



TOONDAH HARBOUR

APPENDIX 1 - D
EXTRACTS FROM SMBIs
WATER TRANSPORT
ALTERNATE ROUTE
STRATEGY



1. Introduction

1.1 The project

GHD was commissioned by Redland City Council to provide an independent assessment of the feasibility of additional access routes to the Southern Moreton Bay Islands including:

- Alternative and/or additional vehicle barge routes
- Alternative and/or additional water taxi routes
- A bridge from the southern end of Russell Island to the mainland

The project:

- Reviewed background information and previous assessments of alternative routes
- Identified environmental constraints including marine park zoning, sea grass distribution and habitat areas.
- Identified locational constraints including:
 - Land tenure and availability
 - Access to the existing transport networks and upgrade requirements
 - Water depth, access channels and dredging requirements
 - Wind direction/shelter/exposure/tidal flows
- Identified operational constraints including:
 - Travel time and costs
 - Impact on other services/operators
 - Landside requirements
- Prepared and compared indicative cost estimates for barge and water taxi alternatives and a potential bridge for cost comparison purposes

Figure 1 Study area



1.2 Study area

The Southern Moreton Bay Islands (SMBI) are situated in the southern end of the Moreton Bay Marine Park (refer to Figure 1). They are rich in environmental and cultural resources and offer an idyllic quiet lifestyle on the doorstep of Australia's third largest and fastest growing metropolitan area.

Russell, Karragarra, Lamb and Macleay (including Perulpa) Islands were incorporated into Redland City Council on 12 May 1973. In the 1960s and early 1970s, much of the collective island land was subdivided into small allotments. Since then, Redland City Council has restricted further subdivisions and rationalised planning so that the significant environmental and cultural values of the islands and surrounding Moreton Bay are preserved. From a connectivity perspective, the islands are serviced from Weinam Creek Marina, Redland Bay, on the mainland by passenger ferry and vehicle barge.

1.3 Study need

1.3.1 Capacity constraints at Weinam Creek

Demand for car parking at Weinam Creek is arguably the most contentious issue affecting the Southern Moreton Bay Islands.

The *Redland Bay Centre and Foreshore Master Plan* notes: "Future demand for car park spaces in the Weinam Creek Ferry Terminal car parking area will continue to increase in an unsustainable

way, if trends are not arrested or changes influenced by policy decisions. This position is unsustainable and will place unacceptable demands on public foreshore land in the locality."

1.3.2 Travel cost

One of the concerns raised most frequently by island residents is the cost of accessing the mainland. As at 4 October 2010, the return barge fare for island residents for a (standard vehicle) was \$87.00.

The isolated nature of the islands means that residents are reliant on the use of either a passenger ferry or vehicular barge, and are thus at the mercy of operator pricing arrangements.

Increased use of vehicular barges has the potential to reduce parking demand at Weinam Creek by allowing those island residents who require the use of a private vehicle on the mainland to store their vehicle at their private property on the island rather than on the mainland. However, anecdotal evidence currently suggests that the cost of vehicle barge journeys means some residents prefer to maintain two vehicles, one on the mainland and one on the island, compounding parking problems.

Reduced barge costs also have the potential to reduce the cost of goods and services on the islands by reducing the cost of transport and delivery.

1.3.3 Safety and emergency access

The residents of the Southern Moreton Bay Islands are currently reliant on a single access point to the mainland at Weinam Creek. Discussions with Maritime Safety Queensland have suggested that the provision of appropriate infrastructure to cater to emergency and evacuation requirements should be considered in the design and rationalization of transport infrastructure. The recent upgrades to Dunwich terminal on North Stradbroke Island were largely driven by emergency evacuation requirements.

1.4 Mainland destinations

In many cases, the barge and passenger ferry terminal at Weinam Creek does not provide the most appropriate mainland landing point for onward journeys using public transport.

Table 1 provides a summary of travel survey results undertaken on the Southern Moreton Bay Islands in recent years such as:

- The 2003 SMBI Travel Survey
- The 2009 SMBI Travel Survey
- The 2010 Barge Intercept Survey (barge passengers only)

The majority of mainland destinations are located within Redland City Council, followed by Brisbane City Council. This suggests that outside of Redland City Council, the majority of trips to the mainland are in a northbound direction and could benefit from reduced travel times resulting from an additional barge route from Macleay Island to a more northern mainland landing point.

Table 1 Mainland destinations by Local Government Area

	2003 ¹	2009 ¹	2010 ²
Redland City Council	43%	42%	30%
Brisbane City Council	24%	37%	30%
Gold Coast City Council	5%	6%	9%
Logan City Council	4%	7%	6%
Other	3%	8%	25%
Total	79% ³	100%	100%

¹ Southern Moreton Bay Islands Travel Survey Report, April 2009

² Barge Intercept Survey, RCC, 2010

³ Total as shown in 2009 Southern Moreton Bay islands Travel Survey Report, RCC

1.5 Study assumptions

The assessment of potential barge and passenger ferry landing points and the proposed Russell Island Bridge was based on the following key assumptions:

- Historic and existing environmental conditions including bathymetric surveys provided by Maritime Safety Queensland and the level of highest astronomical tide (HAT). The report does not consider the potential impacts of climate change including sea level rise and tidal inundation.
- A bathymetric depth of -1m LAT (lowest astronomical tide) was selected as the minimum depth required for the operation of barge services. -1m LAT was chosen on the

basis that a tide of this depth is reached infrequently.

- Due to a lack of data, the assessment does not consider the requirements for dredging; a major constraint that requires detailed investigation.
- Population and settlement patterns are generally as assumed in the Southern Moreton Bay Islands Planning and Land Use Study (2002) and Redland City Council's *Issue Paper – Population and Dwelling Profile – Southern Moreton Bay Islands*.
- The recommendations made in this report are exclusive of detailed environmental assessment. Any further investigation must include detailed environmental investigations including the hydrodynamic modelling and impact on sediment movement.
- The existing barge type and configuration has been used as the basis for the study. The current flat bottom barges are considered most suitable for the Southern Moreton Bay Islands due to the limited depth and enforced speed restrictions which aim to reduce potential environmental impacts. The exception was the consideration for a cable driven barge from southern Russell Island.
- The purchase and operational cost of additional barge vessels have not been included in the cost as there is insufficient information to make an assumption on barge costs. For example, whether the vessel would be purchased second hand or purpose built.
- The existing infrastructure for the barge service is adequate for efficient operation. Proposed new infrastructure has been modelled upon that existing on the islands and mainland. Constructing a terminal style facility similar to

that at Weinam Creek is outside the scope of this study.

- Installation of additional navigation aids is outside the scope of this study.
- The recommendations provided in this report are void of any detailed geotechnical data or recent topographic and bathymetric survey data. Therefore, the viability and configurations of the concepts provided would need to be reviewed following completion of these detailed investigations.
- The recommendations and cost estimates provided in this report are based on high level analysis of the requirements for infrastructure upgrades within the vicinity of potential landing points only. Further investigations must consider capacity impacts and upgrade requirements on wider transport networks and the impact on travel behaviour both on the islands and the mainland.
- Additional traffic associated with the construction of the proposed facilities, may place strain on the existing barge/road network. A traffic assessment has not been completed nor has the cost of additional maintenance to the existing road network been considered as this is outside the scope of the study.



2. Existing situation

2.1 Terminal facilities

All existing vehicular barge and passenger ferries depart from the Redland Bay Marina at Weinam Creek, Redland Bay. Redland Bay Marina is located approximately 50 minutes driving time south of Brisbane CBD and approximately 55 minutes north of Nerang on the Gold Coast. The marina is also accessible by a number of TransLink bus services to Brisbane, Garden City, Loganholme and Victoria Point.

2.2 Vehicular barge

Stradbroke Ferries is currently the sole operator providing vehicular barge services to the Southern Moreton Bay Islands. The company operates four vessels as detailed in Table 2. Services travel in a clockwise direction from Weinam Creek to

Karragarra, Macleay, Lamb and Russell Island. Barge services in Queensland are not subject to regulation from the Department of Transport and Main Roads. A standard return journey costs \$105. Discounted fares are available for island residents (\$87).

The substantial cost means that it is often cheaper for residents to maintain two vehicles – one on the islands and one on the mainland – than to travel via barge on a regular basis. This was highlighted in the *2010 SMBI Travel Survey* conducted by SocialData which showed that 37% of trips included a passenger ferry journey, whilst only 3.1% of trips included a vehicular barge journey.

The Redland City Council *2010 Barge Survey* highlighted that 32% of vehicles travelling on the

barge were for government or commercial purposes.

Table 2 Barge vessel details

	Lakarna	Moreton Escape	Bay Islander	Stradbroke Venture
Length (m)	38.77	36.77	33.99	54.41
Beam (m)	8.84	11.32	9.45	10.97
Draft ¹ (m)	1.2	1.3	0.9	1.2
Capacity	22	18	16	32

Source: www.stradbrokeferries.com.au, accessed 24.06.10

1 Laden Fore Draft



2.3 Passenger ferry

Bay Islands Transit (BIT), formerly Bay Islands Taxi Service has a fleet of four 60 foot catamarans serving the Bay Islands. Their new larger vessels can now accommodate up to 150 passengers (previously up to 120 passengers) and are wheelchair accessible and bicycle friendly.

Services travel in both a clockwise (via Karragarra Island) and anti-clockwise (via Russell Island) direction to the four islands.

BIT has an unexclusive, fare regulated contract with the Department of Transport and Main Roads. The contract allows for an annual review of fares based on major operating costs – fuel, wages etc – but excluding capital expenditure.

As previously mentioned, passenger ferry is the most popular water transport mode to access the mainland.

Table 3 Existing services (one way)

	Vehicular barge	Passenger ferry
Journey time (Russell Island) (Macleay Island)	65 mins 40 mins	20 mins 18 mins
Journey cost (standard)	\$50.50	\$7.70
Services / weekday	14	38
Operating hours	05:30 – 18:30	04:20 – 00:10

* Valid at 24 June 2010



3. Overarching considerations

Appropriate landing sites for potential future landing points were selected based a wide variety of considerations including:

- Landside access
- Potential demand
- Water depth and access
- Environmental constraints

At this pre-feasibility stage, potential landing points have been assessed based on a high level desktop analysis. Any further investigations into future vehicular barge and water taxi routes and a potential Russell Island Bridge must include detailed investigations into the environmental, social and economic impacts.

3.1 Landside considerations

3.1.1 Existing infrastructure

Locations with existing maritime infrastructure are likely to be those with appropriate water depth, access to navigable water, road access etc. Additional water-based transport may also have less environmental impact in those areas with existing infrastructure than those in relatively untouched environments.

However, the Department of Transport and Main Roads discourage the dual use of maritime infrastructure for public and private use for safety reasons. Whilst this may be the department's preference, legislation relevant to coastal

development (such as the Draft Queensland Coastal Plan) has preference for protecting undeveloped coastal areas and catering for demand for maritime services and maritime development as follows:

- Existing infrastructure utilised to the greatest extent possible
- Marine development provided within designated maritime development areas
- Marine development facilities provided in areas adjoining maritime areas
- New marine facilities provided outside of designated areas (preferable in degraded areas) where there is an overriding need in the public interest

3.1.2 Land tenure, zoning and ownership

Those sites within an existing road reserve or under Council ownership are preferred. Impact on Environmental Protection areas, Conservation Areas and Open Space areas designated under the Redlands Planning Scheme should be avoided where possible. Vacant sites that are in private ownership will also be considered.

3.1.3 Landside access

There are three key considerations for landside access:

- **Road access:** existing vehicular access to minimize the need for road works and clearing,

proximity to arterial routes and destination points, impact on existing transport networks and upgrade requirements

- **Proximity to public transport:** existing and potential bus services, proximity to rail heads (on the mainland)
- **Passenger amenity:** passenger facilities, proximity to commercial facilities, aesthetic and safety considerations

3.1.4 Infrastructure requirements

Vehicular barge

The general arrangement of the landside infrastructure has been modelled on the existing facilities on the islands, including:

- **Barge Ramp:** The barge ramp will be constructed of durable concrete planks. The ramp will provide all tide access.
- **Waiting Area:** An area to queue before travelling on the barge. An area to turn vehicles and reverse onto the barges will also need to be provided.
- **Breasting Piles:** Piles driven either side of the ramp will be required to guide the barges to the ramp while also assisting the barge to hold steady while at the ramp.

Additional infrastructure that is required at the alternative barge ramp locations to provide all tide access is a causeway to link the barge ramp with the waiting area. This is preferred over the alternative to dredging which has more potential

for environmental impacts and would represent an ongoing maintenance cost. Causeways have not been needed at existing barge ramp locations as access to deep water has not been an issue.

Additional navigation aids are also likely to be required, however the positioning, number of aids and cost associated with the installation of the navigation aids has not been reviewed as part of this study.

Passenger ferry

Similarly to the vehicular barge, the infrastructure required for the passenger ferry terminal has been modelled on the existing facilities on the islands, including:

- **Floating terminal:** A floating pontoon held in place by piles and attached to the shoreline by a piled walkway structure will be required. The terminal will need to be located in sufficient water depth to allow the ferry all tide access.
- **Car Park:** A car park sufficient for the current population as well as space to expand for future population growth will be required at the ferry terminals.
- **Breasting Piles:** Piles driven either side of the pontoon will be required for the ferry to moor against while at the terminal.

Similarly to the vehicle barges, additional navigation aids are likely to be required.

3.1.5 Land reclamation

The requirement for reclamation of land below highest astronomical tide (HAT) at terminal locations is critical to the assessment of any

development in the study area. Reclamation of tidal waters can result in significant degradation of coastal resources and as such should be avoided.

The State Coastal Management Plan (Policy 2.1.9) notes that land below the highest astronomical tide may be reclaimed where:

(c) it is for coastal-dependent land uses or other 'areas of state significance (social and economic)' and there is a demonstrated net benefit for the state or a region;

(e) it is necessary for the development of a public or private facility and there is public support and a demonstrated public benefit from the proposal;

For (c) and (e) above, it needs to be demonstrated that there are no alternative sites available that do not require reclamation.

This sentiment is reiterated in the Draft Queensland Coastal Plan which states:

SO3 – 16 Reclamation of land below HAT only occurs within maritime areas unless it is:

(a) necessary for maintaining physical coastal processes including maintaining intensively managed foreshores; or

(b) within an existing artificial waterway; or

(c) necessary for the establishment of government supported transport infrastructure and there are no alternative sites available that do not require reclamation.

3.2 Water depth and access channels

Existing vehicular barges and passenger ferries on average have a laden draft of 1.2 metres and 1.6 metres respectively. An under keel clearance

of approximately 1 metre is preferred when under way, therefore the minimum depth required in the access channels to provide all tide access is -2.2 metre LAT and -2.6 metre LAT for the vehicular barge and passenger ferries respectively.

The waters of southern Moreton Bay are generally characteristic of a relatively shallow seabed with highly mobile sand banks. Muddy tidal flats extending out from low-lying islands which are densely vegetated with mangroves indicate that there is little erosion caused by wave and wind action.

The removal of material below the high water mark can have significant impacts on the coast, ranging from effects on water quality, aquatic fauna and flora to sediment supply.

Consequently, the Department of Environment and Resource Management seeks to avoid developmental dredging in the Moreton Bay Marine Park.

Developmental dredging of a navigation channel or boat harbour is classified as major works under the *Marine Parks (Moreton Bay) Zoning Plan 2008* and cannot be carried out without a permit.

Maintenance dredging (for navigational purposes) may be carried out without permission after giving notice.

3.3 Environmental constraints

The following environmental legislation applies to development within the study area:

- The *Draft Queensland Coastal Plan 2010* will replace the *State Coastal Management Plan 2002*, until such time the existing legislation will remain in force. It seeks to provide policy direction and guidance on managing coastal land in Queensland in line with the Coastal Act.
- *South East Queensland Regional Coastal Management Plan 2006* provides specific regional direction on coastal management outcomes in support of the State Coastal Plan.
- *Marine Parks (Moreton Bay) Zoning Plan 2008* which seeks to manage different activities in the marine park by separating potentially conflicting uses, while maintaining the park's unique biodiversity. The Marine Park Zoning Plan overrides the South East Queensland Coastal Plan
- The *Redlands Planning Scheme* describes the land use intent in the local government area. The Conservation Zone Sub-area CN1 identifies land with environmental values and/or
- The *Vegetation Management Act (VMA)* including the requirements of Regional Vegetation management Code for SEQ
- The *Environmental Protection and Biodiversity Conservation Act (EPBC)* requires that any proposal within Moreton Bay be referred to the

Federal Minister for the Department of the Environment, Water, Heritage and the Arts regarding impact on a matter of National Environmental Significance.

- The *Ramsar Convention* is an intergovernmental treaty that provides a framework for the conservation and wise use of wetlands and their resources

The Moreton Bay Marine Park covers the entirety of the Southern Moreton Bay Islands study area. Its waters provide for environmentally significant fish, turtle and dugong habitats and its shorelines and riparian zones provide habitat for significant coastal wetlands a shorebird habitats.

A summary of applicable environmental regulations and policy requirements is provided on the next page. These regulations apply unless it can be demonstrated there is an overriding need in the public interest and that no other suitable sites are available:

- Development must not adversely impact on areas of high ecological significance including:
 - Coastal wetlands
 - Endangered regional ecosystems
 - Protected areas (State land) declared under the *Nature Conservation Act 1992*
 - Declared fish habitat area
 - Seagrass (including turtle and dugong feeding habitat)
 - Rocky reefs

- Reefs (including coral)
- Wetlands (significant and coastal)
- Shore bird habitat (including internationally significant migratory bird roosts)
- Development must allow the natural effect of coastal processes to continue including hydrological flows, tidal or natural currents or drainage patterns and sediment flows.
- Protection of undeveloped tidal waterways from maritime infrastructure
- Reclamation of land below HAT only occurs within *maritime development areas*
- In the Moreton Bay Marine Park, major works may only be designated in general use or habitat protections zones

As can be seen in Figure 2 and Figure 3 significant environmental habitats limit the potential for additional maritime infrastructure in the Southern Moreton Bay Islands study area. However, there is potential for development approval if it can be demonstrated that there is an overriding need in the public interest. According to the *Draft Queensland Coastal Plan* (Sec A2.1), to demonstrate overriding need in the public interest, the applicant must establish:

- “The overall social, economic and environmental benefits of the development outweigh:
 - Any detrimental effect upon the natural values of the site and adjacent areas; and
 - Conflicts with the policy outcome of this draft; and
- The development cannot be located elsewhere to avoid conflicting with the policy outcome of this draft policy.”

The approvals process for any new bridge, barge or ferry route, and associated infrastructure is discussed in Section 3.5.

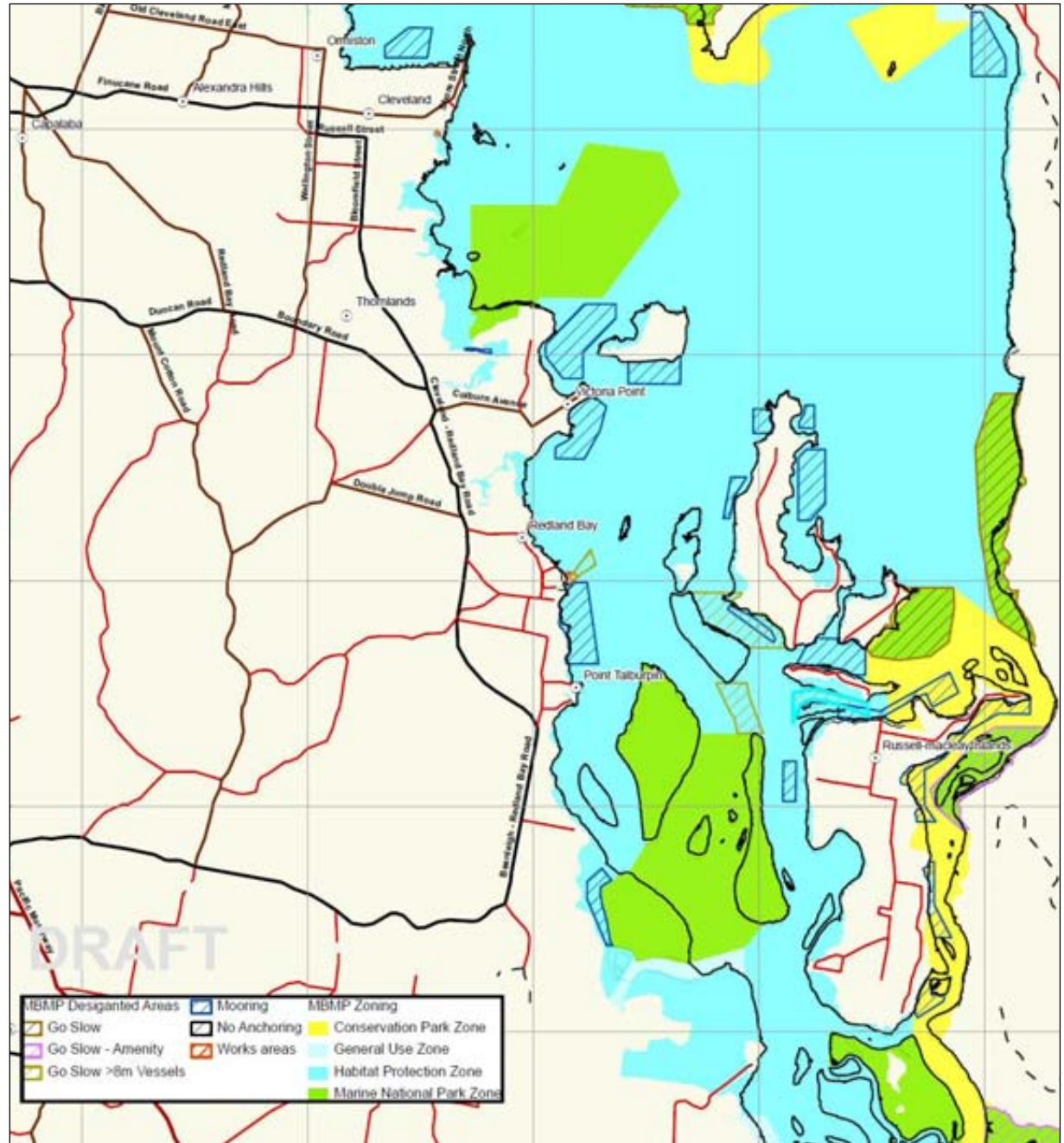
3.4 Operational considerations

3.4.1 Wind direction / shelter

Review of the 9am and 3pm wind roses prepared by the Bureau of Meteorology for Redlands indicate the prevailing wind direction in the morning is South East, coupled with significant contributions from the South West and North West quadrants. South East winds remain the prevailing wind direction in the afternoon, however winds from the North West quadrant provide the only other significant contribution in the afternoon.

Given the prevailing south-east wind direction all potential landing sites on the west side of Russell and Macleay Islands are relatively protected. Most of these sites, however, are exposed to the northerly and westerly winds.

Figure 2 Environmental constraints



3.4.2 Travel speed

Maritime Safety Queensland applies a speed limit of **40 knots** on smooth water limits on all Queensland Waterways (unless otherwise prescribed) (MSQ website, 22 Sept 2010). The South Brisbane smooth water limit extends from Cleveland Point on the mainland to Amity Point, North Stradbroke Island and south to the Gold Coast Seaway.

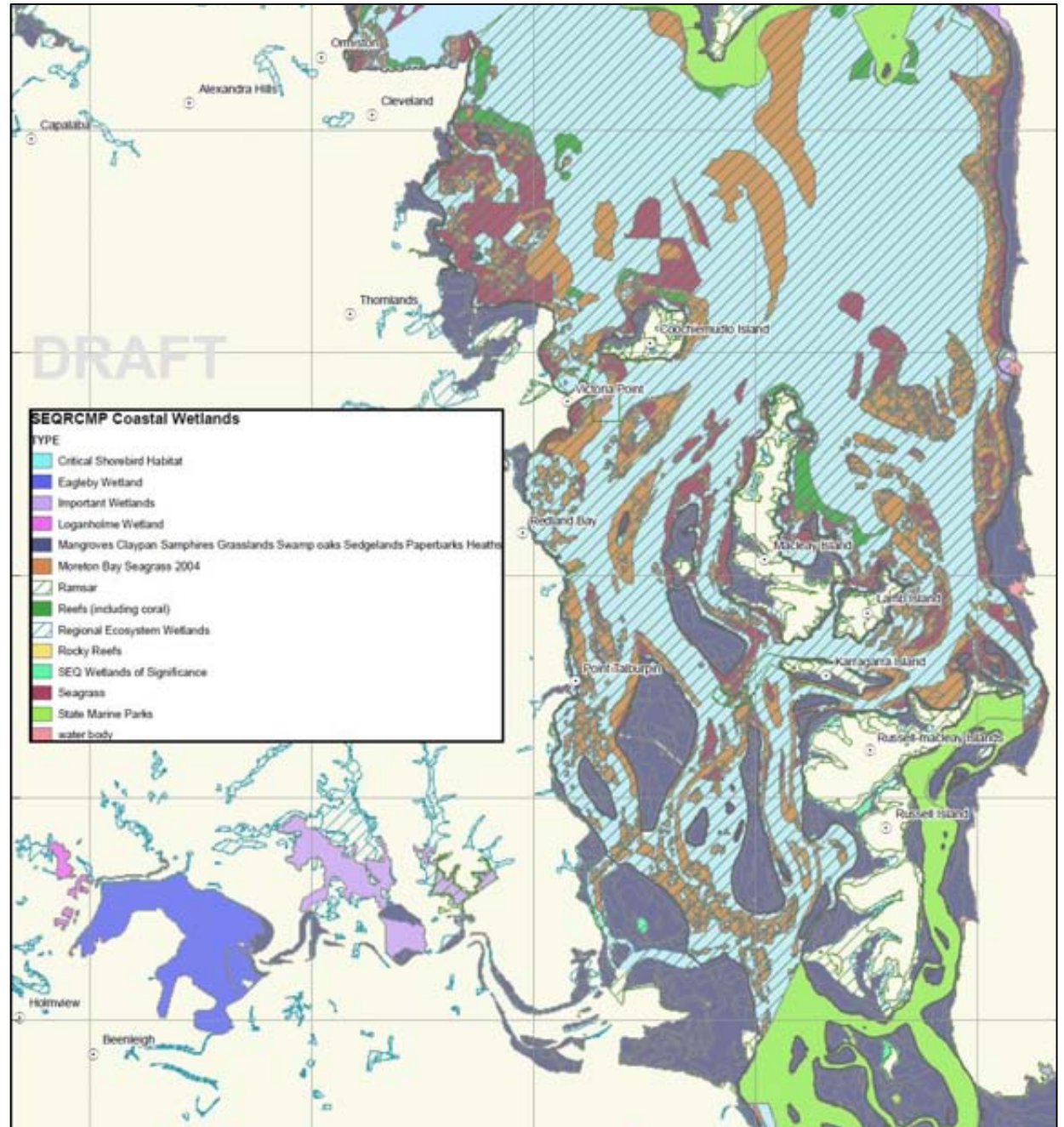
A further restriction to **six knots** is applied:

- Within 30 metres of boats anchored, moored to the shore or aground, a jetty, wharf, pontoon or boat ramp
- Within 30m of people in the water
- Within 50m of people in the water when operating a personal watercraft
- In boat harbours and marinas

In addition, the Department of Environment and Resource Management applies the following restrictions in designated areas to help manage specific environmental issues (Marine Park (Moreton Bay) Zoning Plan, 2008):

- **Go Slow Areas for Turtles and Dugongs:** all vessels must travel off-the-plane in displacement mode, and in a way that minimises the change of a turtle or dugong being struck
- **Go Slow Areas for Turtles and Dugongs (vessels >8m):** vessels over 8m are restricted to 10 knots or less in the following areas:
 - GSB01 – Weinam Creek
 - GSB02 – Garden Island
 - GSB03 – Karragarra Channel
 - GSB04 – Krummel Passage

Figure 3 Marine Park zones



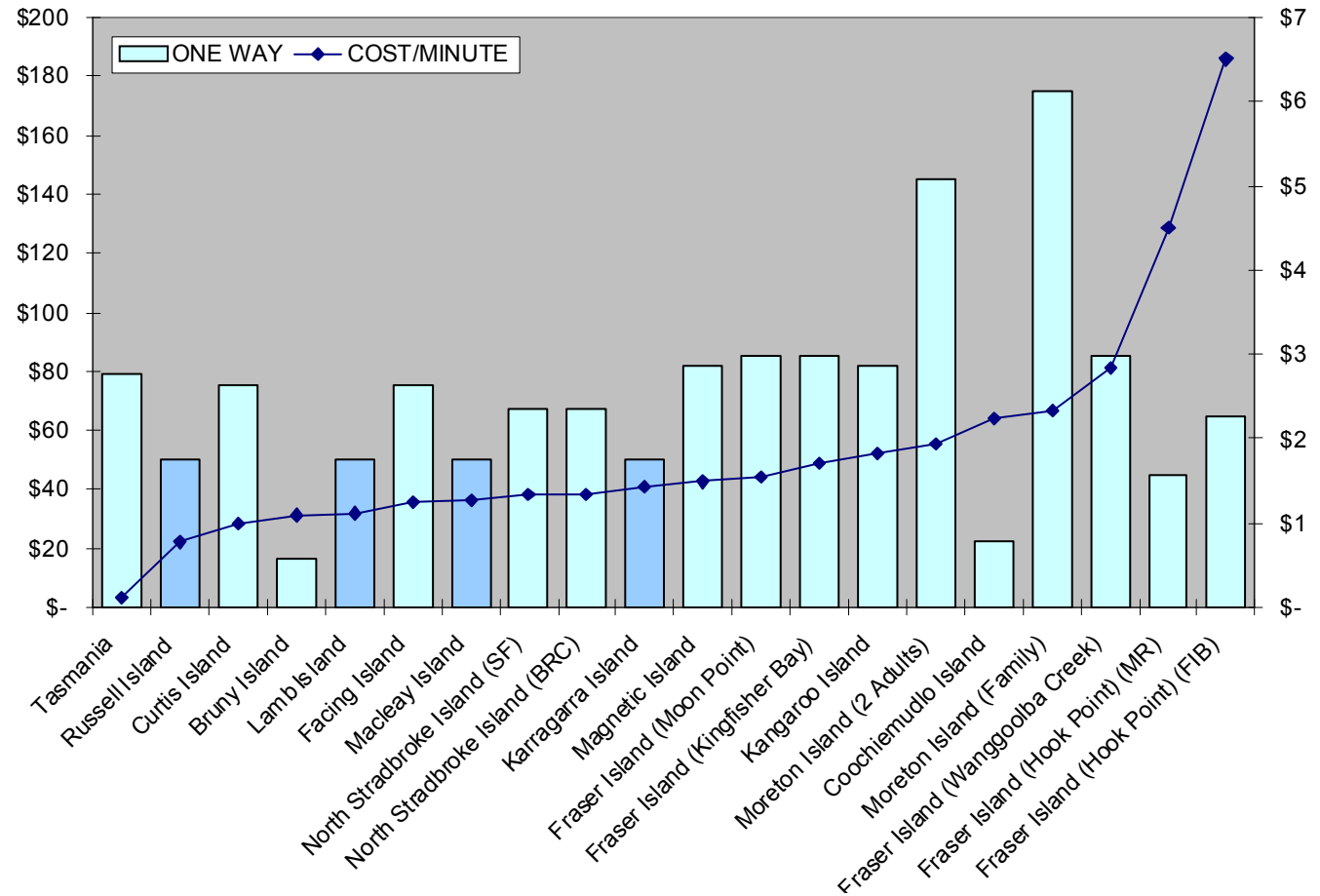
However, permission may be granted for vessels to operate in the area at a speed of more than 10 knots.

- **Go Slow Areas for Natural Values:** all vessels must travel off-the-plane or in displacement mode

3.4.3 Travel time and cost

There is a common belief that shorter travel distances will reduce time on the water, thus reducing the cost per journey. The high cost of fares is cited as one of the reasons for low barge usage and consequent parking of a second vehicle at the Weinam Creek terminal by residents. It follows that reduced fare costs will make barge travel a more attractive mode choice for residents and reduce parking demand at Weinam Creek. However, a comparison of barge fares on the east coast of Australia shows that there is no direct correlation between journey time and cost (Figure 4).

Figure 4 Comparison of vehicular barge fares in Australia





3.5 Environmental approvals process

Any potential new barge routes will only be progressed by a private operator as Redland City Council does not operate barge services

Council advised that the operator of any new barge service will be responsible for the construction and operation of any new infrastructure as well as obtaining all the required statutory approvals, which will include the following:

- Resource entitlement to any State land on which the infrastructure is located. This may involve first applying for tenure over the State land involved.
- Allocation of quarry material or a dredge management plan for any dredging and disposal of dredge spoil to above high water mark under the Coastal Protection and Management Act 1995.
- Approval to conduct environmentally relevant activities (ERA) under the Environmental Protection Act 1997.
- Permits under the Marine Parks Act 2004 for works and operations in the Moreton Bay Marine Park.
- Development approval for tidal works under the Sustainable Planning Act 2009 (SPA)

The development approval under SPA will be for prescribed tidal works for which the Redland City Council will be the Assessment Manager and the following agencies will have a Concurrence role:

- Department of Environment and Resource Management (DERM) in relation to coastal management and consistency with the policies of the State Coastal Management Plan, Draft Queensland Coastal Plan and South-east Regional Coastal management Plan;
- Fisheries Queensland (part of the Department of Employment, Economic Development and Innovation (DEEDI)) in relation to effects on fisheries values and in particular the need for a permit to damage or destroy marine plants; and
- Maritime Safety Queensland (MSQ) in relation to maritime safety.

Key issues in the approval process include:

- The effect of the infrastructure located below high water mark on coastal processes and the adjacent coastline
- The extent of reclamation areas over tidal lands. Reclamation works need to be kept to the minimum area necessary to service the maritime infrastructure
- The extent of dredging works. Dredging needs to be kept to a minimum and the expected level of future maintenance dredging needs to be identified
- Disposal of dredge spoil. Land based disposal is the preferred option as are limited opportunities to dispose of dredge material in the marine park
- Fuelling requirements
- Public benefits of the proposal
- Long term maintenance arrangements. The measures that are in place to ensure that there is an identified entity responsible for on-going maintenance.

4. Potential new landing points

4.1 Approach to assessment

Potential sites for alternative vehicular barge and passenger landing points on Macleay Island, Russell Island and the mainland were selected based on sites identified in previous studies and reports and a brief desktop analysis of vacant sites with access to navigable water and road corridors. These are shown in Figure 5.

The suitability of each site was initially assessed based on:

- Land zoning, tenure and availability
- Shelter from prevailing wind and waves
- Access to navigable water without dredging
- Conflicts with use of other marine infrastructure (e.g. recreation boat ramps and moorings)
- Extent of environmental constraints

The outcomes of the Stage 1 assessment are summarised in this section. The full evaluation matrix is presented in Appendix A and summarised in Table 4 at the end of this section.

Sites recommended for further investigation were then assessed in Stage 2 (Section 5) based on:

- Potential to accommodate required infrastructure at landing points
- Causeway length required to access deep water
- Approximate route distance to mainland
- Road upgrade requirements
- Access to public transport and town centres
- Further environmental considerations

Figure 5 Location of potential new landing points



4.4 Mainland

The potential mainland landing points considered extend from Raby Bay, Cleveland in the north to Woongoolba, Gold Coast City Council in the south.

Twelve sites were identified for their potential to accommodate vessel landing infrastructure on the mainland:

- William Street, Cleveland
- Orana Esplanade, Point Halloran
- Dundas Street, Ormiston
- Thompson Street, Victoria Point
- Masters Avenue, Victoria Point
- Toondah Harbour, Cleveland
- Raby Bay Boat Harbour, Cleveland
- Point Talburpin
- Little Rocky Point (south), Woongoolba
- Little Rocky Point (north), Woongoolba
- Rocky Passage Road, Redland Bay
- Zipf's Road, Redland Bay

Figure 8 Location of potential landing points on the mainland



4.4.1 William Street (Volunteer Marine Rescue), Cleveland

The William Street (Volunteer Marine Rescue) site is located on the northern side of Cleveland Point.

The site is currently designated as community purposes and is used by the Volunteer Marine Rescue. The site is surrounded by Foreshore Park and is a popular recreational boat launching facility. Consequently, the area may experience some marine and landside congestion, particularly at the weekends.

The area is clear of mangroves and is provided with maintenance dredging to provide all tide access.

This location should be carried forward to Stage 2 as a possible location for passenger ferry facilities.

4.4.2 Orana Esplanade, Point Halloran

Point Halloran is located to the north of Victoria Point.

Point Halloran is an established residential community with an extensive foreshore park.

The area is largely cleared of mangroves; however, the tidal foreshore falls under RAMSAR designation. There is approximately 135m to the -1m LAT.

The sheltered bay is a popular boat mooring area that is likely to significantly impede navigation.

This location has not been recommended for further investigation based on the water depth and

impact on public parklands, residential areas and boat moorings.

4.4.3 Dundas Street, Ormiston

The Dundas Street site is located on the Ormiston side of Endeavour Canal, fronting the north-east corner of Raby Bay.

The site is currently designated open space and is clear of mangroves and remnant vegetation.

It provides good access to deep water and is free of marine infrastructure.

This location should be carried forward to Stage 2 as a possible location for passenger ferry facilities.

4.4.4 Thompson Street, Victoria Point

Thompson Street is located to the south of Victoria Point. It provides a popular recreational reserve and is one of a few sandy beaches in the Redlands.

There is an extensive tidal shelf extending 615m to the -1m LAT mark. For this reason, and for impact on popular recreational amenities, this location should not be carried forward for further investigation.

4.4.5 Zipf's Road, Redland Bay

Zipf's Road is located south of Scenic Road in southern Redland Bay. The site has limited access to navigable water as it is surrounded by tidal flats which dry at low tide and is unsuitable for further investigation.



4.4.6 Masters Avenue, Victoria Point

Masters Avenue, Victoria Point, is the existing vehicular barge and passenger ferry terminal to Coochiemudlo Island.

The area is designated open space and is cleared of mangroves. Subsequently, significant environment and property impacts are not expected.

Any introduction of additional marine transport services is likely to conflict with the existing commercial and recreational facilities in this location.

The existing Coochiemudlo Barge service is currently limited during low spring tides. The existing channel may require ongoing dredging and would need to be deepened for larger capacity vessels.

This location is not expected to experience significant environmental or private property impacts. Maintenance of a navigable channel is required for the Coochiemudlo services. Although Masters Avenue does not score highly under the Stage 1 assessment, the locations should be carried forward based on its northern location and minimal environmental impacts.



4.4.7 Toondah Harbour, Cleveland

Toondah Harbour, Cleveland, is the existing vehicular barge and passenger ferry terminal to Stradbroke Island.

The area is a designated marine facility area and has mixed tenure. Although the site has been cleared of mangroves there may be some impacts on the Cassim Island world heritage bird rookery. Any introduction of additional marine transport services is likely to conflict with the existing commercial and recreational facilities in this location.

Maintenance dredging is required to maintain access to the existing terminal, however, the channel has capacity limitations.

This location is not expected to experience significant environmental or private property impacts. Maintenance of a navigable channel is already required for the North Stradbroke services. Existing capacity constraints resulting from North Stradbroke Island barge services mean that this location should be carried forward for further investigation for passenger ferries only.

4.4.8 Raby Bay Boat Harbour, Cleveland

The Raby Bay Boat Harbour site is located adjacent to Cleveland Railway Station in parkland on the corner of Shore Street West and Harbourview Court. The open space in this location offers one of the most important recreational grounds and scenic vistas in Cleveland Centre.

The site is located at the far end of Endeavour Canal, and consequently offers good shelter from prevailing winds and access to navigable water.

This section of Endeavour Canal functions as a busy recreational boating harbour resulting in potential conflict with both motoring and moored recreation and tourist vessels in the canal.

The Raby Bay Boat Harbour site is not recommended for further investigation based on potential conflict with the busy boating harbour and impact on significant open space.

4.4.9 Point Talburpin

Point Talburpin is located to the south of Redland Bay. There is a road reservation to the foreshore



and is surrounded by urban residential and open space.

The site has poor access to navigable water as it is surrounded by tidal flats exposed at low tide. This site should not be carried forward for further investigation.

4.4.10 Little Rocky Point (south), Woongoolba

Little Rocky Point is located south of the Logan River in Gold Coast City Council.

The site is a de-facto island of high land surrounded by mangroves. It currently accommodates farming land and a public park and is joined to the mainland by a long causeway

structure.

The site has good access to adequate water depth (approximately 65m to 1m HAT) and partly sheltered.

Although any development in this location would have significant impact on important tidal mangrove habitats, this option should be carried forward for further investigation based on its proximity to Russell Island and good water depth.



4.4.11 Little Rocky Point (north), Woongoolba

The northern causeway option is located to the north of Little Rocky Point. The proposed landing point is the location of the current Energex easement across to Russell Island. It provides the most direct access between the island and mainland.

This location is below high water mark in a significant mangrove habitat of State environmental significance. A track has already been passed through this area for maintenance of the electricity pylons which may reduce some disturbance.

The bathymetry in this location is very shallow with a tidal area of 420m to the -1m LAT line. A significant causeway would be required either bridge or barge option in this location.

This site will be carried forward for further investigation as it has been put forward as a potential location for a barge landing point and as the mainland connection for the Russell Island Bridge. It is expected that environmental impacts will rule out either option however further investigations are required.

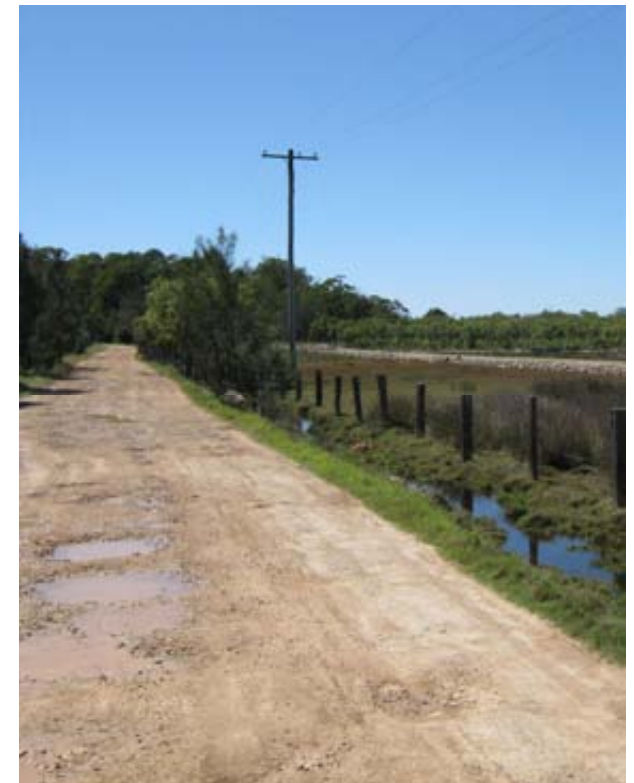
4.4.12 Rocky Passage Road, Redland Bay

Rocky Passage Road is located in the south of Redland Bay on the Logan River.

The site is designated conservation and environmental protection and accommodates an existing freehold residential dwelling.

The site is well sheltered however may be of concern during times of flood. There is good access to navigable water relatively close to the shoreline.

Any development in this site would require clearing of significant remnant vegetation and mangroves and state biodiversity significance. However, the site should be carried forward for further investigation based on good access to navigable water, location within Redland Shire and proximity to Russell Island.



4.5 Recommended sites for further investigation

22 sites were assessed for their suitability for marine transport infrastructure based on:

- Land zoning, tenure and availability
- Shelter from prevailing wind and waves
- Access to navigable water without dredging
- Conflicts with use of other marine infrastructure (e.g. recreation boat ramps and moorings)
- Extent of environmental constraints

The full multi-criteria analysis is presented in Appendix A and summarised in Table 4.

The following ratings have been applied:

- 1 – meets criteria (no cost or approval blockages)
- 2 – partially meets criteria (with some costs and standard approvals)
- 3 – may be possible to achieve criteria (but likely to have significant cost and complex approval requirements)
- 4 – unlikely to be able to meet criteria (costs and approvals likely to be prohibitive)

Note: The lowest score equates to the highest achievement.

Table 4 demonstrates that of the remaining sites on Russell Island, Macleay Island, and the mainland that haven't already been developed, there are no sites that demonstrate high suitability for new marine infrastructure. The development of additional marine facilities at those few sites that are not subject to significant environmental constraints would result in conflict with existing recreational and commercial facilities. Extensive causeway constructions and maintenance or

capital dredging would be required at the majority of sites.

Notwithstanding these constraints, seven sites were recommended for further investigation:

- **Cross Street, Macleay Island** based on its northern location and road reserve access to the HAT mark
- **Rocky Point, Russell Island** based on the sites proximity to the mainland
- **Masters Avenue, Victoria Point** based on the site's proximity and minimal environmental impacts
- **Toondah Harbour, Cleveland** for passenger ferry services only based on the sites proximity to Cleveland Centre and existing vehicular barge capacity constraints
- **Little Rocky Point (south), Woongoolba** based on the sites proximity to Russell Island
- **Little Rocky Point (north), Woongoolba** for cable barge services only based on the sites proximity to Russell Island and environmental impacts
- **Rocky Passage Road, Redland Bay** based on the sites proximity to Russell Island and location within Redland City Council

Rocky Point, Macleay Island, and Little Rocky Point, Woongoolba will also be considered for a potential vehicular bridge.



Table 4 Summary of potential new landing site evaluation matrix

	Land use		Waterside access		Existing facilities	Environmental Constraints	Distance	Score	Suitable
	Zone	Land availability	Shelter	Navigable water					
Eagle Street	2	2	1	2	1	4	3	15	X
Karrawarra Street	2	2	1	3	1	3	2	14	X
Wharf Street	2	3	1	2	1	4	2	15	X
Orana Street / Kalara Street	2	3	1	4	1	2	2	15	X
Attunga Street	3	3	2	2	1	2	2	15	X
Dalpura Street	1	1	2	3	4	2	2	15	X
Beelong Street	2	3	3	2	3	3	2	18	X
Cross Street	3	2	2	3	1	3	1	15	✓
Jackson Road / Channel Street	2	1	2	3	1	3	3	15	X
Rocky Point	2	1	2	2	1	2	1	11	✓
William Street	2	2	1	1	4	2	3	15	X
Orana Esplanade	3	2	3	3	3	2	3	19	X
Dundas Street	2	2	2	1	3	2	3	15	X
Thompson Street	2	3	1	4	3	2	3	18	X
Masters Avenue	2	2	3	3	4	1	1	16	✓
Toondah Harbour	1	1	1	3	2	3	3	14	✓
Raby Bay Boat Harbour	2	2	1	1	4	1	3	14	X
Point Talburpin	2	2	2	3	2	2	3	16	X
Little Rocky Point (south)	3	2	2	1	1	3	1	13	✓
Little Rocky Point (north)	3	2	2	3	1	3	1	15	✓
Rocky Passage Road	3	2	1	1	1	3	2	13	✓
Zipf's Road	2	2	1	2	2	3	3	15	X

6. Potential passenger ferry route

6.1 General approach to passenger ferry route assessment

Council requested that GHD investigate the potential for passenger ferry services concurrently with the review of barge infrastructure requirements.

Of the 22 sites assessed for suitability for marine infrastructure, three were further considered for passenger ferry facilities. These were:

- Cross Street, Macleay Island
- Masters Avenue, Victoria Point
- Toondah Harbour, Cleveland

The full Stage 1 multi-criteria assessment is presented in Appendix A.

Passenger ferry terminal infrastructure requirements would include:

- Floating pontoon
- Covered walkway
- Piling
- Widening of causeways to accommodate pedestrian traffic
- 100 bay car park

The cost to build passenger ferry infrastructure would be over and above the cost for vehicular barge ramp infrastructure.

6.2 Background

A water taxi service has previously run from the Southern Moreton Bay Islands to Cleveland. Bay Islands Transit cancelled this service in November 2001 following a dramatic decrease in patronage rendering the service financially unviable.

The 2002 SMBI ILTP declared it likely that a passenger ferry service from SMBI to Cleveland be re-introduced in the near term. The route is considered strategically important as it provides a key connection to the CityTrain network.

6.3 Likely demand

A recent survey conducted by Bay Islands Transit System suggests that there is little community interest in a Cleveland Service. Approximately 500 questionnaires were distributed to ferry travellers, only 132 were returned - of those respondents, only 57.6% would be prepared to travel the extra journey time of 50-75 minutes, and only 25% travelled by train.

6.4 Cross Street (Macleay Island)

Cross Street was considered for the location of passenger ferry facilities as it offered the shorter travelling time to Victoria Point and Cleveland.

However, the additional requirements for passenger ferry infrastructure, including carparking, cannot be accommodated at the Cross Street site. The development of passenger

ferry facilities at the northern tip of Macleay Island conflicts with the existing development pattern and would likely result in traffic management and parking issues on surrounding streets.

Furthermore, the development of a new northbound passenger ferry route from Macleay Island to the mainland would likely result in patronage leakage from the existing services with the potential to reduce the profitability of the Weinam Creek service, potentially to the detriment of the remaining SMBI community.

For these reasons, as well as those outlining the limitation of Masters Avenue and Toondah Harbour below, it is not recommended that any additional passenger ferry routes be investigated.

6.5 Masters Avenue (Victoria Point)

Masters Avenue is currently used as the vehicular barge and passenger ferry terminal for services to Coochiemudlo Island. The existing Masters Avenue water transport terminal experiences capacity constraints from existing services and conflict with the recreational boat ramp.

A passenger ferry terminal to Victoria Point has the potential to improve access to Victoria Point Town Centre from Macleay Island, provide a direct connection to existing bus services, reduce on water journey time compared to the existing Brighton Road to Weinam Creek route, and

reduce the overall journey time for north-bound journeys.

However, any additional services to Victoria Point would place additional pressure on the already congested terminal, conflict with the Coochiemudlo services and the recreational boat ramp. Furthermore, the introduction of additional passenger ferry services would require an increase in parking provided at Victoria Point and likely result in traffic management and parking issues in the surrounding neighbourhood.

The channel to the Coochiemudlo Barge terminal at Victoria Point was dredged by Port of Brisbane in the mid 1990's. Since then, the channel depth appears to have remained relatively stable, with the turning basin and entrance channel still clearly evident from aerial photography. Hydrographic surveys undertaken in June 2001 indicate the depth in the area to be between -0.9m LAT and -0.7m LAT meaning that further capital dredging would be required.

For these reasons, the introduction of additional passenger ferry services at Victoria Point is not recommended.

6.6 Toondah Harbour (Cleveland)

Toondah Harbour is currently used as the vehicular barge and passenger ferry terminal for services to North Stradbroke Island and is already extremely constrained.

Maritime Safety Queensland has advised that the Toondah Harbour facility is already at capacity in terms of vessel movements. Consequently, the

introduction of any additional water transport services would be dependent on an extensive redevelopment of the harbour facilities and has not been costed in this study

The recent Toondah Harbour masterplanning and redevelopment exercise did not take into account the potential for a passenger ferry service to the Bay Islands, however, Redland City Council has not provided any formal policy on the potential re-introduction of the Southern Moreton Bay Islands to Cleveland route.

9. Summary and conclusions

9.1 Assessment process

GHD was commissioned by Redland City Council to provide an independent assessment of the feasibility of additional access routes to the Southern Moreton Bay Islands including:

- Alternative and/or additional vehicle barge routes
- Alternative and/or additional water taxi routes
- A bridge from the southern end of Russell Island to the mainland

The project involved:

- A review of background information and previous assessments of alternative routes
- Identification of environmental constraints including marine park zoning, sea grass distribution and coastal habitat areas.
- Identification of locational constraints including:
 - Land tenure and availability
 - Access to the existing transport networks and upgrade requirements
 - Water depth, access channels and dredging requirements
 - Wind direction/shelter/exposure/tidal flows
- Identification of operational constraints including:
 - Travel time and costs
 - Impact on other services/operators
 - Landside requirements
- Preparation of comparative cost estimates for bridge and shortlisted barge and water taxi alternatives

- Feasibility assessment of the proposed routes

22 sites were assessed for their suitability for marine transport infrastructure based on:

- Land zoning, tenure and availability
- Shelter from prevailing wind and waves
- Access to navigable water without dredging
- Conflicts with use of other marine infrastructure (e.g. recreation boat ramps and moorings)
- Extent of environmental constraints

Seven sites were recommended for further investigation:

- Cross Street, Macleay Island
- Rocky Point, Russell Island
- Masters Avenue, Victoria Point
- Toondah Harbour, Cleveland
- Little Rocky Point (south), Woongoolba
- Little Rocky Point (north), Woongoolba
- Rocky Passage Road, Redland Bay

Rocky Point, Russell Island, and Little Rocky Point, Woongoolba were also considered for a potential vehicular bridge.

9.2 Vehicular barges

Based on the analysis completed, there were two routes considered suitable for further investigation:

- Cross Street (Macleay Island) to Masters Avenue (Victoria Point)
- Rocky Point (Russell Island) to Rocky Passage Road (Redland Bay)

Significant dredging issues would need to be resolved for either of these routes.

9.2.1 Cross Street (Macleay Island) to Masters Avenue (Victoria Point) – \$6.06M

Out of seven sites analysed, Cross Street is the only potential new site for water-transport infrastructure on Macleay Island. High level analysis estimates the cost for a new barge ramp and associated road upgrades at this location to be \$4.72 million.

A new barge ramp would be required to be built at Victoria Point to accommodate the additional services at a cost of approximately \$1.34 million.

Dredging requirements may be a fatal flaw at Victoria Point, and as a minimum are likely to reduce the size of the barge that could service this route. Small barges may not be able to handle peak morning and evening loads.

The Macleay Island to Victoria Point vehicular barge route would require 28,641 trips annually to pay off the new infrastructure in 25 years based on current trip cost per minute. This is similar to the current total demand between Macleay Island and the mainland (approx 30% of the total existing SMI vehicular barge service). Consequently, it is highly likely that the introduction of an additional vehicular barge service from Macleay Island to the

mainland would result in significant patronage leakage from the existing service.

9.2.2 Rocky Point (Russell Island) to Rocky Passage Road (Redland Bay) – \$7.23M

Rocky Point is the only potential site for additional water-transport infrastructure on Russell Island. A new barge facility and associated road upgrades in this location would cost approximately \$4.21 million.

On the mainland, a new barge ramp and 700m extension of Rocky Passage Road is estimated to cost \$3.02 million.

Additional considerations not included in the analysis is the poor vertical alignment at Rocky Passage Road which may require significant works to upgrade, and dredging requirements at the mouth of the Logan River.

The Russell Island to southern Redland Bay route would require 20,294 additional trips annually to pay for the marine infrastructure in 25 years. This equates to approximately two thirds of the current annual demand between Russell Island and Weinam Creek and could result in significant patronage leakage from the existing service in the short term.

9.2.3 Rocky Point (Russell Island) Little Rocky Point (south) (Woongoolba) – \$12.32M

A new barge facility and associated road upgrades at Rocky Point would cost approximately \$4.21 million.

On the mainland, a new barge ramp at Little Rocky Point (south) and significant road upgrades to Santa Barbara Road would be required. This is estimated to cost \$8.11 million.

The upgrading of Santa Barbara Road through remnant mangrove vegetation would have significant environmental impacts and require extensive environmental approvals.

A regular vehicular barge from Russell Island to Woongoolba would require 78,822 additional trips annually to pay off the infrastructure within 25 years. This equates to approximately three times the current annual demand between Russell Island and the Mainland.

9.2.4 Rocky Point (Russell Island) Little Rocky Point (north) (Woongoolba) – cable barge (\$22.51M)

A cable barge between Rocky Point and Little Rocky Point would require a much higher investment in landing point facilities at both Russell Island and Woongoolba. The causeway at Rocky Point would need to extend past the adjacent sandbank to approximately the alignment of the first Energex pylon (245m compared to 10m for the regular barge) and a 1300m causeway

would be required at Woongoolba in addition to upgrades to Santa Barbara Road.

The estimated cost for infrastructure is \$7.25 million at Rocky Point and \$15.21 million at Little Rocky Point (north).

The proposed cable barge would require 534,033 additional trips annually based on current trip cost per minute.

The proposed causeways at both Rocky Point and Woongoolba will result in significant environmental degradation and there may also be problems associated with the use of the cable barge in the navigation channel.

9.3 Passenger ferries

Three potential locations for additional passenger ferry infrastructure were considered – Cross Street (Macleay Island), Masters Avenue (Victoria Point) and Toondah Harbour (Cleveland).

Passenger ferry terminal infrastructure requirements would include a floating pontoon, covered walkway, piling and carparking.

Based on travel distance and time, the only location considered as having some potential for additional passenger ferry infrastructure on the Southern Moreton Bay Islands is at Cross Street. This means that any additional services would service the Macleay Island population only. However, the additional requirements for carparking cannot be accommodated at the site and a passenger terminal here would likely result in traffic management and parking issues on surrounding streets.

None of the mainland sites were considered suitable for the provision of passenger ferry infrastructure. Facilities at Toondah Harbour would be dependent on an extensive redevelopment of the harbour facilities.

It is noted that a recent survey by Bay Islands Transit System, the existing operator, suggests that there is currently little community interest in an additional northern passenger ferry service.

9.4 Russell Island Bridge

The potential Russell Island Bridge from Rocky Point to Little Rocky Point (north) at Woongoolba is estimated to cost \$110.16 million. The estimated cost is based on the cheapest of six indicative designs which would require bridge and causeway construction across navigation channels and result in major environmental implications.

A minimum demand analysis was used to determine the threshold at which point “break-even” would be reached. The proposed bridge would require 6,256,973 trips annually to reach break even or pay off the infrastructure in 25 years. This equates to 17,000 trips per day based on the adopted trip cost (\$1.30).

To maximise the demand catchment, additional barge/bridge infrastructure would need to be provided between the Southern Moreton Bay Islands.

Clearly the number of trips required to pay off the proposed bridge infrastructure over the 25 years

could be reduced by increasing the total cost per trip (toll).

9.5 Study caveats

In relation to the findings of this preliminary assessment of alternative water transport routes for the SMBI the following should be noted:

- The economic assessment is based public sector financing which requires a lower rate of return than if implemented by the private sector. A rate of return of 5.5% has been considered that addresses cost recovery only. The private sector would be seeking a positive NPV and a rate of return of around 10%.
- Dredging, barge vessel purchase and operational costs have not been able to be included because they are unquantifiable at this stage (and could be significant).
- Environmental assessment processes are expected to be significant and costly. Further, the Southern Moreton Bay Islands’ location within the Moreton Bay Marine Park means that it may be difficult to satisfy approval requirements.

10. Bibliography

Bay Islands Transit (date unknown), *Cleveland Service Survey Results*

GHD (2005), *Redland Bay Boat Ramp Study*

Moreton Bay Combined Islands Association (September 2009), *SMBI Transport Gateways*

Office of Economic and Statistical Research (2010), *Queensland Regional Profiles – Redland City (based on local government area 2010)*

Queensland Government (2002), *The State Coastal Management Plan*

Queensland Government (2004), *Couran to Redland Bay Boating Safety Chart, Second Edition*

Queensland Government (2004), *Nerang River to Couran Boating Safety Chart, Second Edition*

Queensland Government (2006), *South East Queensland Regional Coastal Management Plan*

Queensland Government (2008), *Marine Parks (Moreton Bay) Zoning Plan*

Queensland Government (2008), *Redland Bay to Cabbage Tree Creek, Third Edition*

Queensland Government (2010), *Draft Queensland Coastal Plan*

Redland City Council (2009), *Issues Paper – Population & Dwelling Profile – Southern Moreton Bay Islands*

Redland City Council (2010), *Southern Moreton Bay Islands Barge Intercept survey*

Redland City Council (November 2009), *Response to SMBI Transport Gateways Proposal*

SocialData (October 2010), *Travel Survey for the Southern Moreton Bay Islands – Preliminary Survey Results*

SocialData (October 2010), *Travel Survey for the Southern Moreton Bay Islands – Completion of Travel Survey Field Work Report*

Websites

Bay Islands Transit,
<http://www.transitsystems.com.au/divisions/view/4/bay-islands-transit>

Bayside Bulletin,
<http://www.baysidebulletin.com.au/>

Bayside Journal, <http://www.baysidejournal.com/>

Department of Environment and Resource Management, <http://www.derm.qld.gov.au/>

Department of Infrastructure and Planning, *Southern Moreton Bay Marine Infrastructure Master Plan*,
<http://www.dip.qld.gov.au/projects/transport/harbours-and-ports/southern-moreton-bay-marine-infrastructure-master-plan.html>

Department of Transport and Main Roads,
<http://www.tmr.qld.gov.au/>

Gold Coast City Council,
<http://www.goldcoast.qld.gov.au/>

Gold Coast City Council, *Property and Development Online*,
<http://pdonline.goldcoast.qld.gov.au/masterview/modules/propertymaster/default.aspx?page=home>

Maritime Safety Queensland,
<http://www.msq.qld.gov.au/>

Redland City Council,
<http://www.redland.qld.gov.au/>

Redland City Council, *Red-e-map*,
<http://maps.redland.qld.gov.au/redemap/>

Stradbroke Ferries,
<http://www.stradbrokeferries.com.au/>

TransLink Transit Authority,
<http://www.translink.com.au/>

Various

Bayside Bulletin (22 November 2001), *BITS Cleveland ferry run to end*

GIS Bathymetry information received from Maritime Safety Queensland: 13 October 2010

GIS information received from Redland City Council: 16 July 2010

Minutes for the Planning and Environment Committee (16 July 1991) on the Russell Island Ferry Service Proposal (268-05)