Building an airstrip on Ugar would use a significant proportion of its land area, would remove much of its existing vegetation as well as the only two small peaks on the island, and would also cost in the order of $5 - 10M. Dredging a channel to the barge ramp would cost in the $5 - 10M range. Dredging this channel would allow the supply barge to work to a timetable, rather than the tide. Working the tide here is not straightforward and there can be some weeks where the high tides do not give sufficient depth of water for the barge to land. The current barge supplies Ugar, Mer and Darnley, and so dredging a channel at Ugar would have some beneficial effect on the other two islands as well. Given the size of airstrip that could be built on Ugar, using it for any significant quantity of freight would not be practical.

Dredging would improve both passenger transport and freight outcomes and so must therefore rate as a higher priority than an airstrip. It would need to be prioritised against other dredging needs in the Torres Strait, and this will need to be carried forward into the Long Term Sea Access and Dredging Strategy. Dredging at Ugar should be considered as a high priority on an access and equity basis. This will need to be balanced against the population numbers, potential benefits and the relative needs of other islands.

A preliminary feasibility study on Passenger Transport and Freight Infrastructure Options at Stephens Island is also currently in progress and should be completed.

The lack of barge ramp facility at **Murray Island** is also a network deficiency. However, barges can operate here as deep water is relatively close. Barges currently land adjacent to the Council compound. This is workable with the current Seaswift barge that delivers to Murray Island. Barges previously used the Bonn site where there is deep water access available without the need for dredging. Provision of a barge ramp here is much cheaper here than anywhere else. However, there have been land ownership and native title issues here that have previously been intractable. Analysis of both sites should be included in the long term sea access and dredging strategy and the TSRA and Murray Island Council and the Proscribed Body Corporate would need to progress the native title issues. Given these issues, it is not currently possible to schedule physical works here to correct what is an obvious network deficiency. Once these issues are resolved, consideration should then be given to providing a barge ramp facility.

With regard to **Prince of Wales**, this island has a very large land area and could potentially develop. However, Torres Shire Council has nominated Horn Island as the location where its future growth will occur. There is very little land on Prince of Wales Island that is not reserve land covered by native title. Any development here would have to satisfy Torres Shire building and other regulations, however whether such development occurs is at the discretion of the native title owners, not Torres Shire Council. Therefore, development here could be considered “out of sequence” development unless and until the native title owners adopt a development position on a scale that would justify provision of significant infrastructure.

Nevertheless people live there now and desire safe access from small boats to shore for their journey to work/school. This is difficult to provide economically, as any new infrastructure must conform with current Australian Access and Mobility Standards. This precludes construction of conventional jetty structures. Provision of wheelchair accessible pontoons adds considerably to the cost. It will be necessary to develop a suitable, economic means of providing safe access from small boats to shore to be in a position to address the issues here, and to address the ultimate long term replacement of the finger piers on other islands.

An issue of more regional significance is the lack of a suitable **marine facility for small craft**. This is impacted by the Torres Strait's place on national and international shipping routes.

For yachts circumnavigating Australia or heading for Asian and Western destinations, and for international yachts passing Australia through the Torres Straits following the trade wind route around

the world, the nearest supply ports are Cairns, Darwin and Port Moresby. There would be potential commercial opportunity here for a marine facility on Thursday Island. Possible users for such a facility would be:

- Dinghy commuters;
- Trailable recreational boats;
- "Store-in-water" recreational users (yachts and launches);
- Boat-lift 'store-on-shore' recreational users;
- Horn/TI ferries;
- Boat repair slip and hardstand;
- Commercial trawlers and fishing vessels;
- Charter boats;
- TI/Seisa ferry; and
- Cruising vessels for short stops or for longer periods to wait for the next season's wind changes (cyclone avoidance in the Arafura Sea).

Whilst the Torres Straits may not be able to attract major funding for roads or rail, it could be argued that they have a legitimate claim for the maritime equivalent – a single safe-haven boat harbour in their region. Provision of such a facility would recognise the basic seafaring nature of the islander population. Given the number of possible uses for such a facility, further investigation of economic feasibility on a commercial development basis is warranted.

The main issues regarding freight distribution in the Torres Strait are the state of the **berthing dolphins** and the **dredged channels**. QT has a program for replacing berthing dolphins, however the approach channels require further investigation.

Problems with approach channels, being experienced by barge operators in delivering supplies to the inhabited islands, include:

- Insufficient swing basin size due to the change in barge sizes servicing the islands. The barge size has increased from the 32 m long barge in the original 'Design Report for the Sea Transport Unloading Facilities' undertaken for the Torres Strait Island Co-ordinating Council in 1989 to the current 50 m long (Sea Swift's Malu Titan);
- Reduced channel and swing basin depths due to siltation that has occurred since constructed in 1991/1992;
- Insufficient channel depth and width due to increase in barge sizes since constructed. Barge laden draft has increased from the 1.4 m (design vessel) to 2.2 m (Sea Swift's Malu Titan) and beam (width) has increased from 8.5 m (design vessel) to 10.9 m (Sea Swift's Malu Titan); and
- Poor protection from seas afforded by groynes and breakwaters. These include those of insufficient length (bearing in mind that the current barges are up to 50 m long compared with the design vessel of 32 m long) and insufficient height. The latter has waves propagating across the submerged groyne/breakwater at high tides and adversely affecting barge handling.

QT has carried out hydrographic surveys of the existing channels, swing basins and small boat facilities at all fourteen islands which had barge ramps and access constructed in 1991/1992, as well as the near shore areas on Murray Island which was not provided with new marine facilities in 1991/1992.

A long-term sea access strategy is now required to:

- Determine the measures needed to maintain long term sea access to the nominated Outer Torres Strait Islands (OTSI); and
- Set priorities to guide subsequent budget submissions for works or other measures recommended.

4.5.4 Environmental

The Torres Strait has a diverse geological composition. The regional seabed has large coral reefs protecting many of the islands and creating an environment for fish and marine mammals. Also, the thick mangroves on some of the islands require protection from new infrastructure developments (e.g. marine). The reefs and marine resources require protection from small boat, barge and ship movement impacts over a period of time.

The Torres Strait is an environmentally sensitive area with a diversity of sea-life that must be protected.

Figure 4.8 Dredged Channel Path

4.5.5 Economy

The economy is mainly supported by employment in government areas (health, education and social services), and locals engaged in State and Federal Government programs. Due to the distances for freight of daily requirements, the high costs associated with these items are affecting the economy. Average wages of residents are equivalent to social security unemployment benefits. The low income levels support affordability as a major goal of future transport planning. With low employment rates and small economic development opportunities, the CDEP will continue to employ locals, contributing to some air and sea travel.

A focus of the community councils in the Torres Strait is to increase employment opportunities for island residents. A wide range of industries are currently under consideration including: growing sea sponges, prawn farms, juvenile crayfish farm, etc. However, the focus of these industries is the employment of the residents of the individual island, and again due to the land constraints, it is considered unlikely that there is sufficient land on most islands to develop large scale industries requiring labour from adjoining islands. While this is possible, it is considered unlikely.

The exceptions to this are Moa and Badu where it would be possible to have large scale industries that could potentially generate employment in excess of the capacity of the respective island. However, it is considered unlikely that this will occur within the twenty year timeframe being considered under this plan. It is envisaged that development will generally occur on islands in order to generate employment for that particular island's residents, and that it will not lead to significant changes in people's travel behaviour.

Any development will place additional demand on the freight services, however, this is seen as a positive result since the current freight volumes are relatively small and increased volumes may promote competition within the freight sector.

It is stressed that the economic viability of developments within the Torres Strait is heavily influenced by barge freight costs. This is because all materials, equipment, consumables, etc, are transported by barge from Cairns, and any goods produced will most likely be transported back to Cairns (eg. sea sponges, juvenile crayfish).

4.5.6 Tourism

Discussions with representative bodies in the Torres Strait have identified tourism as a key potential industry to underpin employment and economic growth in the Torres Strait over the next twenty years. Cultural and historical tourism developments to date include the Gab Titui Cultural Centre (Thursday Island), Horn Island's military museum and cultural guest facilities at Poruma and Masig. These attractions are beginning to create a critical mass of tourist destinations in the region. A number of other islands are currently constructing or planning to construct tourist facilities (e.g. Warraber Island), and for these ventures to be successful tourists will need to be attracted from outside the Torres Strait region.

There is a steady annual growth in the number of tourists visiting Cape York and staying in the NPA. This in turn is leading to growth in the number of tourists visiting the Torres Strait, particularly Thursday and Horn Islands, as they travel across from Seisia on the ferry that runs daily in the tourist season. Over the next twenty years it is envisaged that the majority of tourists will arrive in the Torres Strait either by ferry from Seisia or by aircraft from Cairns. It is also envisaged that the frequency of cruise ships visiting the area will increase.

The majority of OTSIs are not large enough to support any large scale tourist ventures due to the shortage of land. The exceptions to this are Badu and Moa Islands where it could be possible to construct large scale eco-tourism ventures. If a large scale development was to occur on either Badu or Moa it could provide the catalyst for a regular ferry service to Horn/Thursday Island, as the travel time for a ferry would be similar to the ferry that runs to Seisia.

It is envisaged that tourist travel to the OTSIs will be via light aircraft in a similar arrangement to that currently used. Although the remoteness of the Torres Strait is a key attractant for tourists, it is also a deterrent due to the long travel times. Hence, if tourists are flying long distances to arrive at Horn Island, they will be expecting to get to their destination island as quickly as possible.

In general, the anticipated increase in the number of people flying to/within the Torres Strait over the next twenty years may provide an improved service to the area.

Also, it is understood that there are seventeen cruise ships that plan to bring tourists from their ships (to be held between Friday Island and Prince of Wales Island) to Thursday Island. The impact of providing passenger facilities to meet the demand of these cruise vessels must be further considered. Cruise vessels generally use their tenders or life rafts to bring passengers ashore. The existing facilities at Thursday Island do not provide ideal facilities for the transfer of these passengers.

4.5.7 Security

The geographic location of the Torres Strait is of strategic importance in relation to Australia's border security. Activities such as illegal immigration, illegal fishing, smuggling, etc, are a risk in the Torres Strait due to the proximity of Papua New Guinea and Indonesia. Furthermore, the Torres Strait serves as an early detection zone for the transmission of exotic pests and diseases into mainland Australia. The Torres Strait is also of importance to Australia's defence as it controls the main east-west shipping channel.

Recent developments include the “over the horizon” radar installation, and a soon to be constructed detention facility on Horn Island for illegal immigrants. It is believed that additional development by the Federal Government in the Torres Strait to address quarantine, defence and illegal cross-border activities will take place into the foreseeable future.

4.5.8 Demographic

Torres Strait has seen a slight increase in birth rates and proportion of older people. The median age has also increased, so too have average household sizes, at five occupants. There does not appear to be significant changes in demography that would have much influence on travel methods and patterns.

4.5.9 Cultural

The Torres Strait people have long been regarded as having a close affinity with the sea and historically have favoured to travel by sea. This trend is on-going with the flexibility offered by small boats or “dinghies”. The islanders prefer the flexibility of using their “dinghies” with historical connection to the canoes for fishing, pearl diving and other marine harvesting (dugong, turtle, fish, prawns, crayfish, etc). These activities are also undertaken to provide them with a food source, as well as for commercial purposes to earn a living.

The communities within the Torres Strait align themselves with one of the four different language groups, with associated custom and identity. Movement of people, goods and schooling are closely aligned to the identified grouping (i.e., people living on Boigu would rarely travel to Murray Island, but would more commonly travel to Saibai and Dauan).

There are many different cultural events that instigate travel between the islands. These events include:

- Funerals;
- Tombstone openings (which occur one year after someone is buried);
- Weddings;
- Traditional ceremonies;
- Festivals specific to individual islands (eg, the Coming of the Light Festival on Darnley Island, which celebrates when Christianity was first brought to the Torres Strait, and attracts people from all over the region); and
- Sports competitions.

The complexities of custom, language and group identification have important implications for transport planning.

4.5.10 Long Distance Sea Transport

There are several major problems with a long distance sea transport service, which include some of the issues and constraints above:

- The low level of use by the residents due to limited demand for regularly travelling between the outer islands (especially those islands that fall outside their language group);
- The high operating costs including fuel and maintenance costs, which are much higher in the Torres Strait than in other Australian locations;
- The current state of marine infrastructure at most of the outer islands, and the need to upgrade them so that they may service a reasonable size vessel;
- The logistics of providing a regular and time-efficient service, when it would likely take over six hours to travel from Horn Island to Murray Island in a very fast vessel (see **Table 4.14**); and

- The difficulty in providing both a safe and reliable service when high winds and storms are prevalent for much of the year, causing slower speeds and even prohibiting sea travel all together.

4.5.11 Air Transport Perceptions

Many of the residents on the islands, as well as visitors, who regularly pass through the Torres Strait, do not consider air travel to be a safe mode of transport. This perception is generated primarily from the condition of the planes which service the region, and the level of experience of the pilots. Whether these views are valid or not, they prevail across the spectrum of people that travel within the region.

Many of the planes in the Torres Strait have sagging roof linings, broken fixtures and air vents, are extremely noisy, and generally do not provide the passengers with confidence. The sagging roof linings are a major issue during the wet season, when pooled water leaks into the cabin when the plane begins to taxi.

The recent air crash at Lockhart River killing 15 people has had a very negative impact on people's attitudes to air travel.

Another aspect which contributes to the concerns is the skill and experience of the pilots. Many new pilots who find it difficult getting work around Australia will come to the Torres Strait in an effort to accumulate their flying hours. Commonly, once they have achieved a certain level of experience, they will move to a better location. The limited experience of the pilots is compounded by the difficult flying conditions that are common in the Torres Strait.

4.5.12 PNG Gas Pipeline

The final IAS for the PNG Gas Pipeline corridor does not discuss any potential for gas take-offs in the Torres Strait which could be used as a power source for local development. The proponents for the pipeline are currently not interested in establishing gas take-offs for small scale use, such as for the Torres Strait. Also, gas take-offs are very expensive to establish and maintain/operate, which would make it difficult for the Torres Strait to afford. Finally, there would not appear to be any logical site to establish a gas take-off facility in the area.

The IAS also indicated that local employment opportunities from the pipeline's construction will be minimal due to the specialist nature of the works.

The route of the pipeline is remote from population centres, as it is proposed to travel through the deepest possible water on a reasonably direct route from PNG. However, there are issues in the IAS regarding clearance to under-keel shipping depths in shipping channels. The EMP provides for establishing pipeline technologies that protect the pipeline and avoid any impacts on shipping operations. These include trenching/burying and harden-protecting exposed sections.

4.6 Demand and Constraints Analysis

The transport demands discussed above in Section 4.3 and Section 4.4, and the constraints outlined in Section 4.5, have been analysed in this section to present a picture for the options to be considered in the next stages of this study. The analysis provided is mostly qualitative, as there was limited statistical information readily available.

4.6.1 Passenger

Air Transport

The cost of flights between Horn Island and various other islands in the Torres Strait are summarised in **Table 4.9**. Costs from May 2003 and June 2005 are included for comparative purposes, to show the change in airfares over the past 2 years. Generally, airfares have increased by between $5 and $10.

Table 4.9 also includes the cost per kilometre travelled for each of the journeys. Note that as the distance of the journeys increase, the cost per kilometre changes. This is illustrated in **Figure 4.9**, where from the 39km journey between Horn Island and Kubin, costs $4.00 per kilometre, compared to the 207km journey between Horn Island and Murray Island, which costs $1.48 per kilometre (based on the supplied Aerotropics airfares). This is because there is a minimum cost for an aircraft for take-off and landing, while distance costs accumulate slowly and are due to fuel burn and operating costs such as wages.

The geography and infrastructure that contributes to the high cost per kilometre include:

- Short length of Island airstrips restricting usage to small aircraft only; and
- Existence of many small centres close together, which mean high fuel usage for frequent take off and landings.

Further examination of these issues need to be undertaken when considering measures to reduce high costs of air services in the Torres Strait which appears to be inequitable.

Table 4.9 Airfare Costs and Cost per Kilometre Travelled in the Torres Strait

Air Service to/from Horn Island	Distance (km)	Adult Fare May 2003* ($)	Adult Fare June 2005* ($)	$ / km **	Airline
Kubin	39	145	156	4.00	Aerotropics
Badu	54	140	151	2.80	Aerotropics
Mabuiag	72	161		2.23	Aerotropics
Darnley	197	284	295	1.50	Aerotropics
Yam	93	182	182	1.96	Aerotropics
Coconut	106	197	208	1.96	Aerotropics
Saibai	138	234	254	1.84	Aerotropics
Bamaga	44	130		2.95	Aerotropics
Boigu Island	145	243	254	1.75	Aerotropics
Yorke Island	156	243	254	1.63	Aerotropics
Murray Island	207	295	306	1.48	Aerotropics
Kubin	39	132	149	3.82	Regional Pacific
Badu	54	143	144	2.67	Regional Pacific
Darnley	197	270	285	1.45	Regional Pacific
Yam	93	182	190	2.04	Regional Pacific
Coconut	106	193	205	1.93	Regional Pacific
Saibai	138	236	245	1.78	Regional Pacific
Bamaga	44	132		3.00	Regional Pacific
Boigu Island	145	231	245	1.69	Regional Pacific
Yorke Island	156	231	145	0.93	Regional Pacific
Murray Island	207	281	297	1.43	Regional Pacific

* Y-class (economy) fare

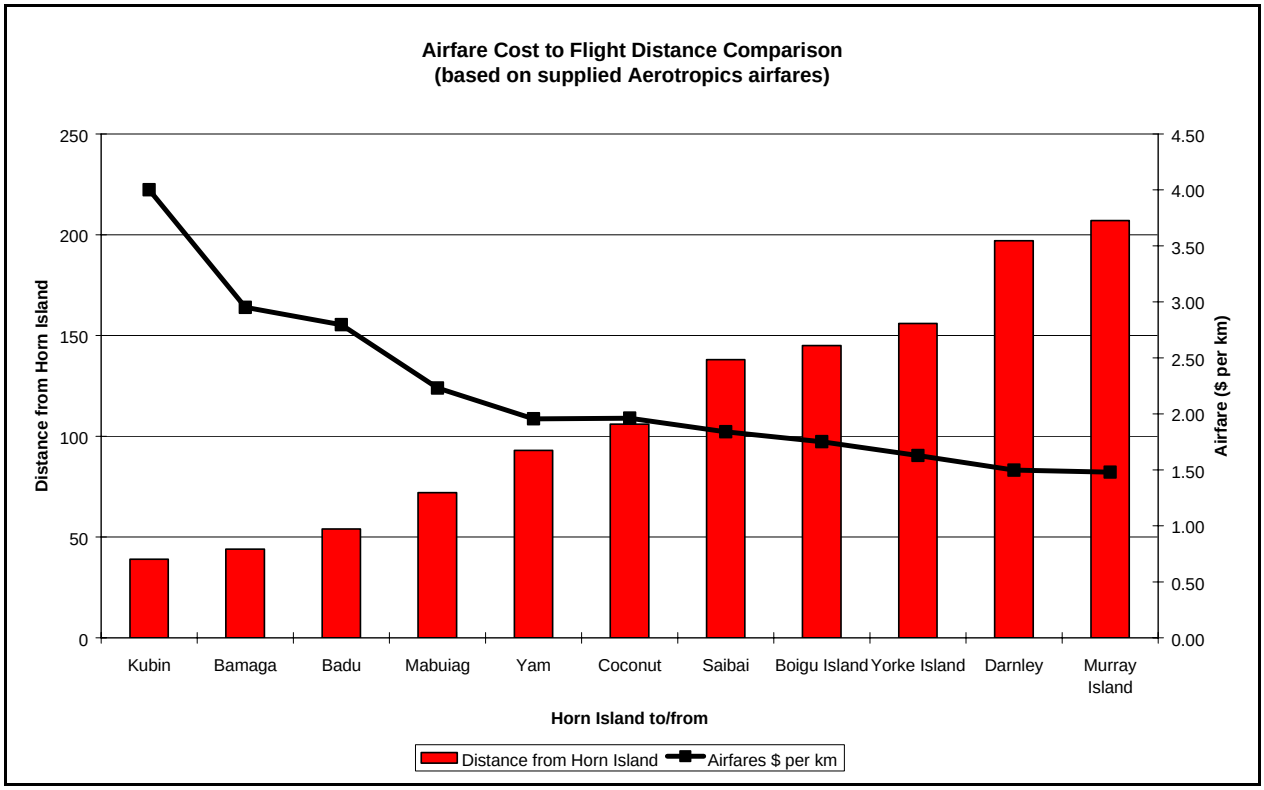
** Based on June 2005 airfares where available

Flight distance and cost information data from May 2003 and June 2005

Source for May 2003 data: "Stocktake of Transport Services in the Torres Strait", QT, December 2004

Source for June 2005 data: Provided by the respective airlines

Figure 4.9 Airfare Costs to Flight Distance Comparison



Other information obtained on the costs, distances and approximate travel times between each of the major islands in the Torres Strait are summarised in **Table 4.8**, **Table 4.9** and **Table 4.10** respectively.

Sea Transport

The existing sea transport services offered in the Torres Strait consist mostly of the ferry services between Thursday Island, Horn Island, Seisia and Prince of Wales Island. An example of the current ferry costs for some of these trips are summarised in **Table 4.10**.

Table 4.10 Current Sea Transport costs

Trip	Cost	Operator
Horn Island to/from Thursday Island	$8.00	McDonald Charter Boats
Thursday Island to/from Seisia	$42.50	Peddells Ferry

Based on an adult cash fare

Sea transport to the other islands in the Torres Strait does not currently exist. A ferry operator recently started a service connecting most of the islands in the region, but folded after a very short time in operation. Discussion of issues surrounding long distance sea transport is contained in Section 4.5.10.

Time Comparison between Air and Sea Transportation

Table 4.14 lists the approximate distances between Horn Island and some of the other major islands in the Torres Strait. It also compares scheduled flight times with approximate ferry times for possible services to and from Horn Island.

Table 4.11 Torres Strait Airfares Matrix

	Badu Island									
Boigu Island	167	**Boigu Island**								
Coconut Island	220	303	**Coconut Island**							
Darnley Island	295	377	160	**Darnley Island**						
Kubin	81	172	205	279	**Kubin**					
Murray Island	292	388	171	120	293	**Murray Island**				
Saibai Island	185	130	305	376	178	291	**Saibai Island**			
Warraber Island	190	275	102	187	175	200	273	**Warraber Island**		
Yam Island	209	290	108	176	191	200	288	108	**Yam Island**	
Yorke Island	261	343	119	114	247	143	341	147	140	**Yorke Island**
Horn Island	144	245	205	285	149	297	245	171	190	245

Airfares cost $

Airfares sourced from Regional Pacific Airlines and were effective 1/2/2005

Table 4.12 Torres Strait Distance Matrix

Badu Island	**Badu Island**									
Boigu Island	92	**Boigu Island**								
Coconut Island	101	124	**Coconut Island**							
Darnley Island	187	170	92	**Darnley Island**						
Kubin	15	105	94	182	**Kubin**					
Murray Island	208	207	107	47	202	**Murray Island**				
Saibai Island	100	52	82	117	105	155	**Saibai Island**			
Warraber Island	79	122	32	124	65	136	90	**Warraber Island**		
Yam Island	72	90	36	114	69	138	56	34	**Yam Island**	
Yorke Island	142	140	53	41	143	68	88	84	75	**Yorke Island**
Horn Island	54	145	106	197	39	207	138	74	93	156

Distances in kilometres and are approximate

Table 4.13 Torres Strait Flight Time Matrix

Badu Island	**Badu Island**									
Boigu Island	30	**Boigu Island**								
Coconut Island	30	35	**Coconut Island**							
Darnley Island	50	45	30	**Darnley Island**						
Kubin	10	30	30	45	**Kubin**					
Murray Island	50	50	30	15	50	**Murray Island**				
Saibai Island	30	15	25	30	30	40	**Saibai Island**			
Warraber Island	20	35	15	35	20	35	25	**Warraber Island**		
Yam Island	20	25	15	30	20	35	15	15	**Yam Island**	
Yorke Island	35	35	15	15	40	20	25	25	25	**Yorke Island**
Horn Island	20	40	30	50	20	50	35	20	25	40

Flight time in minutes

Flight times sources from Aero-Tropics schedule as at 17/5/04 and Regional Pacific Airlines schedule as at 1/3/04

Where unavailable flight times have been estimated based on similar distances