replaced by the marina for the Solaris Development.

Minutes Compiled:

Kieran O’Neill (Flanagan Consulting Group)

Minutes Approved:

John Finch (Acting Harbour Master, Port of Townsville)

# Appendix B

## Marina Access Survey Data

### FCG Depth Survey Data

Transect	Time	Northing	Easting (E)	Measured Depth (m)	Corrected Depth (mAHD)
A	8.45am	19°15.057'S	146°49.386'E	5.4	-4.45
B	8.50am	19°14.994'S	146°49.373'E	4.5	-3.55
C1	8.52 am	19°15.032'S	146°49.321'E	2.6	-1.65
	8.53 am	19°15.080'S	146°49.316'E	2.9	-1.95
	8.54 am	19°15.025'S	146°49.006'E	3.1	-2.15
	8.55am	19°15.013'S	146°49.293'E	3.3	-2.35
	8.56 am	19°15.000'S	146°49.338'E	3.4	-2.45
D1	8.58am	19°15.000'S	146°49.338'E	2.9	-1.95
	8.59am	19°14.997'S	146°49.329'E	3.3	-2.35
	9.00am	19°14.980'S	146°49.319'E	3.5	-2.55
	9.01am	19°14.976'S	146°49.308'E	3.6	-2.65
	9.02am	19°14.959'S	146°43.296'E	3.6	-2.65
E1	9.06am	19°14.981'S	146°49.350'E	3.7	-2.75
	9.07am	19°14.975'S	146°49.340'E	3.6	-2.65
	9.08am	19°14.961'S	146°49.324'E	3.7	-2.75
	9.09am	19°14.947'S	146°49.304'E	3.6	-2.65
F1	9.14am	19°14.904'S	146°49.406'E	3.8	-2.85
	9.15am	19°14.888'S	146°49.384'E	3.8	-2.85
	9.16am	19°14.875'S	146°49.367'E	3.8	-2.85
	9.17am	19°14.845'S		3.7	-2.75
	9.18am	19°14.809'S	146°49.266'E	3.8	-2.85
G1	9.20am	19°14.758'S	146°49.466'E	3.9	-2.95
	9.21am	19°14.727'S	146°49.430'E	4.0	-3.05
	9.22am	19°14.698'S	146°49.399'E	4.1	-3.15
	9.23am	19°14.672'S	146°49.367'E	4.2	-3.25
	9.25am	19°14.636'S	146°49.318'E	4.4	-3.45
H1	9.30am	19°14.531'S	146°49.528'E	4.3	-3.35
	9.32am	19°14.556'S	146°49.499'E	4.6	-3.65
	9.33am	19°14.529'S	146°49.464'E	4.9	-3.95
	9.35am	19°14.490'S	146°49.415'E	4.9	-3.95
	9.37am	19°14.447'S	146°49.371'E	4.9	-3.95

*Corrected depth mAHD (points A & B) = 2.5m AHD high tide – measured depth*

*Calibration correction = average difference between calibration points A & B for the FCG survey and Brazier Motti survey = (1.5 +1.6)/2) = 1.55 m.*

*Corrected depth = 2.5m (high tide) - measured depth – 1.55m (calibration correction viz Brazier Motti survey for points A&B)*

# Appendix C

## Boat Traffic Survey Ross Creek

# Townsville, Queensland

## May 2008 Daily Weather Observations



Australian Government  
Bureau of Meteorology

Date	Day	Temps		Rain mm	Evap mm	Sun hours	Max wind gust			9am						3pm					
		Min	Max				Dirn	Spd	Time	Temp	RH	Cld	Dirn	Spd	MSLP	Temp	RH	Cld	Dirn	Spd	MSLP
		°C	°C					km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	Th	15.9	28.7	0	8.8	10.3	ENE	48	12:58	24.7	55	1	SE	17	1017.4	27.5	48	4	ENE	30	1014.1
2	Fr	19.3	29.4	0	8.0	7.5	ENE	46	13:03	25.3	54	2	SE	19	1016.1	27.4	50	6	ENE	30	1013.1
3	Sa	17.7	29.0	0	7.0	10.7	ENE	39	14:11	24.7	57	1	SSW	9	1016.3	27.1	52	1	ENE	30	1012.4
4	Su	16.5	29.1	0	4.0	10.5	ESE	37	11:02	25.5	57	1	SE	13	1016.5	27.0	50	2	NE	30	1013.1
5	Mo	15.3	29.2	0	6.8	10.3	E	41	14:41	24.6	54	2	SE	17	1016.8	28.1	44	6	ENE	30	1013.3
6	Tu	17.9	28.9	0	7.8	9.2	ENE	39	13:28	24.0	56	6	SSE	13	1016.9	26.7	47	7	ENE	31	1013.4
7	We	13.9	28.3	0	6.4	10.8	ENE	41	13:39	23.3	57	1	SE	6	1016.6	26.2	46	2	ENE	33	1013.2
8	Th	13.8	28.3	0	7.4	10.6	ENE	41	12:23	23.5	57	1	SSE	4	1015.8	26.0	51	1	ENE	30	1013.6
9	Fr	14.7	28.1	0	7.4	9.0	ENE	41	12:59	23.9	50	7	SE	20	1016.6	27.0	38	6	E	28	1014.6
10	Sa	16.1	29.2	0	6.6	10.7	E	37	11:37	23.8	61	3	S	15	1016.2	26.5	52	3	ENE	22	1013.9
11	Su	16.0	28.9	0	7.0	8.9	ENE	41	12:17	24.8	61	2	SE	13	1016.2	26.6	54	5	ENE	28	1013.7
12	Mo	16.5	28.6	0	7.0	8.1	NE	37	14:23	24.5	61	1	SE	13	1016.9	26.4	61	4	NE	30	1013.6
13	Tu	18.6	26.9	0	5.6	1.1	ENE	48	10:50	23.6	65	6	SE	13	1017.8	24.3	63	8	E	26	1015.4
14	We	19.0	27.8	0.6	3.6	5.2	E	39	12:21	24.4	66	6	SSE	19	1018.7	25.6	62	7	E	24	1015.5
15	Th	19.8	27.6	0	5.8	1.3	NNW	28	14:26	23.3	70	7	SSW	6	1019.7	23.7	72	7	N	17	1016.5
16	Fr	16.5	27.6	0	3.6	10.0	ENE	35	14:52	23.7	73	2	ESE	9	1019.3	26.0	65	5	ENE	28	1015.1
17	Sa	16.5	28.4	0	5.6	9.7	N	30	11:24	24.8	68	2	SSE	4	1017.0	26.1	54	3	NNW	19	1012.8
18	Su	14.2	27.8	0	6.2	11.0	SW	54	07:45	21.2	28	0	SSW	37	1017.7	27.5	12	0	SSW	22	1013.1
19	Mo	12.2	26.0	0	9.4	10.9	SSW	37	01:07	20.4	24	0	SSW	22	1019.5	24.7	24	0	NE	20	1016.5
20	Tu	9.3	26.3	0	5.8	10.7	NE	37	14:26	20.3	51	0			1019.2	24.5	33	0	ENE	28	1015.6
21	We	11.0	26.2	0	5.6	10.6	NE	30	14:25	21.6	56	1	SSE	7	1018.8	24.6	49	1	NE	20	1016.2
22	Th	13.4	25.7	0	5.0	3.0	ENE	35	14:53	21.8	62	6	SSW	11	1019.5	25.5	53	6	ENE	30	1015.8
23	Fr	13.7	27.4	0	3.4	9.4	ENE	46	14:57	22.3	63	8	E	2	1019.0	26.2	46	7	ENE	35	1015.6
24	Sa	16.4	27.3	0	6.6	9.3	E	43	14:06	22.5	65	7	SE	13	1019.2	25.0	72	6	E	31	1016.2
25	Su	15.5	27.6	0	6.2	8.6	E	39	12:38	23.6	61	7	SE	19	1021.0	24.7	54	7	E	30	1018.1
26	Mo	15.8	27.6	0	5.8	7.8	ENE	48	13:10	23.5	58	5	SE	17	1022.4	25.2	54	7	E	30	1018.6
27	Tu	19.3		0	7.6					21.9	59	7	SW	11	1021.0						
<b>Statistics for the first 27 days of May 2008</b>																					
Mean		15.7	27.9		6.3	8.7				23.4	57	3		13	1018.1	26.0	50	4		27	1014.7
Lowest		9.3	25.7		3.4	1.1				20.3	24	0	E	2	1015.8	23.7	12	0	N	17	1012.4
Highest		19.8	29.4	0.6	9.4	11.0	SW	54		25.5	73	8	SSW	37	1022.4	28.1	72	8	ENE	35	1018.6
Total				0.6	170.0	225.2															

<b>Location:</b>		South-east end of The Strand adjacent to Ross Creek				<b>7-days commencing Wednesday 14 May 2008, 6am to 6pm each day</b>		
<b>DATE</b>	<b>TIME (HH:MM)</b>	<b>Vessel Type</b>			<b>Registration</b>	<b>Height above existing bank (ie. -6m to &gt;+10m)</b>	<b>Direction</b> I = Incoming, O = Outgoing	<b>COMMENTS</b>
		Sailboat	Motorboat	Other (specify)	(if available)			
14/05/2008	6:50		1		RESEARCH	0	O	
14/05/2008	12:05	1				3	O	
14/05/2008	12:15		1			0	O	
14/05/2008	12:20		1		RESEARCH	0	I	
14/05/2008	12:55		1		FERRY	3	O	
14/05/2008	13:40		1		RESCUE	0	I	
14/05/2008	13:50		1		RESCUE	0	O	
14/05/2008	14:30	1			CD314Q	1	O	
14/05/2008	17:20	1				3	O	
14/05/2008	17:30	1				3	O	
14/05/2008	17:35	1				2	O	
14/05/2008	17:40	1				3	O	
14/05/2008	17:40	1				3	O	
14/05/2008	17:40	1				2	O	
14/05/2008	17:40			SURFBOAT		0	I	
14/05/2008	17:40	1				3	O	
14/05/2008	17:45	1				4	O	
14/05/2008	17:45	1				3	O	
14/05/2008	17:45	1				3	O	
14/05/2008	17:45	1				2	O	
14/05/2008	17:50	1				4	O	
14/05/2008	17:50	1				4	O	
14/05/2008	17:50	1				4	O	
14/05/2008	17:50	1				4	O	
14/05/2008	17:55	1				3	O	
14/05/2008	17:55	1				2	O	
<b>TOTALS</b>	<b>26</b>	<b>19</b>	<b>6</b>	<b>1</b>		<b>20 ABOVE</b>		

<b>Location:</b>		South-east end of The Strand adjacent to Ross Creek				<b>7-days commencing Wednesday 14 May 2008, 6am to 6pm each day</b>		
<b>DATE</b>	<b>TIME (HH:MM)</b>	<b>Vessel Type</b>			<b>Registration</b>	<b>Height above existing bank</b> (ie. -6m to >+10m)	<b>Direction</b> I = Incoming, O = Outgoing	<b>COMMENTS</b>
		Sailboat	Motorboat	Other (specify)	(if available)			
15/05/2008	8:05		1		R75507Q	5	I	TOURIST LAUNCH
15/05/2008	8:30		1			3	O	TOURIST LAUNCH
15/05/2008	8:40		1			2	O	TOURIST LAUNCH
15/05/2008	8:40	1			KK1535	4	O	
15/05/2008	8:45		1			3	I	TOURIST LAUNCH
15/05/2008	8:50		1		PV541Q	0	O	
15/05/2008	9:00			ROWBOAT		0	I	
15/05/2008	9:15	1				1	O	
15/05/2008	9:15		1			0	I	
15/05/2008	9:30			RUBBER DUCK		0	O	
15/05/2008	9:30			RUBBER DUCK		0	I	
15/05/2008	10:20	1			J0220	3	O	
15/05/2008	14:55		1		2329400	0	I	
15/05/2008	17:35		1		SUNDANCER	1	O	
15/05/2008	17:40		1			0	O	
<b>TOTALS</b>	<b>15</b>	<b>3</b>	<b>9</b>	<b>3</b>		<b>8 ABOVE</b>		



<b>Location:</b>		South-east end of The Strand adjacent to Ross Creek				<b>7-days commencing Wednesday 14 May 2008, 6am to 6pm each day</b>		
<b>DATE</b>	<b>TIME (HH:MM)</b>	<b>Vessel Type</b>			<b>Registration</b>	<b>Height above existing bank</b>	<b>Direction</b>	<b>COMMENTS</b>
		Sailboat	Motorboat	Other (specify)	(if available)	(ie. -6m to >+10m)	I = Incoming, O = Outgoing	
16/05/2008	6:00		1			3	O	
16/05/2008	7:15		1			4	O	TOURIST VESSEL
16/05/2008	8:20	1				5	I	
16/05/2008	8:40		1			0	I	
16/05/2008	8:45		1			2	I	
16/05/2008	9:35	1				3	I	
16/05/2008	12:10		1		CL584Q	0	I	
16/05/2008	12:55		1		C4584Q	0	O	
16/05/2008	13:05		1		QX268Q	0	O	
16/05/2008	13:45		1		QX268Q	0	I	
16/05/2008	14:35	1				4	O	
16/05/2008	15:50		1		Q0604Q	0	O	
16/05/2008	15:55	1			JENS ANN	4	O	
16/05/2008	16:05		1		ON316Q	0	I	
16/05/2008	16:35		1		Q0604Q	0	I	
16/05/2008	16:45		1			1	O	SPORT FISHING
16/05/2008	17:15	1				4	O	
16/05/2008	17:25			1		4	I	ISLAND FERRY
16/05/2008	17:25			CANOE		0	I	
16/05/2008	17:25			CANOE		0	I	
16/05/2008	17:25			CANOE		0	I	
16/05/2008	17:25	1			AMAYAIL	3	I	
16/05/2008	17:30			CANOE		0	O	
16/05/2008	17:30			CANOE		0	O	
16/05/2008	17:30			CANOE		0	O	
16/05/2008	17:35		1		CD4140	1	O	
16/05/2008	17:40		1		SUNDANCER	0	I	
<b>TOTALS</b>	<b>27</b>	<b>6</b>	<b>14</b>	<b>7</b>		<b>12 ABOVE</b>		

Location:		South-east end of The Strand adjacent to Ross Creek				7-days commencing Wednesday 14 May 2008, 6am to 6pm each day		
DATE	TIME (HH:MM)	Vessel Type			Registration	Height above existing bank	Direction	COMMENTS
		Sailboat	Motorboat	Other (specify)	(if available)	(ie. -6m to >+10m)	I = Incoming, O = Outgoing	
17/05/2008	6:30	1				5	O	
17/05/2008	7:10		1			4	O	
17/05/2008	7:50		1			2	O	
17/05/2008	9:50	1				4	O	
17/05/2008	10:00		1		D73000	0	O	
17/05/2008	10:10	1				4	O	
17/05/2008	10:40		1			0	I	COASTGUARD
17/05/2008	10:40		1			0	O	COASTGUARD
17/05/2008	10:40	1				1	O	
17/05/2008	10:45		1		EV503Q	1	O	
17/05/2008	11:00		1		QR8870	0	O	
17/05/2008	11:05		1			0	O	
17/05/2008	11:10		1			3	I	COASTGUARD
17/05/2008	11:10		1			3	O	COASTGUARD
17/05/2008	11:10		1			1	O	
17/05/2008	11:10		1		L22200	0	I	
17/05/2008	11:10		1		L22200	0	O	
17/05/2008	11:30		1			0	I	
17/05/2008	11:30		1			0	O	
17/05/2008	11:45	1				3	I	
17/05/2008	12:10	1				3	I	
17/05/2008	12:25			CANOE		0	O	
17/05/2008	12:30		1		GOONDOOLOO	3	O	CHARTER BOAT
17/05/2008	12:40		1		QH094Q	0	I	
17/05/2008	13:00		1		QX265Q	0	O	
17/05/2008	13:05	1				3	O	
17/05/2008	13:10	1				3	O	
17/05/2008	13:10	1				3	O	
17/05/2008	13:15	1				1	O	
17/05/2008	13:15	1				3	O	
17/05/2008	13:15	1				3	O	
17/05/2008	13:15			CANOE		0	I	
17/05/2008	13:20		1		SUNDANCER	0	O	
17/05/2008	13:25	1				3	O	
17/05/2008	13:30	1				3	O	
17/05/2008	14:00		1		OH095Q	0	I	
17/05/2008	14:10		1		OH095Q	0	O	
17/05/2008	14:10		1		FWAF2	0	I	
17/05/2008	14:15		1		L1776Q	0	I	
17/05/2008	14:20		1		GOONDOOLOO	3	I	CHARTER BOAT
17/05/2008	14:25		1		D2300Q	1	I	

<b>Location:</b>		South-east end of The Strand adjacent to Ross Creek				<b>7-days commencing Wednesday 14 May 2008, 6am to 6pm each day</b>		
<b>DATE</b>	<b>TIME (HH:MM)</b>	<b>Vessel Type</b>			<b>Registration</b>	<b>Height above existing bank (ie. -6m to &gt;+10m)</b>	<b>Direction</b> I = Incoming, O = Outgoing	<b>COMMENTS</b>
		Sailboat	Motorboat	Other (specify)	(if available)			
17/05/2008	14:45	1				2	I	
17/05/2008	14:50		1			0	O	
17/05/2008	15:00		1		L1776Q	0	O	
17/05/2008	15:20	1				4	I	
17/05/2008	15:30		1			0	I	
17/05/2008	15:40	1				3	I	
17/05/2008	15:50	1				2	I	
17/05/2008	16:00	1				2	I	
17/05/2008	16:00	1				3	I	
17/05/2008	16:20		1		QX268Q	0	I	
17/05/2008	16:30		1		MV8170	0	I	
17/05/2008	16:45		1		QA887Q	0	I	
17/05/2008	16:55		1		QA887Q	0	O	
17/05/2008	17:20		1			2	I	CHARTER BOAT
17/05/2008	17:30			1		5	I	ISLAND FERRY
17/05/2008	17:35		1			0	O	
17/05/2008	17:35		1		AJ557Q	0	I	
17/05/2008	17:45		1			1	I	
17/05/2008	17:45	1				4	O	
17/05/2008	17:45		1		AJ557Q	0	O	
<b>TOTALS</b>	<b>61</b>	<b>21</b>	<b>37</b>	<b>3</b>		<b>33 ABOVE</b>		

Location:		South-east end of The Strand adjacent to Ross Creek				7-days commencing Wednesday 14 May 2008, 6am to 6pm each day		
DATE	TIME (HH:MM)	Vessel Type			Registration	Height above existing bank	Direction	COMMENTS
		Sailboat	Motorboat	Other (specify)	(if available)	(ie. -6m to >+10m)	I = Incoming, O = Outgoing	
18/05/2008	6:55		1			1	I	
18/05/2008	7:00		1			0	I	
18/05/2008	7:10	1				3	O	
18/05/2008	7:25		1			5	O	TOURIST VESSEL
18/05/2008	8:00		1			1	O	
18/05/2008	9:10	1				5	O	
18/05/2008	9:15		1			0	O	
18/05/2008	9:15		1		NN939Q	2	I	
18/05/2008	10:10		1			0	I	
18/05/2008	10:15	1				5	O	
18/05/2008	10:20		1			0	I	COAST GUARD
18/05/2008	10:50	1				4	I	
18/05/2008	11:20		1			0	O	
18/05/2008	11:50	1				3	O	
18/05/2008	13:05		1			0	I	
18/05/2008	13:10		1			0	I	
18/05/2008	13:20		1			0	O	
18/05/2008	13:45		1		232940Q	0	O	
18/05/2008	14:00		1			0	I	
18/05/2008	14:10	1				3	I	
18/05/2008	14:25	1				4	I	
18/05/2008	14:30		1			0	I	
18/05/2008	14:45	1				3	I	
18/05/2008	14:50	1				5	I	
18/05/2008	15:30	1				4	I	
18/05/2008	15:40		1		232904Q	0	I	
18/05/2008	15:50		1			1	I	COAST GUARD
18/05/2008	16:00		1		EV503Q	1	O	COAST GUARD
18/05/2008	16:20		1			0	I	
18/05/2008	17:05		1			0	I	
18/05/2008	17:20			CANOE		0	I	
18/05/2008	17:20			CANOE		0	I	
18/05/2008	17:30	1				5	I	
18/05/2008	17:35			CANOE		0	O	
18/05/2008	17:40			CANOE		0	O	
18/05/2008	17:50	1				3	I	
<b>TOTALS</b>	<b>36</b>	<b>12</b>	<b>20</b>	<b>4</b>		<b>18 ABOVE</b>		

<b>Location:</b>		South-east end of The Strand adjacent to Ross Creek				<b>7-days commencing Wednesday 14 May 2008, 6am to 6pm each day</b>		
<b>DATE</b>	<b>TIME (HH:MM)</b>	<b>Vessel Type</b>			<b>Registration</b>	<b>Height above existing bank</b>	<b>Direction</b>	<b>COMMENTS</b>
		Sailboat	Motorboat	Other (specify)	(if available)	(ie. -6m to >+10m)	I = Incoming, O = Outgoing	
19/05/2008	6:45		1			0	I	
19/05/2008	7:35		1			0	O	
19/05/2008	10:50	1				5	O	
19/05/2008	12:30		1		DZ300Q	0	O	
19/05/2008	12:55		1		P1410Q	0	I	
19/05/2008	13:00		1		P1410Q	0	O	
19/05/2008	14:20	1				3	O	
19/05/2008	14:30		1		DZ300Q	0	I	
19/05/2008	15:55	1				4	I	
19/05/2008	16:20		1		MJB70Q	0	I	
19/05/2008	16:45		1		MJB70Q	0	O	
19/05/2008	17:15			CANOE		0	O	
19/05/2008	17:25			CANOE		0	I	
19/05/2008	17:25			CANOE		0	I	
19/05/2008	17:25			CANOE		0	I	
19/05/2008	17:35	1				5	I	
19/05/2008	17:50			CANOE		0	O	
19/05/2008	17:50			CANOE		0	O	
19/05/2008	17:50			CANOE		0	O	
<b>TOTALS</b>	<b>19</b>	<b>4</b>	<b>8</b>	<b>7</b>		<b>4 ABOVE</b>		

<b>Location:</b>		South-east end of The Strand adjacent to Ross Creek				<b>7-days commencing Wednesday 14 May 2008, 6am to 6pm each day</b>		
<b>DATE</b>	<b>TIME (HH:MM)</b>	<b>Vessel Type</b>			<b>Registration</b>	<b>Height above existing bank</b>	<b>Direction</b>	<b>COMMENTS</b>
		Sailboat	Motorboat	Other (specify)	(if available)	(ie. -6m to >+10m)	I = Incoming, O = Outgoing	
20/05/2008	6:50		1		YA001Q	0	O	
20/05/2008	7:45		1		SC885Q	1	O	
20/05/2008	8:30	1				3	O	
20/05/2008	9:50	1				2	I	
20/05/2008	10:25		1		QXZ680	0	O	
20/05/2008	11:30		1			1	I	
20/05/2008	11:45		1			0	O	
20/05/2008	11:55	1				3	I	
20/05/2008	11:55	1			SAIL AWAY	4	O	
20/05/2008	13:00		1		BUNDY	1	O	
20/05/2008	14:50	1			SAIL AWAY	4	I	
20/05/2008	15:55		1			1	O	
20/05/2008	17:50		1		SUN FERRIES	5	I	REEF CAT
<b>TOTALS</b>	<b>13</b>	<b>5</b>	<b>8</b>	<b>0</b>		<b>10 ABOVE</b>		