Queensland Recreational Boating Facilities Demand Forecasting Study 2017

Mackay Regional Council Assessment

GHD

ECONOMIC ASSOCIATES

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Definitions

‘all-tide’ means that a vessel can be realistically launched into or retrieved from the waterway at the site for 100% of the tidal range

‘ARI’ means average recurrence interval, and refers to the average or expected time period between two occurrences of weather exceeding a certain magnitude

‘capacity’ means the ability to handle throughput for boat ramps, or the ability to handle multiple vessels at pontoons and floating walkways

‘CHMP’ means Cultural Heritage Management Plan

‘CPM Reg’ means the *Coastal Protection and Management Regulation 2003*

‘CTU’ means ‘car-trailer unit’, and applies to parking bays suitable for use by a tow vehicle with attached boat trailer

‘DEE’ means the Department of the Environment and Energy (Commonwealth)

‘DEHP’ means the Department of Environment and Heritage Protection

‘demand’ means the current or projected requirement at a given year to service the needs of the recreational boating community – assuming full effectiveness of existing facilities and based on current numbers of registered recreational boats only. Excludes non-registered vessels such as canoes, kayaks, sail-boards, row boats, powered vessels not requiring registration, etc.

‘effective capacity’ for a boat ramp means the number of lanes for boat ramps after adjusting for usage constraints such as the lack of adequate parking or tidal accessibility, or improvements to efficiency such as floating walkways or pontoons, see section 4.1.1 for additional detail

‘effective capacity’ for a landing means the number of landings after adjusting for usage constraints caused by tidal and depth restrictions, see section 4.2.1 for additional detail

‘EPBC Act’ means the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth)

‘FHA’ means Fish Habitat Area

‘GBR’ means Great Barrier Reef

‘IDAS’ means Integrated Development Assessment System

‘landings’ means jetty and pontoon structures that facilitate direct berthing of non-trailable vessels (keel boats and >8.0m powerboats), transient vessels and/or tenders from larger vessels (where effective anchoring or mooring is available nearby)

‘land-side’ refers to infrastructure constructed above high water mark

‘LGA’ means local government area

‘MCU’ means a material change of use under the planning scheme

‘MIIP’ means the TMR works program known as the Marine Infrastructure Investment Program, with the government’s Marine Infrastructure Fund forming its capital component

‘MNES’ means matter of national environmental significance under the EPBC Act

‘NC Act’ means the *Nature Conservation Act 1992*

‘P Act’ means the *Planning Act 2016*

‘P Reg’ means the *Planning Regulation 2017*

‘near all-tide’ means that a vessel can be realistically launched into or retrieved from the waterway at the site for at least 80% of the tidal range

‘NNTT” means National Native Title Tribunal

‘part-tide’ means that a vessel can be realistically launched into or retrieved from the waterway at the site for at least 50% of the tidal range

‘registration activation rate’ means the percentage of registered vessels liable to be in use on any given good weather weekend day

‘shd’ means schedule

‘shortfall’ means the outstanding number of boat ramp lanes or landings as appropriate (assuming announced TMR projects/upgrades at December 2016 have been built) required to satisfy demand at a particular year, after adjustment for actual number and effective capacity considerations. A negative number for shortfall in a table signifies an oversupply

‘SPL’ means strategic port land

‘Study’ means this document including appendices and the state-wide summary

‘TMR’ means the Department of Transport and Main Roads

‘water-side’ refers to infrastructure constructed below high water mark

‘WHA’ means World Heritage Area

means ‘number’ when used in tables

Executive summary

This study sets out the current and future demand for publicly accessible recreational boating facilities within the Mackay Regional Council area over the next 20 years. The assessment considers facilities for vessels, such as boat ramps and floating walkways, as well as landings for deep-draught vessels. It is intended to be used to inform funding priorities from 2018-19 onwards.

Key issues for Mackay Regional Council

The primary issues raised by stakeholders around access to recreational boating facilities in the Mackay Regional Council area centred on:

- safe launching and retrieval
- crocodile attack safety
- security of vehicles
- lack of sheltered facilities for all-tide or near all-tide, all-weather access
- overcrowding.

Demand assessment

The demand assessment is based on boat registrations from within the local government area (LGA) of Mackay and surrounding LGAs. The demand assessment is analysed against existing capacity to produce an outstanding shortfall projection. Key aspects influencing demand considered in the assessment include:

- The population of Mackay Regional Council is projected to increase from 117,703 persons in 2016 to 159,564 persons in 2036, or by 1.5% per annum, which is very close to the state-wide projected five year forecast of 1.6% (Appendix C).
- Boat registrations are particularly high for boats up to 4.5 metres in length.
- Trailable and non-trailable vessel registrations within the Mackay LGA are mostly used on the water within the LGA, with some leakage/export in usage from the LGA to Whitsunday Regional Council and Isaac Regional Council areas.
- Vessel inflows from outside the LGA are likely from Whitsunday Regional Council and Isaac Regional Council areas.
- There is significant demand for recreational boating infrastructure in Mackay Regional Council area as a result of tourism.
- The registration activation rate from residents of the LGA is anticipated to be average (10%) as a result of a relatively high incidence of blue collar workers combined with the regional centre designation of Mackay.

Boat ramps

At present there are 21 boat ramp facilities in the LGA, containing 32 boat ramp lanes, however the lack of parking for car-trailer units (CTU) or limited tidal access at some locations means that the effective capacity of these ramps is 23.2 lanes. Once infrastructure planned for implementation by 2017-18 is in place (referred to as Marine Infrastructure Investment Program (MIIP) upgrades), this effective capacity does not change as floating walkways are being duplicated or replacing existing ramp lanes.

To address any shortfall between demand and current capacity, existing facilities were further assessed to identify what type of access the facility provides to the two main destinations, being either open-water or non-open-water. This then allows identification of the type of additional facilities needed to address demand.

The projected boat ramp lane shortfall for Mackay is shown in Table 1.

Table 1 – Projected boat ramp lane shortfall, Mackay Regional Council

Evaluation category*y	Existing effective capacity*	2016		2021		2026		2036	
		Demand	Shortfall	Demand	Shortfall	Demand	Shortfall	Demand	Shortfall
Open-water access	15.2	19.8	4.6	22.1	6.9	23	7.8	26.7	11.5
Non-open-water access	8	14.2	6.2	15.9	7.9	17	9	19.3	11.3
Total	**23.2**	**34**	**10.8**	**38**	**14.8**	**40**	**16.8**	**46**	**22.8**

**Refer section 4.1.2 and* Table 6 *for detailed evaluation categories*

**Existing effective capacity includes MIIP announced projects/upgrades as at December 2016*

**See Appendix B and* Table 6 *for capacity assessment*

Landings

The assessment of capacity and shortfall in landings is shown in Table 2 and Table 3.

Table 2 – Existing landing capacity, Mackay Regional Council

Evaluation category	Existing effective capacity
# of public sheltered mainland landings	0
# of public island landings – supplies available	0
# major private landings*	2
Total	**2**
Facilities not contributing to recreational capacity:	
# of public unsheltered mainland landings	0
# of public island landings – no supplies available*	1

**private landings include marinas and clubs, accessible by fee for deep-draught vessels, and by arrangement, limited access for tender dinghies (varies with private entity, some free)*

**public island landings – no supplies available include Lindeman Island*

Table 3 – Projected landing shortfall, Mackay Regional Council

Evaluation category	Existing effective capacity*	2016		2021		2026		2036	
		Demand	Shortfall	Demand	Shortfall	Demand	Shortfall	Demand	Shortfall
# of landings*	2	4	2	4	2	6	4	6	4

**# of landings consists of public sheltered mainland landings, public island landings – supplies available and major private landings*

Recommended priorities

Refer to Table 4 for the Mackay Regional Council area recommended priorities.

Recommended priorities to increase capacity and meet demand have been defined over the following time scales:

Priority 1 (P1) These sites are needed to meet existing demand.

Priority 2 (P2) Assuming that the priority 1 sites are implemented, these sites are expected to be needed to meet additional demand over the five years ending 2021.

Priority 3 (P3) Assuming that the priority 1 and 2 sites are implemented, these sites are expected to be needed to meet additional demand over the subsequent five years, that is 2021 to 2026.

Priority 4 (P4) These sites are those that will meet future demand, but are not expected to be required before 2026 in demand terms but may be brought forward for construction for other reasons.

Table 4 – Recommended priorities to increase capacity, Mackay Regional Council area

Priority	Sites
Priority 1 (as soon as possible)	Port Binnli – permanent 70 CTU parking expansion in close proximity to the existing ramp.
	New facility at Brisbane Street, Mackay – install a deep-draught accessible public pontoon.
	River Street, Mackay – widen ramp to replace lane lost during floating walkway installation, relocate the existing revetment to accommodate widened ramp and expand carpark.
	Grasstree Beach – expand ramp to 2-lanes, install pontoon and expand parking by 28 CTU spaces.
	Horseshoe Bend (Murray Creek) – expand ramp to 2-lanes with a floating walkway and increase parking by 25 CTU spaces.
	Constant Creek – expand ramp to 2-lanes with a floating walkway and increase parking by 30 CTU spaces.
	Kinchant Dam – expand ramp to 2-lanes.
	Pleystowe – formalise 1-lane ramp.
Priority 2 (over the next five years)	Laguna Quays – install pontoon.
	New facility at Riverside Drive, Cremorne – construct 4-lane ramp with floating walkway and 90 CTU spaces. Riverine training wall works are also required.
	Sarina Beach – if wave study indicates feasibility, expand ramp by 1-lane, install floating walkway and reclaim land for an additional 50 CTU spaces.

Priority	Sites
Priority 3 (over the next five to ten years)	Victor Creek Road, Seaforth – expand ramp by 2-lanes to south of existing pontoon, increase parking to 45 CTU spaces and install pontoon to act as a landing for deep draught vessels or tenders.
	New facility at Sandy Creek, Chelona – construct 1-lane ramp with informal parking.
	New facility at Belmunda Road, Belmunda – construct 1-lane ramp with informal parking.
Priority 4 (other)	New facility at East Point, Mackay – after road access issues are resolved, construct 2-lane ramp with floating walkway and CTU parking.
	Boat Ramp Road, Campwin Beach – expand ramp by 1-lane, install pontoon and increase parking.
	New facility at Alligator Creek – construct 1-lane ramp with informal parking.

Should the wave study at Sarina Beach indicate that a queuing structure is not feasible or cost effective, then consideration should be given to installation of a floating walkway at the Hay Point facility.

1. Introduction

1.1 Background

GHD was commissioned by the Department of Transport and Main Roads (TMR) to establish the current and future demand for recreational boating facilities throughout Queensland. This resulting study is the *Recreational Boating Facilities Demand Forecasting Study 2016* (Study) and supersedes the 2011 study of similar name. The study replaces the *Recreational Boating Facilities Demand Forecasting Study 2016* by incorporating the results of the 2016 census.

The Study will be used to inform planning for the development of existing and new recreational boating facilities by a variety of agencies, including TMR, the Gold Coast Waterways Authority, local government, and port and water authorities. The Study is one tool in a broader assessment process to select and prioritise sites for development. Specifically, the Study is not binding in any way on the agencies it is designed to assist. The Study establishes demand and makes informed suggestions as to how the established demand might be addressed. The 2011 study, at December 2016, has had 66% of its recommendations adopted to a greater or lesser extent. A similar recommendation take-up rate may be expected from this Study.

This LGA report is one of a series of reports for the Study comprising LGA and state-wide components. The state-wide report details the Study background and provides an overview of demand for recreational boating facilities over the next 20 years throughout the state. The state-wide report complements individual reports for each local government area (LGA). Each LGA report identifies existing capacity, current and future demand, and potential opportunities for boating infrastructure within the LGA – with appropriate adjustment for interaction with adjacent LGA's.

1.2 Context

This LGA report has been prepared with a focus on in-water recreational facilities and infrastructure comprising boat ramps, floating walkways and landings within each LGA, which are publicly accessible by registered vessels. As car parking can significantly constrain the efficient use of a facility, it has been considered in the assessment. However, facilities used more than 50% of the time for commercial or public passenger transport (e.g. ferry terminals), private facilities (such as yacht clubs and marinas), and general recreational facilities such as canoe ramps and fishing platforms are not included as part of this study.

The types of infrastructure considered in the assessment of capacity are:

- boat ramps used for the launching and retrieval of vessels
- supporting infrastructure for the boat ramp:
  - queuing facilities (floating walkways, pontoons, queuing beaches)
  - parking for car-trailer units (CTUs)
- short-term landings accessible by deep-draught or non-trailable vessels on the outer face, or their tenders (for longer term tying up) on the inner/landward face or ends.

There may be instances where a public pontoon serves multiple purposes – as a short-term landing, as a tender tying up facility, and as a queuing facility for a boat ramp.

2. Local government area overview

The key characteristics and influences on recreational boating within the Mackay Regional Council area include:

- The area is dominated by key industries of tourism, agriculture and mining.
- The population of Mackay Regional Council is projected to increase from 117,703 persons in 2016 to 159,564 persons in 2036, or by 1.5% per annum, which is very close to the state-wide projected five year forecast of 1.6% (Appendix C).
- Windy weather significantly reduces the annual number of days that are suitable for offshore boating.
- The area experiences a large tidal range, in the order of seven metres.
- There is an accepted/known shortfall in all-tide or near all-tide boat launching facilities.
- A net-free fishing zone has recently been declared over the St Helens to Cape Hillsborough area.
- The LGA is considered to be a regional centre under the remoteness measures used by the Australian Bureau of Statistics.

3. Existing facilities

3.1 Overview of existing facilities

Within the Mackay Regional Council area, existing recreational boating facilities are owned and managed by several organisations, shown in Table 5. North Queensland Bulk Ports also manage one TMR-owned facility at Half Tide Tug Harbour.

Table 5 – Recreational boating facilities within Mackay Regional Council area

Infrastructure owner	Boat ramps		Landings	
	Facilities	Lanes	Pontoons	Jetties
TMR mainland	17	26	0	0
TMR island	0	0	0	1
Mackay Regional Council	1	1	0	0
Sunwater	2	2	0	0
Laguna Quays	1	2	0	0
Private landings (marinas/clubs)	N/A	N/A	2	0
Total	**21**	**31**	**2**	**1**

A map indicating the location of existing facilities is included as Appendix A.

Appendix B contains a summary capacity assessment of these existing facilities.

Important or popular public boat ramp facilities are located at:

- Port Binnli, Mackay
- River Street, Mackay (Pioneer River)
- Tug Harbour Road, Hay Point
- Victor Creek Road, Seaforth (Victor Creek)
- Kinchant Dam.

Existing ramp facilities (including minor ones not mentioned above):

- service the main population centre close to central Mackay, Mackay northern beaches, and the Sarina area
- provide open-water access, or access to estuarine reaches of the numerous river and creek systems – some facilities provide access to both, such as River Street and Victor Creek Road.

Research referenced in the previous demand assessment study (GHD, 2011)[1] indicated that boat owners were prepared to travel up to approximately one hour to reach major or preferred marine infrastructure. In many locations, this infrastructure is represented by facilities that provide all-tide, or near all-tide, open-water access.

Between the NSW border and Port Douglas, TMR has therefore adopted a long term strategy to seek to provide access to an all-tide, sheltered facility, within a one-hour drive time where practical. Exceptions to the strategy include where all-tide, sheltered access is not feasible. In these instances, sites that provide near all-tide sheltered access are sought instead.

All-tide, open-water access is provided at the facilities at Port Binnli and Hay Point, at least one of which is within approximately a one-hour drive of main population areas.

The sole public deep-draught vessel landing within the LGA comprises a jetty on Lindeman Island. It is a destination facility to access island areas of National/Marine Park, but is primarily used by commercial vessels, with little to nil contribution to meeting recreational vessel demand.

3.2 Key issues and hotspots

The primary issues raised by stakeholders around access to recreational boating facilities in the Mackay Regional Council area are centred on safety and security, accessibility (from land and from the sea), and capacity.

3.2.1 Safety and security

Security was identified as a major issue at several of the popular ramps. The main concerns related to a lack of lighting and surveillance of car parking areas, with vehicles broken into or vandalised while the owners are out on their vessels.

The safety of ramp users at Sarina Beach has been raised in the context of seeking additional infrastructure. The ramps in this area are exposed to varying extents of wave action and cross-currents which can make launching and retrieval difficult.

The main problem arises when vessels launch in calm conditions at high tide. During the course of the day, the wind often increases and/or the tide drops, and by the time vessels return to the ramp, wave breaking on the ramp makes vessel retrieval dangerous, particularly for single-handed retrieval. The very shallow water depths limit vessels from navigating to the bottom of the ramp for retrieval. In both locations, there are no queuing facilities to secure a vessel while the tow vehicle is being returned or retrieved, although depending on the tide a rocky beach is available in calm conditions.

The ramp at Hay Point provides a reliable, sheltered alternative launching location for this and other communities in the area, and is a drive of approximately 20 minutes from Sarina Beach or 30 minutes from Mackay.

[1] GHD (2011) Recreational Boating Facilities Demand Forecasting Study. Report prepared for TMR, September.

At estuarine ramps, crocodile attack is of concern during launching and retrieval, especially where users may need to enter the water to get their vessel off or onto the trailer. Many ramps display signage alerting users to crocodile dangers and recent sightings. Floating walkways are popularly requested to partially manage this risk.

3.2.2 Accessibility

A key issue raised by stakeholders is the lack of sheltered launching/retrieval facilities that allow all-weather, all-tide or near all-tide access for all trailable boat sizes. This is especially critical for facilities that provide offshore access, and is severely affected by the large tidal range in the area. On “flat water days” (that is, when the weather conditions are fine, with light winds and low wave action), demand for launching/retrieval facilities is very high, as these days are not frequent. Estuarine areas are generally sheltered and attract greater use on windy days, but the large tidal range limits the number of facilities that can be accessed.

The lack of all-tide or near all-tide access at some facilities can constrain patronage. At locations with part-tide boat ramps, if the tides do not align with preferred usage times, ramp users will travel to other facilities where they can have a larger window of tidal access. This then puts pressure on these other facilities.

3.2.3 Facilities capacity

Overcrowding at certain facilities was raised by many stakeholders. Most of the overcrowding centred on facilities providing all-tide open-water access, with Port Binnli and Hay Point being the sites of main concern. Importantly, stakeholders identified that these facilities were not currently used to their full potential due to insufficient parking for CTUs.

4. Capacity assessment

4.1 Boat ramp capacity

The function of a boat ramp is to provide access for launching and retrieval of trailable vessels into a waterway. Alternative launching facilities such as boat stackers are outside scope for this Study.

4.1.1 Boat ramp capacity evaluation

For the purposes of this Study, boat ramp capacity is measured as “effective” boat ramp lanes. An effective boat ramp is quantitatively characterised as being:

- capable of accommodating 40 launch / retrievals per lane per day (in accordance with Australian Standard AS 3962[2] and Economic Associates (2011)[3])
- supported by landside infrastructure such as queuing and manoeuvring areas
- supported by an appropriate number of CTU parking spaces.

[2] AS 3962-2001 Guidelines for the design of marinas
[3] Economic Associates (2011) Recreational Boating Facilities Demand Forecasting Study: Demand Analysis

The number of launch / retrievals per lane per day has been selected based on the relevant Australian Standard and Economic Associates (2011)[3]. This latter report summarised research undertaken by SKM (1988)[4] and Rose et. al (2009)[5], and stated that a rate of 30 boats per lane per day is considered to provide unhampered overall amenity, whereas a rate of 50 boats per lane per day represents congested operations; thus a midpoint of 40 launches / retrieves per day was selected to represent a balanced scenario.

TMR (2016)[6] provides guidance on its standard/reference number of CTU spaces to match boat ramp lanes:

- 90 CTUs for four-lane ramps
- 70 CTUs for three-lane ramps
- 45 CTUs for two-lane ramps
- 15 CTUs for one-lane ramps with sealed road access
- 10 CTUs for one-lane ramps with all-weather, unsealed road access.

The above figures indicate an average relationship of 22.5 CTU spaces per "effective" lane. The TMR reference standards differ from the number of CTU spaces recommended for public boat launching ramps by AS 3962. That standard requires between 20 and 60 CTU spaces per ramp lane, depending on whether the ramp is in an urban or rural area, whether it has a queuing structure, and whether it has separate rigging and de-rigging areas. For local reasons, TMR may vary from these reference figures in particular cases.

The actual capacity, or "effectiveness" of a boat ramp is unique for each ramp, and is affected by:

- a reduction in the amount of time a ramp is available for use due to tidal variability, the seaward extent of ramp infrastructure, and navigable depths – at each ramp being measured as the % availability of the tidal range that a vessel can be realistically launched or retrieved – with ramps classified as all-tide (100%), near all-tide (>80%), and part-tide (50%) for access – and the reduction in availability occurring either:
  - at the ramp itself, and/or
  - in access channels connecting the ramp to the sea/open water (such as at a river mouth or other channel depth constraint)
- the exposure of the ramp to regular, and sometimes major, wave action – these facilities tending to be beach ramps that are generally only suitable for short excursions in small boats in good weather and with suitable tides – accordingly these ramps are considered to be available only 50% of the time
- factors impacting efficient vessel launching and retrieval cycles, which include:
  - provision of queuing facilities such as pontoons, floating walkways or beaches – with such queuing facilities increasing the capacity of a boat ramp by providing a place for a vessel to be secured during vehicle parking or retrieval without blocking a ramp lane, leading to greater throughput
  - constrained or difficult manoeuvring of vehicles and trailers onto the ramp
  - long distances between the boat ramp and CTU parking spaces

[4] SKM (1988) Public Boat Ramps Central Queensland Strategic Plan, Volume One, demand forecasting – Noosa to Yeppoon
[5] Rose, T., Powell R., & Yu J. (2009) Identification of the Present and Future Recreational Boating Infrastructure in Redland City – A 10 year Infrastructure Plan, Griffith University
[6] TMR (2016) Marine Facilities and Infrastructure Plan

- the physical extent of infrastructure provided, such as:
  - the width and number of ramp lanes
  - the number of CTU parking spaces within the facility
  - provision for overflow parking during busy periods.

To calculate effective lanes at a boat ramp, the following adjustments have been applied to water-side infrastructure:

- all-tide – no change (that is, multiplication factor of 1.0)
- near all-tide – available 80% of the time (that is, multiplication factor of 0.8)
- part-tide – available 50% of the time (that is, multiplication factor of 0.5)
- beach ramp – available 50% of the time (that is, multiplication factor of 0.5)
- access to a queuing facility in the form of a floating walkway – increase efficiency by 50% (that is, multiplication factor of 1.5)
- access to a queuing facility such as a gangway-access pontoon – increase efficiency by 20% (that is, multiplication factor of 1.2).

Access to a beach, while convenient, is not suitable for all vessel sizes or preferred by some vessel owners, and therefore has not been considered to improve the capacity of a boat ramp.

As an example, the water-side effective lanes for a near all-tide, two-lane boat ramp with a floating walkway will be calculated as:

2	x	0.8	x	1.5	=	2.4
lanes		tidal availability		queuing structure		effective lanes

To calculate the land-side constraint on effective lanes, the following CTU groupings have been applied:

- 1 to 9 CTU – 0.5 effective lanes
- 10 to 20 CTU – 1 effective lane
- 21 to 29 CTU – 1.5 effective lanes
- 30 to 39 CTU – 1.8 effective lanes
- 40 to 54 CTU – 2 effective lanes
- 55 to 64 CTU – 2.5 effective lanes
- 65 to 75 CTU – 3 effective lanes
- 76 to 83 CTU – 3.5 effective lanes
- 84 to 97 CTU – 4 effective lanes
- 98 to 105 CTU – 4.5 effective lanes
- 106 to 117 CTU – 5 effective lanes
- 118 to 127 CTU – 5.5 effective lanes
- 128 to 140 CTU – 6 effective lanes
- 141 to 149 CTU – 6.5 effective lanes
- 150 to 157 CTU – 7 effective lanes.

Unmarked or unformed parking areas are denoted accordingly. The number of CTU parking bays may also be the limiting factor on effective capacity, owing to the number of bays provided being less than the TMR reference standard.

The calculation is illustrated further in Appendix B, which details the actual and effective lanes for each facility.

The effective capacity of a facility is therefore limited by the constraining or "bottlenecking" element, and to realise full capacity a facility must balance the land-side and water-side capacities. The capacity assessment in Appendix B also identifies the limiting capacity constraint for each facility.

4.1.2 Boat ramp classification

As previously discussed, each boat ramp is subject to a unique set of constraints and opportunities, particularly in relation to tidal accessibility. To understand how well existing boat ramp facilities meet current demand, consideration has also been given to the recreational destination(s) accessed by each facility. Where available, this has been informed by local knowledge on actual usage.

Regardless of the tidal range available at the ramp itself, boat ramps typically seek to cater to one or more of the following destinations:

- access to the sea for fishing, diving, islands, jet skiing, and general recreation
- access to creeks and estuaries for fishing, crabbing, skiing and general recreation
- access to fresh water for fishing, skiing, jet skiing, and general recreation.

However, there are some practical limitations on the usage of a ramp for these purposes. These include:

- vessel size, as:
  - Small vessels are unsuitable for use in open and exposed waters under most conditions, although they may be taken into nearshore waters in calm conditions or for short journeys. These vessels are most suited to use in protected waterways such as creeks and estuaries.
  - Large vessels suited to offshore use may be physically constrained in very narrow or shallow waterways, such as the upstream reaches of creeks or estuaries.
- travel time to destination, as:
  - Although navigable access from a boat ramp to open water may be possible, it may not be practical due to the distance travelled by water and/or any speed restrictions that may be in place for the waterway. Most people will seek to launch at the facility that takes the least time to reach their destination. This is particularly the case for offshore destinations where larger volumes of fuel must be paid for and carried to allow for the journey.

Discussions with local government stakeholders throughout the state indicated that vessels longer than 4.5m were generally used to access offshore areas, with smaller vessels tending to be used for creek and estuary access. There will be circumstances where smaller vessels will be used to travel offshore and larger vessels will stay in protected waters.

At facilities where open-water access becomes difficult, the Study assumes that the facility will be more frequently used for accessing local creeks, estuaries, and freshwater areas. Facilities have therefore been classified into one of the following categories to reflect the primary level of accessibility between the ramp and open water:

- open-water access – all-tide access
- depth-limited – access to open-water possible but navigation limited at certain stages of the tide by water depth, for example, crossing a tidal bar, or sand shoals in an estuary
- distance-limited – access to open-water possible but limited by longer travel times between the ramp and open-water, for example due to long distances, or speed restrictions in the waterway – with, in some instances, depth also being a limitation but distance being considered as the main constraint
- infrastructure-limited – access limited by configuration or size or nature of the infrastructure, for example, a low bridge preventing navigation
- beach ramps
- no open-water access – access to open-water is not possible or practical, for example, a facility in a dam, or on the upstream side of a weir, barrage, or waterfall.

4.1.3 Existing capacity

The existing boat ramp facilities have been assessed individually to quantify their "effective" lane capacity. This assessment is presented in Appendix B and summarised in Table 6.

TMR's Marine Infrastructure Investment Program (MIIP) – at December 2016 – sets out the infrastructure planned and funded for implementation until the end of the 2017-18 financial year, and includes the government's Marine Infrastructure Fund capital projects. Specific projects scheduled for implementation in the Mackay Regional Council area under the MIIP that seek to increase the capacity of marine infrastructure comprise:

- add a second floating walkway to the Port Binnli ramp
- add a floating walkway to the River Street (Pioneer River) ramp and do a major upgrade/rebuild of the ramp itself, which is in poor condition.

The implementation of these upgrades informs the "effective" capacity in Appendix B. The summary in Table 6 shows (in brackets) the modified capacity following implementation of these projects.

Key observations drawn from this analysis include:

- There is a reasonable balance in the Mackay LGA between the number of facilities that provide access to open-water and those that provide access into estuaries or river/creek systems.
- There are three fresh water facilities.
- Capacity at many facilities is constrained by the water-side infrastructure, largely because all-tide access is not provided due to the large tidal range in the area.
- There are 32 actual lanes but only 23.2 effective lanes at present, reflecting limitations imposed by tidal restrictions and the lack of adequate parking. This is most evident for facilities that provide depth-limited open-water access, where there are currently seven actual lanes but only 3.5 effective lanes.
- The MIIP (as at December 2016) provides no additional capacity in terms of effective lanes as floating walkways are being duplicated or replacing existing ramp lanes.

Table 6 – Summary of existing/planned* boat ramp effective capacity by access type, Mackay Regional Council

Facility accessibility and tidal availability at the ramp	# of facilities	# facilities limited by		Actual # of lanes	Effective lanes
		Water-side infrastructure	Land-side infrastructure		
Open-water access					
All-tide	2 (2)	0 (0)	2 (2)	6 (6)	6 (6)
Near all-tide	6 (6)	3 (3)	3 (3)	12 (12)	8.7 (8.7)
Part-tide	2	2	0	2	1
Subtotal	**10 (10)**	**5 (5)**	**5 (5)**	**20 (20)**	**15.7 (15.7)**
Depth-limited open-water access					
All-tide	0	0	0	0	0
Near all-tide	0	0	0	0	0
Part-tide	6	6	0	7	3.5
Subtotal	**6**	**6**	**0**	**7**	**3.5**
Distance-limited open-water access					
All-tide	0	0	0	0	0
Near all-tide	0	0	0	0	0
Part-tide	0	0	0	0	0
Subtotal	**0**	**0**	**0**	**0**	**0**
Infrastructure-limited open-water access	**0**	**0**	**0**	**0**	**0**
Beach ramps	**2**	**2**	**0**	**2**	**1**
No open-water access	**3**	**3**	**0**	**3**	**3**
Total	**21 (21)**	**16 (16)**	**5 (5)**	**32 (32)**	**23.2 (23.2)**

**Numbers in brackets include MIIP announced projects/upgrades as at December 2016*

4.2 Landing capacity for deep-draught vessels

The function of most landings is to provide short-term shore access for deep-draught vessels to facilitate the transfer of passengers, provisions, or to make short excursions to the shore via tender dinghy. Landings may be located on the coast or in navigable river systems within the LGA, but are of little use unless sheltered from on-shore winds and wave action.

For this Study, landings include jetty and pontoon structures that facilitate direct berthing of non-trailable vessels (keel boats and >8.0m powerboats), transient vessels, and/or tenders from larger vessels (where effective anchoring, berthing, or mooring is available nearby).

4.2.1 Capacity evaluation

The measurement of the recreational capacity of a landing is complex, as it is affected by:

- exposure of the landing to wind and wave conditions
- size and condition of the landing
- tidal availability
- the length of stay permitted
- enforcement practices
- competition from non-recreational boating users (such as authorised commercial users).

To accommodate these factors, landing capacity has been considered in the context of each landing's:

- contribution to a network of public landings within the LGA, and within a day's sail of a landing outside the LGA
- proximity to existing private/commercial recreational boat landings that accommodate visitors (such as those provided by yacht clubs)
- ability to service key destinations, such as access to basic provisions, key population areas or recreational destinations
- proximity to existing anchorage or mooring areas
- anecdotal usage.

4.2.2 Existing capacity – deep-draught vessel landings

Within the Mackay Regional Council area, there is one public landing that can be accessed by larger and deeper draught vessels for short-term stays (a couple of hours or less), as detailed in section 3.1.

Key observations indicate that the jetty on Lindeman Island mainly provides commercial vessel access to National Park areas and accommodation. The contribution to recreational capacity is therefore considered to be negligible.

Although outside the scope of this study, key privately owned modern facilities within the LGA that also actively contribute to landing capacity include:

- Mackay Marina, in the Mackay inner harbour, adjacent to Port Binnli, with basic provisions available nearby but access to public transport and several kilometres to supermarkets and other shops.
- Laguna Quays, close to the border with Whitsunday Regional Council, with many kilometres to the nearest shops until the associated land-side facilities are fully reopened.

The effective capacity of landings servicing the Mackay LGA is summarised in Table 7.

Table 7 – Existing landing capacity, Mackay Regional Council

Evaluation category	Existing effective capacity
# of public sheltered mainland landings	0
# of public island landings – supplies available	0
# major private landings	2
Total	**2**
Facilities not contributing to recreational capacity:	
# of public unsheltered mainland landings	0
# of public island landings – no supplies available	1

5. Demand assessment

The assessment of demand for recreational boating has been evaluated in terms of facilities for launching and retrieval of vessels (that is, boat ramps), and landings for short-term stays (generally less than a couple of hours). The demand for:

- boat ramps is driven by trailable vessels that can access the ramp

- landing facilities is focussed on providing a network of short term landings that service key land-side destinations (such as shops) of relevance or attraction to the boating community, with a particular focus on larger (non-trailable) vessels.

5.1 Boat ramp demand

The demand for boat ramps has been quantitatively evaluated using vessel registrations as the key indicator. The vessel registrations have been converted to an effective lane demand based on a typical boat ramp lane being able to accommodate 40 launch/retrieval manoeuvres per day.

The following section details the assessment of vessel registrations taking into consideration where vessels are likely to be used relative to where they are registered, and the demographics of the local area.

5.1.1 Registration distribution

People using the boat ramp facilities at a particular location are attracted to that facility by several factors, including:

- proximity to home
- road access (quality and distance)
- proximity to vessel destination (reef, open water, islands, creeks, estuary, fishing grounds, skiing areas, and so on)
- quality of the experience and ease of use (launching/retrieval, parking, security, complementary facilities, and so on).

This means that at many locations and at various times, ramp users will travel out of the LGA in which their vessel is registered to use boat ramp facilities in a different LGA. In some locations, demand is driven by ramp users from outside of the LGA, particularly if the ramp is in reasonable proximity to desirable boating destinations such as fishing grounds or popular islands.

Additional detail on the determination of the registration distribution is provided in Appendix C. Note that vessel registrations are less in inland LGAs compared to adjacent coastal LGAs.

A summary of the relative geographic contribution of demand to boat ramp facilities located in the Mackay Regional Council area is shown in Table 8 below for 2016 registration data.

5.1.2 Registration activation

TMR's approach to the provision of infrastructure for recreational boating is to aim to satisfy average demand rather than peak demand (TMR, 2016)[7].

TMR recognises three levels of demand:

- off-peak demand – to be met in almost all circumstances
- average demand – taken to be demand for a facility on weekends (and for certain regional locations other busy periods)
- peak demand – being demand for a facility at peak holiday periods and for special events such as major fishing competitions.

[7] TMR (2016) Marine Facilities and Infrastructure Plan

The qualifier on certain regions and circumstances for average demand recognises that in some areas high numbers of shift workers tend to distribute the demand more evenly across each week.

Provision is not made by TMR for peak boating periods such as Christmas, Easter, school holidays, and long weekends. For facilities provided by them, councils and port/water authority managers may choose to cater for higher than average demand.

Research referenced in the previous demand assessment study (GHD, 2011)[8] indicated that average to high demand was represented by 8% to 14% of registered vessels seeking to use a boat ramp on a typical weekend. This percentage has been termed as "registration activation" for the purposes of this Study.

To better represent the demand within each local government area, refinement of the registration activation percentage considered the following factors as influencing boating popularity over other recreational opportunities:

- incidence of blue collar employment (based on Census data)
- average age of residents (based on Census data)
- remoteness classification by local government area
- whether the LGA is coastal.

Detail on the process for local refinement of registration activation is provided in Appendix C. The adopted parameters for this assessment are summarised in Table 8.

Key observations relevant to the registration activation include a high incidence of blue collar workers compared to the state average outside the Mackay LGA, as well as the status of Mackay as a regional centre, with ready access to alternative recreational opportunities.

Table 8 – Contribution to demand for boat ramp facilities, Mackay Regional Council

Contributing LGA	% of contributing LGA using Mackay facilities*	# of registered vessels from contributing LGA using Mackay facilities	% registration activation	Contribution comment
Mackay	90%	12,120	10%	Resident population Blue collar, regional centre, coastal
Isaac	5%	100	12%	Visitation from adjacent coastal LGA Blue collar, remote, coastal
Whitsunday	5%	265	14%	Visitation from adjacent coastal LGA Blue collar, older, remote, coastal
Interstate	5%	38	-	Interstate

**See Economic Associates Appendix C for percentage estimates*

[8] GHD (2011) Recreational Boating Facilities Demand Forecasting Study. Report prepared for TMR, September.

Key observations regarding boat ramp demand relevant to the contributions from the various sources are that:

- Population areas within the Mackay LGA are largely constrained to the coast by the Great Dividing Range. Most (90%) Mackay residents are considered to use facilities within the LGA. The remaining 10% are considered to use facilities in Isaac or Whitsunday LGAs.
- Although there are boat ramp facilities near the boundaries of Isaac and Whitsunday LGAs the population in these areas is low and sharing of demand between Mackay and these adjoining LGAs is expected to be relatively small.

In addition to usage of the Mackay facilities by residents from Mackay and adjacent LGAs, the Mackay area is considered to record an uplift in boating infrastructure demand as a result of tourism activity. While much increased boating tourism will be commercial, a substantial increase will be incurred by residents taking visiting friends and relatives out on their boats.

Economic Associates (Appendix C) assumed that Mackay would experience a 10% uplift in boat ramp lane demand as a result of tourism activity throughout the year.

5.1.3 Demand classifications

The demand by registered vessels has been sub-classified to better align with differing types of destinations, with:

- Smaller vessels (less than 4.5m in length) are considered to be generally used to access protected waters such as creeks and estuaries, and to venture into nearshore waters during good weather conditions
- Larger vessels (between 4.5 and 8m in length) are considered to be generally used to access offshore waters, but seek protected waters during poor weather conditions. Depending on the location, some larger vessels are unable to use more tidally restricted facilities in creeks and estuaries.

5.1.4 Boat ramp lane demand

Applying the registration distribution and activation factors to vessel registration data results in an effective quantitative demand for boat ramp lanes within the catchment. This is summarised in Table 9, and shown in terms of small and large vessel demand. Assumptions used in the projections for future growth in demand are provided in Appendix C (Economic Associates report).

Table 9 – Boat ramp lane demand projections, Mackay Regional Council

Vessel length	Boat ramp lanes				
	2016	2021	2026	2031	2036
0 to 4.5m	25	28	29	32	34
4.5 to 8m	9	10	10	11	12
Total	**34**	**38**	**39**	**43**	**46**

Key observations relevant to the catchment demand include:

- The majority of demand on facilities originates from Mackay Regional Council residents.
- Demand from small boats is nearly three times that of larger boats.
- Growth is forecast to be relatively consistent over the next 20 years.

5.2 Deep-draught vessel landing demand

5.2.1 Local usage and network

The lack of public landings in Mackay means that the cruising public is solely reliant on private facilities for landings in the Mackay LGA. This is further exacerbated by the similar lack of any landings in Isaac LGA, meaning that the two nearest public landings from Mackay are Rosslyn Bay Boat Harbour, 175 nautical miles to the south, and Abell Point Marina, Airlie Beach, 75 nautical miles to the north.

Given Mackay's status as a tourist destination in its own right, visiting vessels tend to stay for more than one night, and therefore will need to seek an overnight protected berth or mooring. Commercial marina facilities cater to this demand, providing landing facilities for their members and for casual visitors. Moorings or berths are generally available at the private facilities at Mackay Marina or Laguna Quays.

Community stakeholders have indicated a desire for a short term public landing close to the Mackay central business district in the Pioneer River. Demand for a publicly accessible landing servicing the northern areas of Mackay is focussed around the Victor Creek anchorage, where tenders are routinely secured to the floating walkway at the boat ramp.

The Lindeman Island jetty is used more for day use commercial access rather than forming part of the travelling recreational network. This facility is not considered to be overloaded by stakeholders.

5.2.2 Landing demand

The projected demand for deep-draught vessel landings within the Mackay Regional Council area was assessed by Economic Associates as being driven by the size of the non-trailable fleet. A key difficulty with this assessment is understanding how long visits lasts. It was assumed that demand comprises 5% of the active non-trailable fleet seeking to access a landing. The assessment is shown in Table 10.

Table 10 – Landing demand projections, Mackay Regional Council

Evaluation category	Landings				
	2016	2021	2026	2031	2036
# of landings	4	4	6	6	6

6. Development needs and opportunities

The need for additional recreational boating infrastructure within the Mackay Regional Council area has been identified by comparing the existing capacity within the area with the expected demand.

6.1 Evaluation of needs

6.1.1 Development priorities

The priorities for development are linked to need and funding cycles, as follows:

Priority 1 (P1) These sites are needed to meet existing demand.

Priority 2 (P2) Assuming that the priority 1 sites are implemented, these sites are expected to be needed to meet additional demand over the five years ending 2021.

Priority 3 (P3) Assuming that the priority 1 and 2 sites are implemented, these sites are expected to be needed to meet additional demand over the subsequent five years, that is 2021 to 2026.

Priority 4 (P4) These sites are those that will meet future demand, but are not expected to be required before 2026 in demand terms but may be brought forward for construction for other reasons.

6.1.2 Quantification of shortfall – boat ramp lanes

The overall demand for boat ramp lanes compared to the effective capacity provided by existing facilities is summarised in Table 11.

Table 11 – Projected boat ramp lane shortfall, Mackay Regional Council

Evaluation category	Existing effective capacity*	2016		2021		2026		2036	
		Demand	Shortfall	Demand	Shortfall	Demand	Shortfall	Demand	Shortfall
All vessels, all facilities	23.2	34	10.8	38	14.8	39	15.8	46	22.8

**Existing effective capacity includes MIIP announced projects/upgrades as at December 2016*

However, the provision of additional boat ramp lanes needs to cater to the type of demand to appropriately address that demand. This realistically translates to:

- large (that is 4.5 to 8m) vessels seeking access to open-water
- small (that is <4.5m) vessels not seeking access to open-water.

As there will be some small vessels seeking access to open-water, and some larger vessels not seeking access to open-water, an envelope of projected need has been developed. The best estimate represents the average need within the envelope.

This analysis is shown in Table 12 for facilities classified as providing unhindered open-water access from all-tide or near all-tide facilities, with the envelope of projected need in the Mackay LGA based on the following:

upper bound = 100% larger vessels + 60% smaller vessels

lower bound = 90% larger vessels + 30% smaller vessels

The analysis was also conducted for facilities classified as not providing open-water access, or where water depth or the on-water travel time meant that the facility could not reliably or realistically provide access to open-water (see Table 13). In this analysis, the envelope of projected need in the Mackay LGA was based on the following:

upper bound = 70% smaller vessels + 10% larger vessels

lower bound = 40% smaller vessels + 0% larger vessels

Table 12 – Projected boat ramp lane shortfall, open-water access facilities, Mackay Regional Council

Evaluation category	Existing effective capacity *	2016		2021		2026		2036	
		Demand *	Shortfall	Demand	Need	Demand	Shortfall	Demand	Shortfall
Best estimate	**15.2**	**19.8**	**4.6**	**22.1**	**6.9**	**22.6**	**7.4**	**26.7**	**11.5**
Upper bound	15.2	24	8.8	26.8	11.6	27.4	12.2	32.4	17.2
Lower bound	15.2	15.6	0.4	17.4	2.2	17.7	2.5	21	5.8

**Existing effective capacity includes MIIP announced projects/upgrades as at December 2016*

**Example of demand calculation: Upper bound 2016 – 100% of larger vessels (Table 9) + 60% of smaller vessels (Table 9) = 9 + 15 = 24*

Table 13 – Projected boat ramp lane shortfall, non-open-water access facilities, Mackay Regional Council

Evaluation category	Existing effective capacity*	2016		2021		2026		2036	
		Demand	Shortfall	Demand	Shortfall	Demand	Shortfall	Demand	Shortfall
Best estimate	**8**	**14.2**	**6.2**	**15.9**	**7.9**	**16.4**	**8.4**	**19.3**	**11.3**
Upper bound	8	18.4	10.4	20.6	12.6	21.3	13.3	25	17
Lower bound	8	10	2	11.2	3.2	11.6	3.6	13.6	5.6

**Existing effective capacity includes MIIP announced projects/upgrades as at December 2016*

There will be some facilities that have been calculated as a “non-open-water access” facility that can, under some circumstances, provide open-water access. However, for the majority of users, access into the local waterway is the primary destination. This also applies to “open-water access” facilities in waterways, where some users will travel upstream into the waterway rather than going offshore.

Given that the majority of demand is driven by Mackay Regional Council residents, the location of additional or upgraded facilities should be targeted to service the main population centres of:

- central Mackay
- Mackay northern beaches
- Sarina and associated coastal communities.

Regional areas and smaller communities to the west of Mackay are currently serviced by several fresh water facilities.

6.1.3 Quantification of shortfall – deep-draught vessel landings

The assessment of shortfall in landings is shown in Table 14. This assessment indicates that at present there is a shortfall in public deep-draught landings. In conjunction with the supplementary capacity provided by commercial or club landings, two additional public landings are required to meet current demand with a further 2 required in the future.

Table 14 – Projected landing shortfall, Mackay Regional Council

Evaluation category	Existing effective capacity	2016		2021		2026		2036	
		Demand	Shortfall	Demand	Shortfall	Demand	Shortfall	Demand	Shortfall
# of landings*	2	4	2	4	2	6	4	6	4

**# of landings consists of public sheltered mainland landings, public island landings – supplies available and major private landings*

6.2 Identified stakeholder opportunities

Table 15 summarises the key facilities and sites identified by stakeholders during consultation activities as requiring consideration.

Table 15 – Stakeholder identified opportunities to increase capacity, Mackay Regional Council

Facility	Stakeholder comments	Study comments
Port Binnli	Very popular, well-used facility. Excellent open-water access. Parking is limited at facility. Closer overflow parking is desirable. People deciding not to go out on busy days.	The existing temporary overflow parking area is approximately 500m south of the facility and as such is unpopular and only used when there is no alternative. Permanent 70 CTU parking expansion in close proximity to the existing ramp is recommended.
Tug Harbour Road, Hay Point	Popular, well-used facility. Excellent open-water access. Parking is limited. Queuing structure desirable	Expansion of this facility is constrained by port development. Long-term, relocation of this facility out of the port area is desired, however a suitable alternative site has not been located. A queuing structure to improve the efficient and safe use of this ramp would need to be situated to avoid conflict with port activities. Expansion of facility not currently recommended, but a floating walkway should be considered at this site pending the outcome of wave study at Sarina Beach.

Facility	Stakeholder comments	Study comments
River Street, Mackay	Popular, well-used facility. Good open-water access. Strong currents. Parking is limited. Parking expansion at the ramp is impacted by the Mackay levee. Queuing facility desirable.	A floating walkway is planned in the current MIIP to replace one of the existing ramp lanes. Further ramp expansion will require rebuilding of part of the river training structures. Expansion of the ramp to 3-lanes with a floating walkway and a parking expansion on the southern side of the levee is recommended.
Victor Creek Road, Seaforth	Popular, well-used facility. Good open-water access. May see demand increase due to Net Free Zone. Parking is limited. Parking expansion desirable.	Site attracts usage from trailable and non-trailable vessels. Good access to reef and island destinations for nearly all of the tide. Expansion of ramp by 2-lanes to south of existing pontoon, increase of parking by 45 CTU spaces and installation of a pontoon to act as a landing for deep draught vessels or tenders is recommended.
Sarina Beach ramps	Popular, well-used facilities. Fair open-water access. Parking is limited. Queuing structure desirable.	Two ramps at this location. The western (Perpetua Point) ramp is located within Sarina Inlet and is more sheltered from wave action than the eastern ramp. The exposure of the eastern ramp effectively renders it a beach ramp, with waves breaking on the ramp severely affecting usage. A feasibility assessment for a floating walkway at the western site is underway. The all-tide facility at Hay Point is approximately a 20 minute drive away from Sarina Beach. Expansion of ramp by 1-lane, installation of floating walkway and reclamation of land for an additional 50 CTU spaces is recommended if supported by cost-benefit assessment for wave exposure.
Horseshoe Bend, Murray Creek	Estuarine access. May see demand increase due to Net Free Zone. Options for facility expansion.	Expansion of ramp to 2-lanes with a floating walkway and increasing parking by 25 CTU spaces is recommended.

Facility	Stakeholder comments	Study comments
Riverside Drive, Mackay	Potential location for near all-tide, open-water access facility. Strong currents. Additional facilities in the Pioneer River are desirable. Additional facilities providing open-water access are desirable.	4-lane ramp with a floating walkway and 90 CTU spaces is recommended. Riverine training wall works are also required.

7. Development priorities

7.1 Methodology for selecting priorities

7.1.1 Boat ramp facilities

The selection of recommended works and their priority level has been considered on several levels. The first level of consideration for increasing boat ramp capacity is founded on two main criteria:

- type of access required – open-water or non-open-water
- preference for expansion of existing facilities if suitably located.

Expansion of existing facilities is preferred over the establishment of new facilities in locations where travel times for most users to the existing facilities are not onerous, as road infrastructure for access is already in place and the foreshore is currently allocated to the purpose.

TMR's Marine Facilities and Infrastructure Plan (2016)[9] also guides the prioritisation of boating facilities. This plan states that:

> *"The department favours proposals for boat launching and landing facilities that give access to the open sea at all tides.*
>
> *Priority will be given to the provision of sheltered all-tide or near all-tide launching facilities giving access to the open sea on an all-tide or near all-tide basis.*
>
> *Part-tide facilities (for launching or access) may be provided where there is demand, and dredged access is not feasible. For instance, beach access or open beach ramps may be provided where there is sufficient demand and no suitable nearby sheltered waterway." (Section 3.1.1 – Coastal locations – guideline).*
>
> *"Access channels are not normally provided to open beach boat ramps. Beach access and open beach boat ramps are regarded as part-tide facilities." (Section 6.8 – Dredging of access channels to beach ramps – guideline).*

The process used within each LGA identified opportunities to meet the need for ramp lanes for each type of access (open-water/non-open-water) at each of the priority time steps (2016, 2021, 2026 and 2036), is set out in the flowchart in Figure 1. Once the forecast shortfall for ramp lanes for a priority level has been met, further consideration of facilities falls to the next priority level until all forecast shortfall is met.

[9] TMR (2016) Marine Facilities and Infrastructure Plan

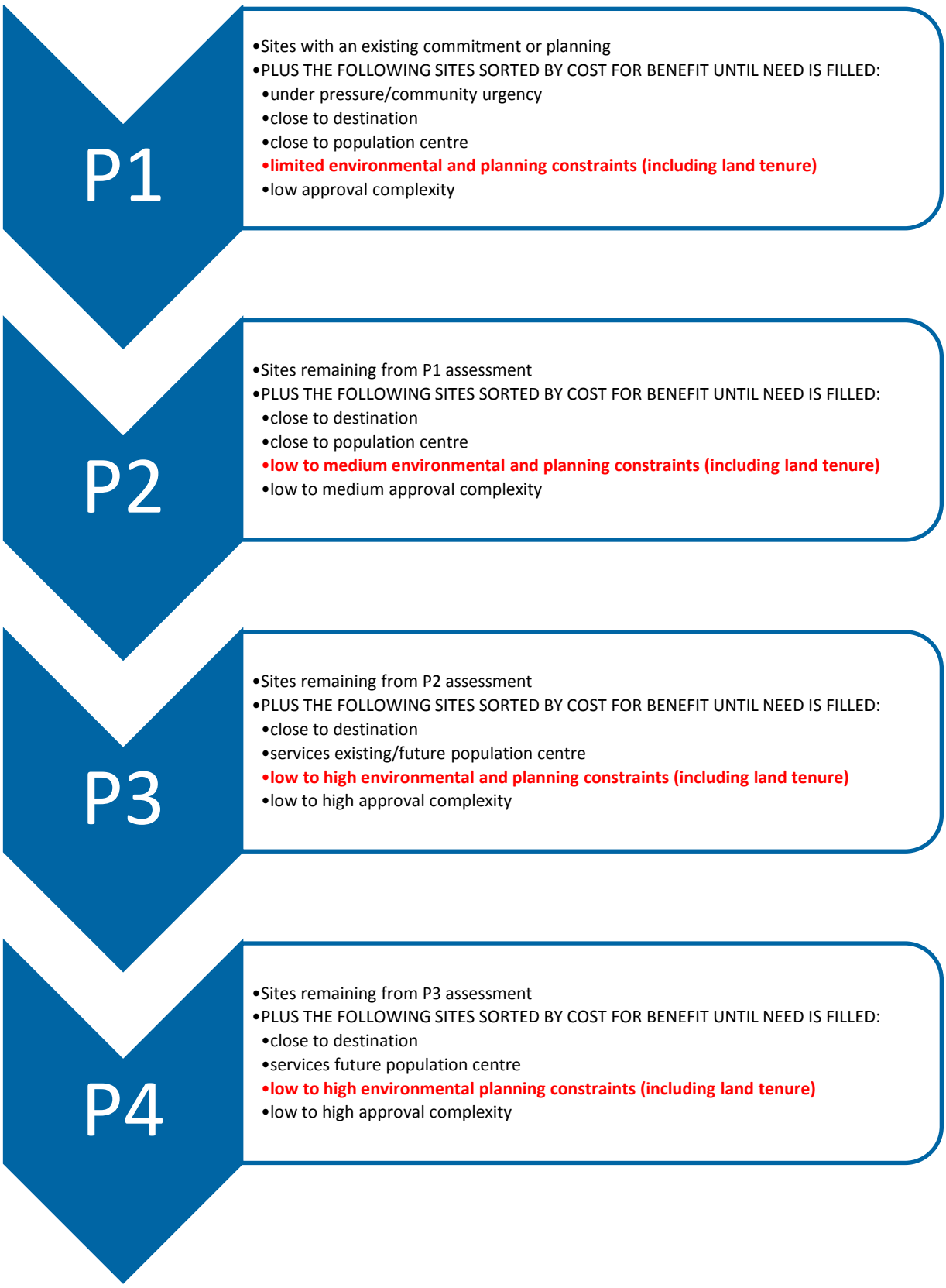

Figure 1 – Priority selection methodology

7.1.2 Deep-draught vessel landings

The criteria for recommended works and priorities for landings comprises:

- the geographical spread of existing facilities
- unserviced destinations and popular anchorages
- access to water of sufficient depth
- access to landside services (shops or transportation) for mainland locations.

In some instances, deep water is not available and so provision for access by tenders or at higher tides is made.

In most instances where demand for additional landings is identified, there are very few locations that satisfy all needs. The prioritisation for these facilities is based on stakeholder perceptions of urgency. From a stakeholder perspective, the demand for landings is all current (that is, now). However, the recommendations have matched the timing of new landings to the demand forecast.

7.2 Recommended priorities

Table 16 – Recommended priorities to increase capacity, Mackay Regional Council area

Priority	Sites
Priority 1 (as soon as possible)	Port Binnli – permanent 70 CTU parking expansion in close proximity to the existing ramp.
	New facility at Brisbane Street, Mackay – install a deep-draught accessible public pontoon.
	River Street, Mackay – widen ramp to replace lane lost during floating walkway installation, relocate the existing revetment to accommodate widened ramp and expand carpark.
	Grasstree Beach – expand ramp to 2-lanes, install pontoon (if feasible) and expand parking by 28 CTU spaces.
	Horseshoe Bend (Murray Creek) – expand ramp to 2-lanes with a floating walkway and increase parking by 25 CTU spaces.
	Constant Creek – expand ramp to 2-lanes with a floating walkway and increase parking by 30 CTU spaces.
	Kinchant Dam – expand ramp to 2-lanes.
	Pleystowe – formalise 1-lane ramp.
Priority 2 (over the next five years)	Laguna Quays – install pontoon.
	New facility at Riverside Drive, Cremorne – construct 4-lane ramp with floating walkway and 90 CTU spaces. Riverine training wall works are also required.
	Sarina Beach – if wave study indicates feasibility, expand ramp by 1-lane, install floating walkway and reclaim land for an additional 50 CTU spaces.

Priority	Sites
Priority 3 (over the next five to ten years)	Victor Creek Road, Seaforth – expand ramp by 2-lanes to south of existing pontoon, increase parking to 45 CTU spaces and install pontoon to act as a landing for deep draught vessels or tenders.
	New facility at Sandy Creek, Chelona – construct 1-lane ramp with informal parking.
	New facility at Belmunda Road, Belmunda – construct 1-lane ramp with informal parking.
Priority 4 (other)	New facility at East Point, Mackay – after road access issues are resolved, construct 2-lane ramp with floating walkway and CTU parking.
	Boat Ramp Road, Campwin Beach – expand ramp by 1-lane, install pontoon and increase parking.
	New facility at Alligator Creek – construct 1-lane ramp with informal parking.

A proposed expansion of berths in the Mackay Marina is anticipated to provide additional landings at some point in the future. The increase in capacity provided by this commercial development is considered to satisfy demand for an additional landing by 2036.

Should the wave study at Sarina Beach indicate that a queuing structure is not feasible or cost effective, then consideration should be given to installation of a floating walkway at the Hay Point facility.

7.3 Capacity evaluation incorporating development priorities

The effective lane capacity has been reassessed to incorporate the delivery of the recommended development priorities as shown in Table 17, and described in detail in the following sections. The increase in effective lanes gained by each recommendation is shown in the relevant table for that recommendation.

Note that some of the demand for non-open-water access facilities is met by open-water access facilities such as those at Victor Creek and River Street, Mackay.

Table 17 – Effective lane and landing capacity after delivery of recommended priorities, Mackay Regional Council

Evaluation category	Existing effective capacity*	2016		2021		2026		2036	
		Demand	Post-delivery effective capacity *	Demand	Post-delivery effective capacity	Demand	Post-delivery effective capacity	Demand	Post-delivery effective capacity
Open-water access	15.2	19.8	19.4	22.1	21.7	22.5	23.7	26.7	26.9
Non-open-water access	8	14.2	12	15.9	16	16.5	17.5	19.3	18
All vessels, all facilities	23.2	34	31.4	38	37.7	39	41.2	46	44.9
# of landings*	2	4	3	4	4	6	5	6	6

**Existing effective capacity includes MIIP announced projects/upgrades as at December 2016*

**Effective capacities are reported to the nearest 0.5 of a lane*

**# of landings consists of public sheltered mainland landings, public island landings – supplies available and major private landings*

7.4 Priority 1 sites

Table 18 – Priority 1 – Port Binnli

Site name	Port Binnli
Existing formal facility?	Yes
Location	At the northern end of Mulherin Drive, Mackay Harbour
Current tidal status	All-tide, open-water access
Site characteristics	Port Binnli is Mackay's most popular boat ramp, and comprises a 4-lane ramp with a floating walkway, supported by 98 CTU spaces. An additional 70 CTU spaces are provided on a temporary site approximately 500m to the south, leased for 10 years. An additional floating walkway to improve efficient use of the ramp is planned as part of the 2016-17 to 2017-18 MIIP as at December 2016. The ramp is frequently congested, particularly during good weather conditions as it is the only ramp in Mackay City that provides all-tide access. The site is constrained by existing Port development to the north and south. Land immediately to the west of the boat ramp facility is currently vacant, but has been prepared for construction, and is intended for commercial port use.
Proposed works	Establishment of a permanent 70 CTU car park expansion in close proximity to the existing ramp.
Increase in effective lanes provided by works	1.5 effective lanes
Rationale	This is the main open-water access site in the Mackay Regional Council area, and there are very few sites available elsewhere to increase capacity for sheltered, all-tide access. The site is heavily constrained for expansion, however the existing temporary car park receives limited usage due to the long distance between it and the boat ramp. The temporary nature of this car park also means that if the capacity provided by this parking is not made permanent, the observed congestion will increase in the future. Permanently relocating this car park closer to the ramp, onto the presently vacant land west of the ramp, will result in an immediate improvement to ramp congestion.
Environmental and planning constraints	Developed site, impact potential is minimal. Native title claim under Yuwibara People, NNTT QC2013/007. World Heritage and a National Heritage place – Great Barrier Reef. Impacts are unlikely as previously cleared and disturbed area. If the works are likely to impact on MNES, a referral under the EPBC Act must be made to DEE. Works are located on land that is Strategic Port Land at the Port of Mackay. The works are therefore exempt from assessment against the local planning scheme. Assessment will fall under the Port Authority Land Use Plan. An MCU is required to be lodged under the P Act if the works are inconsistent with the land use plan approved under the Transport Infrastructure Act, section 286. Special activities (port) zoning under the Mackay City Planning Scheme. Freehold tenure.
Consultation feedback	This proposal is not supported by NQBP. This vacant land has been prepared by NQBP for commercial use at significant cost. The land is one of the closest vacant sites to the Port's Wharf 1, which is used for break bulk cargo and the wharf will be used to commence a container trade in the near future. As a priority port where development is to be

Site name	Port Binnli	
	encouraged, the use of critical strategic port land such as this for community facilities cannot be supported. In addition, the proposed site is adjacent to fuel storage tanks and the location of a new community use in this area would not achieve acceptable planning outcomes. NQBP recognizes the need that additional car parking close to the boat ramp would provide benefits to the Mackay community and NQBP offers to work with TMR to investigate possible alternatives that can achieve this outcome.	
Indicative cost (excl. GST) (to ±50%)	Water-based infrastructure	$ -
	Land-based infrastructure	$1,790,000

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Paper Size A3

0 5 10 20 30 40 50

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

LEGEND

- Populated Places
- Carpark
- State controlled road
- Cadastre

Department of Transport and Main Roads
Queensland Recreational Boating Demand Study

Job Number 41-30098
Revision A
Date 15 Dec 2016

Boating facility
Port Binnli

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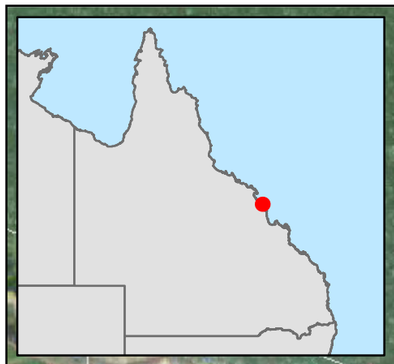
Table 19 – Priority 1 – Brisbane Street, Mackay

Site name	Brisbane Street, Mackay
Existing formal facility?	No
Location	On the south bank of the Pioneer River, at the intersection of Brisbane Street and River Street, Mackay.
Current tidal status	Near all-tide, open-water access
Site characteristics	This site is on the bank of the Pioneer River, adjacent to the central business district of Mackay. The river bank in this area is currently undergoing renewal and redevelopment, and includes boardwalks, fishing platforms and other public space that draws links to the river and its history in development of the City. This reach of the Pioneer River is navigable and accessed by deep draught recreational vessels. Tidal currents in the River can be strong due to the large tidal range. The River is also known to flood; levee banks line the banks to control inundation.
Proposed works	New pontoon
Increase in effective lanes provided by works	N/A
Rationale	At present there is no facility in central Mackay that allows deep-draught vessels to directly access shops, services and other attractions in this historic centre. The marina in Port Binnli has very little capacity to cater to day-use visiting recreational vessels. Inclusion of a recreational pontoon in the progressive redevelopment of the city reach of the Pioneer River would also provide an additional attraction for the City. A more heavy duty structure would be required if the facility is to be used by commercial vessels
Environmental and planning constraints	Native title claim under Yuwibara People, NNTT QC2013/007. World Heritage and a National Heritage place – Great Barrier Reef. If the works are likely to impact on MNES, a referral under the EPBC Act must be made to DEE. Operational Works for tidal works or works within a coastal management district is triggered under P Act for the works in the tidal area. Works are considered accepted development under the P Reg Shd 7 Part 3, Item 10 (b) for tidal works that is undertaken by TMR. Accepted development works are to comply with the requirements for the work prescribed under the Coastal Act, Section 167(5)(b). Marine plants are established along the waterway and this area is mapped accordingly under the local planning scheme as an area of high ecological significance. Removal of marine plants will require an Operational Works permit for the removal, destruction or damage of marine plants under P Act (Shd 10 Part 17 Item 28 of P Reg). May be accepted development if works can comply with the requirements under Shd 7 Item 8 of the P Reg. Environmental Relevant Activity 16 extracting and screening activities for dredging more than 1000 tonnes of material in a year may be triggered depending on works (P Reg Shd 10, Part 5, Div 2, Item 1). The pontoon is located in the Special Activities (City) Zoning of the Mackay City Planning Scheme. A code assessable material change of use application will be required for the works to be assessed under the planning scheme. The operational works are exempt from assessment against the local planning scheme as the works would be undertaken

Site name	Brisbane Street, Mackay	
	by or on behalf of a public sector entity (TMR) (Shd 6 Part 3, Section 8 of P Reg). Unallocated state land.	
Consultation feedback	Previous advice from TMR is that it would not be considered a public facility and so would not be available for MIIP funding. Not sure Council would consider it a priority.	
Indicative cost (excl. GST) (to ±50%)	Water-based infrastructure	$530,000
	Land-based infrastructure	$ -



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BARNES CREEK ROAD
RIVER STREET
SYDNEY STREET
WOOD STREET
SEVENTH LANE
EIGHTH LANE
BRISBANE STREET
CARLYLE STREET
TENNYSON STREET
ELEVENTH
VICTORIA

Paper Size A3

0 5 10 20 30 40 50

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

LEGEND

- Populated Places
- Pontoon
- State controlled road
- Cadastre

Department of Transport and Main Roads
Queensland Recreational Boating Demand Study

Job Number	41-30098
Revision	A
Date	15 Dec 2016

Boating facility
Brisbane Street, Mackay

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Table 20 – Priority 1 – River Street, Mackay

Site name	River Street, Mackay
Existing formal facility?	Yes
Location	On the south bank of the Pioneer River, at the easternmost end of River Street, Mackay
Current tidal status	Near all-tide, open-water access
Site characteristics	This site is located close to the mouth of the Pioneer River, and contains an existing narrow 3-lane boat ramp which is used as a 2-lane ramp supported by 22 CTU spaces. This popular ramp is subject to strong currents due to the large tidal range. Downstream of the ramp is landscaped parkland that connects to the open coast via the Blue Water Trail. The land area upstream of the ramp and carpark is constrained by existing development. A floating walkway and widening of the ramp to three standard width lanes is planned in the 2016-17 to 2017-18 MIIP (as at December 2016).
Proposed works	Expansion of the car park to the south of the ramp, at the eastern end of Victoria St.
Increase in effective lanes provided by works	1.5 effective lanes
Rationale	This facility is a popular alternative to Port Binnli due to its proximity to the ocean and the general reliability of navigation through the river mouth, but is heavily constrained by the extent of the existing parking. Access into estuarine reaches of the Pioneer River is also possible from this site subject to clearance under the bridges crossing the river. Expansion of the parking will substantially increase the capacity of the facility. Vehicular access between the boat ramp and the proposed car park will be via the existing road network. Pedestrian access between the ramp and car park would connect to the Blue Water Trail, and provide close access to the ramp.
Environmental and planning constraints	Native title claim under Yuwibara People, NNTT QC2013/007. World Heritage and a National Heritage place – Great Barrier Reef. If the works are likely to impact on MNES, a referral under the EPBC Act must be made to DEE. Within a wetland protection area wetland and wetland trigger area. SDAP Module 11 will apply to all works triggering under the P Act which are high impact earthworks in a WPA. Category B vegetation, being essential habitat and of concern regional ecosystem (RE) 8.1.1, 8.1.4 and 8.1.5. Exemptions apply for clearing native vegetation on land generally that is clearing for the construction or maintenance of community infrastructure mentioned in Shd 21, Part 1, Section 14 (b) of P Reg that is government supported transport infrastructure. Operational Works for tidal works or works within a coastal management district is triggered under P Act for the works in the tidal area. Works are considered accepted development under the P Reg Shd 7 Part 3, Item 10 (b) for tidal works that is undertaken by TMR. Accepted development works are to comply with the requirements for the work prescribed under the Coastal Act, Section 167(5)(b). Marine plants are established along the waterway and this area is mapped accordingly under the local planning scheme as an area of high ecological significance. Removal of marine plants will require an Operational Works permit for the

Site name	River Street, Mackay	
	removal, destruction or damage of marine plants under P Act (Shd 10 Part 17 Item 28 of P Reg). May be accepted development if works can comply with the requirements under Shd 7 Item 8 of the P Reg. Environmental Relevant Activity 16 extracting and screening activities for dredging more than 1000 tonnes of material in a year may be triggered depending on works (P Reg Shd 10, Part 5, Div 2, Item 1). The pontoon is located in the open space zone of the Mackay City Planning Scheme. A code assessable material change of use application will be required for the works to be assessed under the planning scheme. The operational works are exempt from assessment against the local planning scheme as the works would be undertaken by or on behalf of a public sector entity (TMR) (Shd 6 Part 3, Section 8 of P Reg). Unallocated state land and reserve tenure.	
Consultation feedback	The area highlighted is a revegetation area and is also proposed for a connection from the Blue Water Trail to Victoria Street to link to the Cross City Link, which runs to the cul de sac in Victoria Street currently linking the two systems.	
Indicative cost (excl. GST) (to ±50%)	Water-based infrastructure	$ -
	Land-based infrastructure	$1,160,000

The works planned in the MIIP are shown in the figure for clarity, and pre-date this Study.

Paper Size A3

0 5 10 20 30 40 50

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

LEGEND

- Populated Places
- State controlled road
- Cadastre
- Breakwater
- Carpark
- Floating Walkway
- Boat Ramp

Department of Transport and Main Roads
Queensland Recreational Boating Demand Study

Job Number 41-30098
Revision B
Date 20 Dec 2016

Boating Facility
River Street, Mackay

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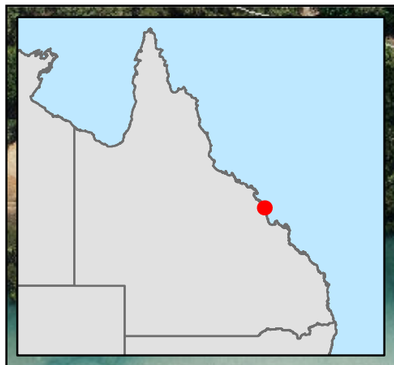
Table 21 – Priority 1 – Grasstree Beach

Site name	Grasstree Beach
Existing formal facility?	Yes
Location	At the southern end of the Esplanade, Grasstree Beach.
Current tidal status	Near all-tide, open-water access
Site characteristics	The site is located on a Reserve on the northern bank of the mouth of Cabbage Tree Creek, Grasstree Beach, approximately 11km northeast of Sarina. It is protected from direct wave action by Coral Point and its south-facing orientation into the Creek. Sand shoals in the vicinity of the ramp can limit launching and retrieval at lower tides. Tides in the area exceed 7m; accordingly, the current speeds in the Creek can be strong and make launching and retrieval processes difficult. An existing 1-lane boat ramp is serviced by parking for 16 CTUs. The remainder of the site comprises open mowed park area with occasional trees and shrubs.
Proposed works	Add 1-lane to the boat ramp, install a pontoon if feasible, expand parking by 29 CTUs.
Increase in effective lanes provided by works	1.2 effective lanes
Rationale	This ramp is one of four facilities that service the beach communities of Hay Point; Grasstree, Campwin and Sarina Beaches; and the town of Sarina (collectively referred to as Sarina area facilities). Community stakeholders have requested upgrades to all four facilities to increase capacity. The travel time between all facilities is no more than 30 minutes. Grasstree Beach is the most centrally located of the Sarina area facilities, with travel time to this facility from Hay Point less than 30 minutes, and only 15 minutes from the other townships. Compared to the other facilities, increasing the capacity of the Grasstree Beach facility to meet the wider community demand can be achieved in a timely manner due to the availability of suitable and cleared land. Alternatively, a similar upgrade to the existing facility could be provided at Campwin Beach to service the wider region (see Priority 4 recommendations). This site also provides access to the ocean as well as the Cabbage Tree Creek estuary. Installation of a pontoon as a queuing facility is recommended to assist launching and retrieval under strong cross-currents. A site-specific assessment will be required to determine if a pontoon is viable at this site.
Environmental and planning constraints	Native title claim under Yuwibara People, NNTT QC2013/007. DATSIP Cultural Heritage Database search required World Heritage and a National Heritage place – Great Barrier Reef. If the works are likely to impact on MNES, a referral under the EPBC Act must be made to DEE. Within a wetland protection area and wetland trigger area. SDAP Module 11 will apply to all works triggering under the P Act which are high impact earthworks in a WPA. Operational Works for tidal works or works within a coastal management district is triggered under P Act for the works in the tidal area. Works are considered accepted development under the P Reg Shd 7 Part 3, Item 10 (b) for tidal works that is undertaken by TMR. Accepted development works are to comply with the requirements for the work prescribed under the Coastal Act, Section 167(5)(b).

Site name	Grasstree Beach	
	Marine plants are established along the waterway and this area is mapped accordingly under the local planning scheme as an area of high ecological significance. Removal of marine plants will require an Operational Works permit for the removal, destruction or damage of marine plants under P Act (Shd 10 Part 17 Item 28 of P Reg). May be accepted development if works can comply with the requirements under Shd 7 Item 8 of the P Reg. Environmental Relevant Activity 16 extracting and screening activities for dredging more than 1000 tonnes of material in a year may be triggered depending on works (P Reg Shd 10, Part 5, Div 2, Item 1). The works are located in the open space zone of the Mackay City Planning Scheme. A code assessable material change of use application will be required for the works to be assessed under the planning scheme. The operational works are exempt from assessment against the local planning scheme as the works would be undertaken by or on behalf of a public sector entity (TMR) (Shd 6 Part 3, Section 8 of P Reg). Unallocated state land and reserve tenure.	
Consultation feedback	Latest counts have usage at 24 vehicles per day. Cannot see a driver for ramp upgrade. Site is tide-restricted so not sure why ramp and pontoon upgrade required.	
Indicative cost (excl. GST) (to ±50%)	Water-based infrastructure	$1,090,000
	Land-based infrastructure	$960,000



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Paper Size A3

0 5 10 20 30 40 50

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

LEGEND

- Populated Places
- State controlled road
- Cadastre
- Carpark
- Pontoon
- Boat Ramp

Department of Transport and Main Roads
Queensland Recreational Boating Demand Study

Job Number 41-30098
Revision A
Date 15 Dec 2016

Boating facility
Grasstree Beach

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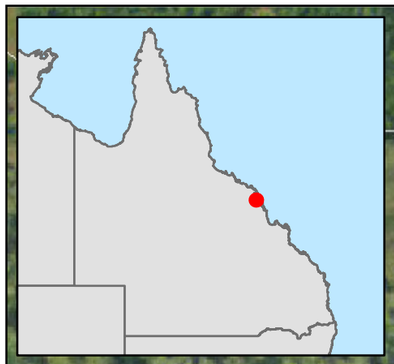
Table 22 – Priority 1 – Horseshoe Bend (Murray Creek)

Site name	Horseshoe Bend (Murray Creek)
Existing formal facility?	Yes
Location	West bank of the Murray River, approximately 6km east of Calen.
Current tidal status	Part-tide, depth-limited open-water access
Site characteristics	This facility is located approximately 6.5km upstream of the mouth of the Murray River. It comprises a 1-lane boat ramp supported by parking for 18 CTUs. A cleared area towards the access road adjoins the existing sealed parking area, but otherwise the surrounding land is low lying, densely vegetated and undeveloped.
Proposed works	Add 1-lane and a floating walkway, expand parking by approximately 25 CTUs.
Increase in effective lanes provided by works	1 effective lane
Rationale	This facility is growing in popularity due to the quality of the fishing. The parking is already under pressure and stakeholders have requested widening of the ramp and provision of a floating walkway to improve safety against crocodile attack. Upgrading this facility would contribute to meeting existing demand.
Environmental and planning constraints	Native title claim under Yuwibara People, NNTT QC2013/007. DATSIP Cultural Heritage Database search required. Within Nationally important wetland – St Helens Bay and Great Barrier Reef, World Heritage and National Heritage property –threatened flora and fauna– if the works are likely to impact on MNES, a referral under the EPBC Act must be made to DEE. Category B vegetation, being essential habitat, of concern RE 8.3.6a and least concern RE 8.1.1. Exemptions apply for clearing native vegetation on land generally that is clearing for the construction or maintenance of community infrastructure mentioned in Shd 21, Part 1, Section 14 (b) of P Reg that is government supported transport infrastructure. Operational Works for tidal works or works within a coastal management district is triggered under P Act for the works in the tidal area. Works are considered accepted development under the P Reg Shd 7 Part 3, Item 10 (b) for tidal works that is undertaken by TMR. Accepted development works are to comply with the requirements for the work prescribed under the Coastal Act, Section 167(5)(b). Marine plants are established along the waterway and this area is mapped accordingly under the local planning scheme as an area of high ecological significance. Removal of marine plants will require an Operational Works permit for the removal, destruction or damage of marine plants under P Act (Shd 10 Part 17 Item 28 of P Reg). May be accepted development if works can comply with the requirements under Shd 7 Item 8 of the P Reg. Environmental Relevant Activity 16 extracting and screening activities for dredging more than 1000 tonnes of material in a year may be triggered depending on works (P Reg Shd 10, Part 5, Div 2, Item 1). FHA management area A is located in the site area. Operational work completely or partly in a declared fish habitat area is assessable development, unless the work is accepted development under shd 7, part 3, section 7 of the P Reg.

Site name	Horseshoe Bend (Murray Creek)	
	The works are located in the open space zone of the Mackay City Planning Scheme. A code assessable material change of use application will be required for the works to be assessed under the planning scheme. The operational works are exempt from assessment against the local planning scheme as the works would be undertaken by or on behalf of a public sector entity (TMR) (Shd 6 Part 3, Section 8 of P Reg). Reserve tenure.	
Consultation feedback	None received	
Indicative cost (excl. GST) (to ±50%)	Water-based infrastructure	$1,220,000
	Land-based infrastructure	$770,000



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LANDING ROAD

Paper Size A3

0 5 10 20 30 40 50

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

LEGEND

- Populated Places
- State controlled road
- Cadastre
- Carpark
- Floating Walkway
- Boat Ramp

Department of Transport and Main Roads
Queensland Recreational Boating Demand Study

Job Number	41-30098
Revision	A
Date	15 Dec 2016

Boating facility
Horseshoe Bend (Murray Creek)

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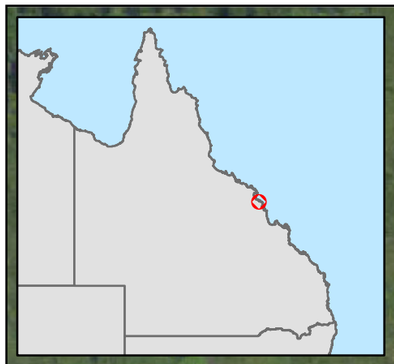
Table 23 – Priority 1 – Constant Creek

Site name	Constant Creek
Existing formal facility?	Yes
Location	West bank of Constant Creek, 13km south of Halliday Bay.
Current tidal status	Part-tide, depth-limited open-water access
Site characteristics	This facility is positioned on the west bank of Constant Creek, between the access road and the waterway. Located approximately 8km upstream of the Creek mouth, it currently contains 1-lane and sealed parking for 15 CTUs. A previous ramp was located south of the existing ramp. The available width of land between the made road and the waterway narrows significantly towards the south, and towards the north the land is intertidal and is colonised by mangroves. On the western side of the road reserve and beyond the land is cleared, the adjoining land is freehold that is used for agricultural purposes.
Proposed works	Add 1-lane and a floating walkway, expand parking by approximately 30 CTUs.
Increase in effective lanes provided by works	1 effective lane
Rationale	Like Horseshoe Bend, this facility is growing in popularity, particularly since the parking was formalised and the ramp relocated. Further expansion of this facility would assist in further accommodating this demand and provision of a floating walkway would improve safety during vessel launching and retrieval against crocodile attack.
Environmental and planning constraints	Native title claim under Yuwibara People, NNTT QC2013/007. DATSIP Cultural Heritage Database search required. Within Nationally important wetland – Sand Bay, World Heritage and National Heritage property –threatened flora and fauna– if the works are likely to impact on MNES, a referral under the EPBC Act must be made to DEE. Category R reef regrowth watercourse vegetation mapped over the site. Category B remnant vegetation mapped over site, being of concern and least concern Res 8.12.12a and 8.1.1. Exemptions apply for clearing native vegetation on land generally that is clearing for the construction or maintenance of community infrastructure mentioned in Shd 21, Part 1, Section 14 (b) of P Reg that is government supported transport infrastructure. Essential habitat mapped at the site boundaries. Operational Works for tidal works or works within a coastal management district is triggered under P Act for the works in the tidal area. Works are considered accepted development under the P Reg Shd 7 Part 3, Item 10 (b) for tidal works that is undertaken by TMR. Accepted development works are to comply with the requirements for the work prescribed under the Coastal Act, Section 167(5)(b). Marine plants are established along the waterway and this area is mapped accordingly under the local planning scheme as an area of high ecological significance. Removal of marine plants will require an Operational Works permit for the removal, destruction or damage of marine plants under P Act (Shd 10 Part 17 Item 28 of P Reg). May be accepted development if works can comply with the requirements under Shd 7 Item 8 of the P Reg. Environmental Relevant Activity 16 extracting and screening activities for dredging more than 1000 tonnes of material in a

Site name	Constant Creek	
	year may be triggered depending on works (P Reg Shd 10, Part 5, Div 2, Item 1). FHA management area A is located in the site area. Operational work completely or partly in a declared fish habitat area is assessable development, unless the work is accepted development under shd 7, part 3, section 7 of the P Reg. The works are located in the open space zone of the Mackay City Planning Scheme. A code assessable material change of use application will be required for the works to be assessed under the planning scheme. The operational works are exempt from assessment against the local planning scheme as the works would be undertaken by or on behalf of a public sector entity (TMR) (Shd 6 Part 3, Section 8 of P Reg). Unallocated state land and road reserve.	
Consultation feedback	None received	
Indicative cost (excl. GST) (to ±50%)	Water-based infrastructure	$960,000
	Land-based infrastructure	$460,000 (unsealed)



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HOWELLS ROAD

Paper Size A3

0 5 10 20 30 40 50

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

LEGEND

- Populated Places
- State controlled road
- Cadastre
- Carpark
- Floating Walkway
- Boat Ramp

Department of Transport and Main Roads
Queensland Recreational Boating Demand Study

Job Number	41-30098
Revision	A
Date	15 Dec 2016

Boating facility
Constant Creek

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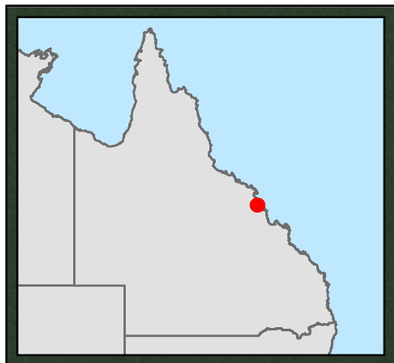
Table 24 – Priority 1 – Kinchant Dam

Site name	Kinchant Dam	
Existing formal facility?	Yes	
Location	On the south-eastern shoreline of Kinchant Dam, approximately 32km west of Mackay.	
Current tidal status	No open-water access	
Site characteristics	This facility provides access into the fresh water Kinchant Lake. It contains a boat ramp with two narrow lanes, which are effectively used as 1-lane. The ramp is supported by a large expanse of part-sealed but unmarked parking between the waterway and Kinchant Dam Road. There is limited flat space between the waterbody and road in adjoining areas. The site is owned and managed by Sunwater.	
Proposed works	Widening of the boat ramp to form two standard width lanes.	
Increase in effective lanes provided by works	1 effective lane	
Rationale	This facility is popular for fishing, water skiing and other on-water recreation for the local community and tourists. Widening of the ramp will increase the capacity and efficient usage of the facility, and contribute towards meeting demand for freshwater or where access to the ocean is not desired.	
Environmental and planning constraints	Native title claim under Yuwibara People, NNTT QC2013/007. DATSIP Cultural Heritage Database search recommended. Lake Kinchant is a high impact (red) waterway and is mapped through Kinchant Dam, it may therefore trigger Operational Works for waterway barrier works under P Act for the ramp. Environmental Relevant Activity 16 extracting and screening activities for dredging more than 1000 tonnes of material in a year may be triggered depending on works (P Reg Shd 10, Part 5, Div 2, Item 1). Operational works for the taking or interfering with water from a watercourse may apply depending on the works involved. The operational works are exempt from assessment against the local planning scheme as the works would be undertaken by or on behalf of a public sector entity (TMR) (Shd 6 Part 3, Section 8 of P Reg). Mirani converted record adjacent to community purposes (Mirani). The works are not easily defined under the planning scheme. If the works are defined as a local utility, they will be considered exempt from assessment under the local planning scheme. To be confirmed with Council. Freehold tenure.	
Consultation feedback	None received	
Indicative cost (excl. GST) (to ±50%)	Water-based infrastructure	$440,000
	Land-based infrastructure	$ -



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KINCHANT DAM ROAD

Paper Size A3

0 5 10 20 30 40 50

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

LEGEND

Populated Places

Boat Ramp

State controlled road

Cadastre

Department of Transport and Main Roads
Queensland Recreational Boating Demand Study

Job Number 41-30098
Revision A
Date 15 Dec 2016

Boating facility
Kinchant Dam

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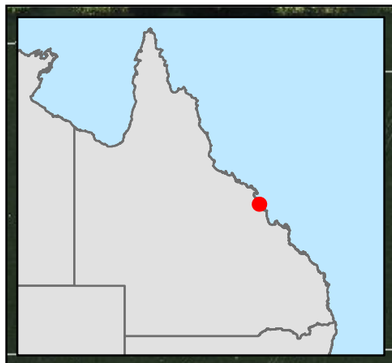
Table 25 – Priority 1 – Pleystowe

Site name	Pleystowe
Existing formal facility?	No
Location	South bank of the Pioneer River, adjacent to the Pleystowe Connection Road.
Current tidal status	No open-water access
Site characteristics	This fresh water site is located on the Pioneer River, approximately 17km west of Mackay. Dumbleton Weir, which also acts as a tidal barrage, is just over 5km downstream. An informal boat ramp has been constructed on the site and a pontoon is immediately downstream. The river bank in this area is steep, however the bank has been modified around the bridge which has allowed the ramp and vehicular access to be oriented to face downstream on a flatter slope. A lease over the ramp area, part of the access road and the pontoon, is in place. There is very limited space for parking immediately adjacent to the ramp, however a large expanse of road reserve suitable for informal parking is available at the intersection of Pleystowe Connection Rd and Mackay-Eungella Rd, approximately 130m away. This area also contains a bus stop and a memorial.
Proposed works	Formalisation of one boat ramp lane.
Increase in effective lanes provided by works	1 effective lane
Rationale	This site is already regularly used to access the fresh water reach of the River between the rocky reach at Marian and Dumbleton Weir, a distance of approximately 9km. Formalising the ramp will increase the capacity and efficient usage of the facility, and contribute towards meeting demand for freshwater or where access to the ocean is not desired. The informal parking available adjacent to the site is considered sufficient to adequately support a single lane boat ramp.
Environmental and planning constraints	Native title claim under Yuwibara People, NNTT QC2013/007. DATSIP Cultural Heritage Database search required. Category R reef regrowth watercourse vegetation. Category B remnant vegetation mapped over site, being of concern REs 8.3.1a and 8.3.3a. Exemptions apply for clearing native vegetation on land generally that is clearing for the construction or maintenance of community infrastructure mentioned in Shd 21, Part 1, Section 14 (b) of P Reg that is government supported transport infrastructure. The Pioneer River is a major impact (purple) waterway and may therefore trigger Operational Works for waterway barrier works under P Act for the ramp. Environmental Relevant Activity 16 extracting and screening activities for dredging more than 1000 tonnes of material in a year may be triggered depending on works (P Reg Shd 10, Part 5, Div 2, Item 1). Operational works for the taking or interfering with water from a watercourse may apply depending on the works involved. The works are not easily defined under the planning scheme. If the works are defined as a local utility, they will be considered exempt from assessment in the rural zone under the local planning scheme. To be confirmed with Council. The operational works are exempt from assessment against the local planning scheme as the works would be undertaken by or on behalf of a public sector entity (TMR) (Shd 6 Part 3, Section 8 of P Reg).

Site name	Pleystowe	
	Unallocated state land and road reserve.	
Consultation feedback	None received	
Indicative cost (excl. GST) (to ±50%)	Water-based infrastructure	$220,000
	Land-based infrastructure	$ -



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PLEYSTOWE CONNECTION ROAD

MACKAY EUNGELLA ROAD

Paper Size A3

0 5 10 20 30 40 50

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

LEGEND

- Populated Places
- Boat Ramp
- State controlled road
- Cadastre

Department of Transport and Main Roads
Queensland Recreational Boating Demand Study

Job Number	41-30098
Revision	A
Date	15 Dec 2016

Boating facility
Pleystowe

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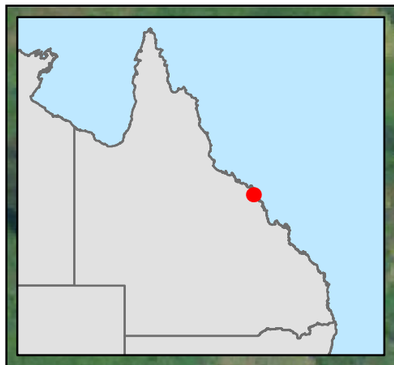
7.5 Priority 2 sites

Table 26 – Priority 2 – Laguna Quays

Site name	Laguna Quays
Existing formal facility?	Yes
Location	In Laguna Quays Marina, 5.4km north-west of Midge Point.
Current tidal status	Near all-tide, open-water access
Site characteristics	The existing boat ramp is located on the north-western side of the marina. It comprises a 2-lane facility supported by parking for 49 CTUs. The ramp is public but the facility is owned and managed privately. When dredged, the marina provides all-tide access, however a lack of maintenance in recent years has reduced the tidal availability for vessel launching and retrieval. The ramp is protected from wave action by the marina walls. The eastern side of the boat ramp is adjoined by berths. A reclaimed area containing the car park and a small amount of grassed open space abuts the western side. The facility is popular for offshore access.
Proposed works	Installation of a pontoon.
Increase in effective lanes provided by works	0.3 effective lanes
Rationale	There is insufficient space available to expand the boat ramp to include a floating walkway. However, on the western side of the ramp a pontoon could be positioned to provide the same functionality as a floating walkway particularly at lower tides. The pontoon can also act as a landing facility for deep-draught vessels or their tenders. The section of the marina affected by the pontoon is small and not presently utilised for other purposes.
Environmental and planning constraints	Operational Works for tidal works or works within a coastal management district is triggered under P Act for the works in the tidal area. Works are considered accepted development under the P Reg Shd 7 Part 3, Item 10 (b) for tidal works that is undertaken by TMR. Accepted development works are to comply with the requirements for the work prescribed under the Coastal Act, Section 167(5)(b). Marine plants are established along the waterway and this area is mapped accordingly under the local planning scheme as an area of high ecological significance. Removal of marine plants will require an Operational Works permit for the removal, destruction or damage of marine plants under P Act (Shd 10 Part 17 Item 28 of P Reg). May be accepted development if works can comply with the requirements under Shd 7 Item 8 of the P Reg. Environmental Relevant Activity 16 extracting and screening activities for dredging more than 1000 tonnes of material in a year may be triggered depending on works (P Reg Shd 10, Part 5, Div 2, Item 1). The works are located in the rural zone of the Mackay City Planning Scheme. A code assessable material change of use application may be required for the works to be assessed under the planning scheme. The operational works are exempt from assessment against the local planning scheme as the works would be undertaken by or on behalf of a public sector entity (TMR) (Shd 6 Part 3, Section 8 of P Reg). Rural zone and lands lease tenure.
Consultation feedback	None received

Site name	Laguna Quays	
Indicative cost (excl. GST) (to ±50%)	Water-based infrastructure	$630,000
	Land-based infrastructure	$ -



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Paper Size A3

0 5 10 20 30 40 50

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

LEGEND

- Populated Places
- Pontoon
- State controlled road
- Cadastre

Department of Transport and Main Roads
Queensland Recreational Boating Demand Study

Job Number 41-30098
Revision A
Date 15 Dec 2016

Boating facility
Laguna Quays

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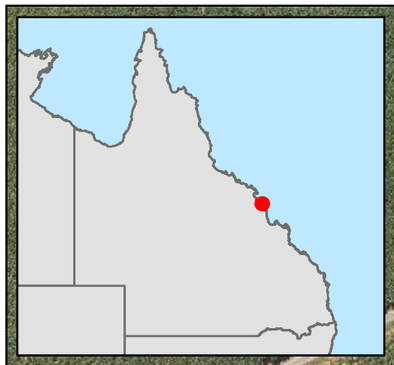
Table 27 – Priority 2 – Riverside Drive, Cremorne

Site name	Riverside Drive, Cremorne
Existing formal facility?	No
Location	On the northern bank of the Pioneer River, 1.1km downstream of the Bruce Highway crossing (Ronn Conn Bridge).
Current tidal status	Near all-tide, infrastructure-limited open-water access
Site characteristics	This site is centrally located between the two main bridges crossing the Pioneer River, and is approximately 5km upstream of the River mouth. The bridge heights can limit vessel access depending on the size of the vessel and the tide level. The site provides access to open-water for small boats and upstream into the River. The site is undeveloped, flat, grassed and lightly treed, and forms part of the Riverfront Reserve. There is no other development in close proximity The riverbank in this area is protected by a rock revetment. Due to the large tidal range in Mackay, the site is exposed to strong currents and may experience occasional flood inundation. It is also exposed to easterly, south-easterly, and to a lesser extent, southerly winds. A detailed assessment of the site for suitability for a boat ramp facility has not been undertaken .
Proposed works	New 4-lane ramp with a floating walkway, supported by parking for 90 CTU. Riverine training works are also required.
Increase in effective lanes provided by works	4 effective lanes
Rationale	The existing nearby boat ramps at Port Binnli and River Street are very popular and under pressure. A new facility that provides access into the estuarine reaches of the Pioneer River and access to open-water will assist in meeting demand for these two destinations.
Environmental and planning constraints	Native title claim under Yuwibara People, NNTT QC2013/007. DATSIP Cultural Heritage Database search recommended. Category B remnant vegetation mapped over site, being essential habitat, of concern REs 8.1.3 and 8.1.2 and least concern RE 8.1.1. Category R reef regrowth watercourse vegetation is mapped along the Pioneer River. Exemptions apply for clearing native vegetation on land generally that is clearing for the construction or maintenance of community infrastructure mentioned in Shd 21, Part 1, Section 14 (b) of P Reg that is government supported transport infrastructure. Operational Works for tidal works or works within a coastal management district is triggered under P Act for the works in the tidal area. Works are considered accepted development under the P Reg Shd 7 Part 3, Item 10 (b) for tidal works that is undertaken by TMR. Accepted development works are to comply with the requirements for the work prescribed under the Coastal Act, Section 167(5)(b). Marine plants are established along the waterway and this area is mapped accordingly under the local planning scheme as an area of high ecological significance. Removal of marine plants will require an Operational Works permit for the removal, destruction or damage of marine plants under P Act (Shd 10 Part 17 Item 28 of P Reg). May be accepted development if works can comply with the requirements under Shd 7 Item 8 of the P Reg. Environmental Relevant Activity 16 extracting and screening activities for dredging more than 1000 tonnes of material in a

Site name	Riverside Drive, Cremorne	
	year may be triggered depending on works (P Reg Shd 10, Part 5, Div 2, Item 1). FHA management area B is located in the site area. Operational work completely or partly in a declared fish habitat area is assessable development, unless the work is accepted development under shd 7, part 3, section 7 of the P Reg. The works are located in the open space zone of the Mackay City Planning Scheme. A code assessable material change of use application will be required for the works to be assessed under the planning scheme. The operational works are exempt from assessment against the local planning scheme as the works would be undertaken by or on behalf of a public sector entity (TMR) (Shd 6 Part 3, Section 8 of P Reg). Reserve and unallocated state land tenure.	
Consultation feedback	None received	
Indicative cost (excl. GST) (to ±50%)	Water-based infrastructure (including revetment works)	$5,240,000
	Land-based infrastructure	$2,940,000



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RIVERSIDE DRIVE

Paper Size A3

0 5 10 20 30 40 50

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

LEGEND

- Populated Places
- State controlled road
- Cadastre
- Breakwater
- Carpark
- Floating Walkway
- Boat Ramp

Department of Transport and Main Roads
Queensland Recreational Boating Demand Study

Job Number 41-30098
Revision A
Date 15 Dec 2016

Boating facility
Riverside Drive, Mackay

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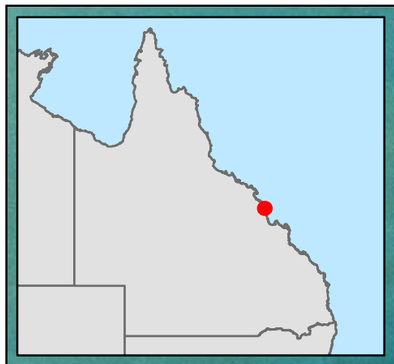
Table 28 – Priority 2 – Perpetua Point, Sarina Beach

Site name	Perpetua Point, Sarina Beach
Existing formal facility?	Yes
Location	On the northern bank of the entrance to Sarina Inlet.
Current tidal status	Near all-tide, open-water access
Site characteristics	This popular facility is located at the southern end of the village of Sarina Beach on the headland Reserve. It provides ocean and estuarine access to the population of Sarina Beach and also services the town of Sarina, 14km to the west. The facility comprises one 1-lane ramp and one 2-lane ramp, both sharing 32 CTU parking spaces. The eastern, 1-lane ramp is more than 100m long and is exposed to wind and wave action from the east and north-east. The western ramp is shorter and more protected, but is still exposed to easterly winds and waves. East of the ramps the shoreline is exposed and rocky, to the west where it is more sheltered the inter-tidal zone is dominated by sand flats and mangroves. Residential properties adjoin Sunset Drive, which is the sole access to the ramps.
Proposed works	Add 1-lane and a floating walkway if supported by wave study and cost-benefit analysis. Undertake reclamation to expand parking area to accommodate an additional 50 CTUs.
Increase in effective lanes provided by works	2 effective lanes
Rationale	This ramp is one of four facilities that service the beach communities of Hay Point; Grasstree, Campwin and Sarina Beaches; and the town of Sarina (collectively referred to as Sarina area facilities). Community stakeholders have requested upgrades to all four facilities to increase capacity. The travel time between all facilities is no more than 30 minutes. Sarina Beach is the most southern of the Sarina area facilities, with travel time to this facility from Hay Point approximately 30 minutes, and only 15 minutes from the other townships. The availability of this facility is heavily affected by waves and tides, particularly the eastern ramp, which is effectively a beach ramp. As the ramps are long and cross-currents can be strong, a queuing facility is desirable to improve the efficiency of vessel launching and retrieval, however a detailed site assessment is required to determine whether the site is too exposed for such infrastructure, or if protective structures would be required. If a queuing facility can be installed, expansion of parking would be necessary to match the increased capacity provided by an expanded ramp. Due to space restrictions extensive reclamation along the shoreline would be required to make room for parking. While there is an opportunity to increase capacity at this site, protective structures and reclamation can be prohibitively expensive, and a cost-benefit analysis would be necessary to justify any works, particularly as boating access for this community can be provided for lower cost within a 5 minute drive at Campwin Beach.
Environmental and planning constraints	Native title claim under Yuwibara People, NNTT QC2013/007. DATSIP Cultural Heritage Database search required. Category B remnant vegetation mapped over the reclamation area, being essential habitat and least concern RE 8.1.1.

Site name	Perpetua Point, Sarina Beach	
	Exemptions apply for clearing native vegetation on land generally that is clearing for the construction or maintenance of community infrastructure mentioned in Shd 21, Part 1, Section 14 (b) of P Reg that is government supported transport infrastructure. Operational Works for tidal works or works within a coastal management district is triggered under P Act for the works in the tidal area. Works are considered accepted development under the P Reg Shd 7 Part 3, Item 10 (b) for tidal works that is undertaken by TMR. Accepted development works are to comply with the requirements for the work prescribed under the Coastal Act, Section 167(5)(b). Marine plants are established along the waterway and this area is mapped accordingly under the local planning scheme as an area of high ecological significance. Removal of marine plants will require an Operational Works permit for the removal, destruction or damage of marine plants under P Act (Shd 10 Part 17 Item 28 of P Reg). May be accepted development if works can comply with the requirements under Shd 7 Item 8 of the P Reg. Environmental Relevant Activity 16 extracting and screening activities for dredging more than 1000 tonnes of material in a year may be triggered depending on works (P Reg Shd 10, Part 5, Div 2, Item 1). The works are located in the open space zone of the Mackay City Planning Scheme. A code assessable material change of use application will be required for the works to be assessed under the planning scheme. The operational works are exempt from assessment against the local planning scheme as the works would be undertaken by or on behalf of a public sector entity (TMR) (Shd 6 Part 3, Section 8 of P Reg). Reserve tenure and unallocated state land.	
Consultation feedback	None received	
Indicative cost (excl. GST) (to ±50%)	Water-based infrastructure (excludes wave protection)	$750,000
	Land-based infrastructure (includes reclamation and revetment)	$4,470,000



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Paper Size A3

0 5 10 20 30 40 50

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

LEGEND

- Populated Places
- State controlled road
- Cadastre
- Breakwater
- Carpark
- Floating Walkway
- Boat Ramp

Department of Transport and Main Roads
Queensland Recreational Boating Demand Study

Job Number	41-30098
Revision	A
Date	15 Dec 2016

Boating facility
Perpetua Point, Sarina Beach

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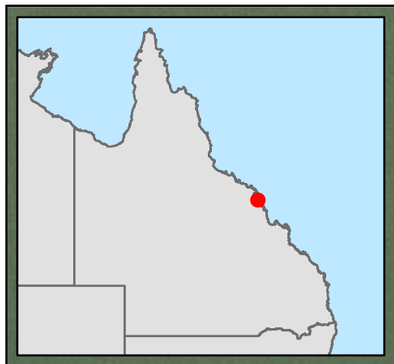
7.6 Priority 3 sites

Table 29 – Priority 3 – Victor Creek Road, Seaforth

Site name	Victor Creek Road, Seaforth
Existing formal facility?	Yes
Location	On the eastern bank of Victor Creek, at the end of Seaforth Port Newry Road.
Current tidal status	Near all-tide, open-water access
Site characteristics	This popular site is located approximately 2.4km west of the town of Seaforth. The existing facility comprises a narrow 4-lane ramp which is used as a 3-lane ramp, supported by a floating walkway and parking for 70 CTUs. The creek channels are well-defined and access to the ocean and nearby islands is possible under most but not all stages of the tide. The ramp also provides access into the estuarine reaches of Victor Creek and its tributaries. The creek is also a popular anchorage for deep-draught vessels, particularly cruising yachts travelling between Mackay and the Whitsundays. Tenders are often secured to the floating walkway. The facility is located on reserve land. South of the existing car park, the remainder of the Reserve is partly vegetated but elevated above the surrounding low-lying areas that are colonised with mangroves.
Proposed works	Addition of two boat ramp lanes to the south of the existing floating walkway. Expansion of the car park by 45 CTUs. Installation of a pontoon accessible by deep-draught vessels or their tenders.
Increase in effective lanes provided by works	2 effective lanes
Rationale	The popularity of Victor Creek boat ramp is expected to continue given its reliable access to ocean and estuary and proximity to Seaforth. Expansion of this facility in the future will provide additional capacity for all types of usage to meet future demand. Installation of a pontoon will free up the floating walkway for vessel launching and retrieval, and make an important contribution to the network of deep-draught landings for cruising vessels.
Environmental and planning constraints	Native title claim under Yuwibara People, NNTT QC2013/007. DATSIP Cultural Heritage Database search required. Category B remnant vegetation and essential habitat mapped over site, being of concern regional ecosystem (RE) 8.2.6a. Exemptions apply for clearing native vegetation on land generally that is clearing for the construction or maintenance of community infrastructure mentioned in Shd 21, Part 1, Section 14 (b) of P Reg that is government supported transport infrastructure. Operational Works for tidal works or works within a coastal management district is triggered under P Act for the works in the tidal area. Works are considered accepted development under the P Reg Shd 7 Part 3, Item 10 (b) for tidal works that is undertaken by TMR. Accepted development works are to comply with the requirements for the work prescribed under the Coastal Act, Section 167(5)(b). Marine plants are established along the waterway and this area is mapped accordingly under the local planning scheme as an area of high ecological significance. Removal of marine plants will require an Operational Works permit for the removal, destruction or damage of marine plants under P Act

Site name	Victor Creek Road, Seaforth	
	(Shd 10 Part 17 Item 28 of P Reg). May be accepted development if works can comply with the requirements under Shd 7 Item 8 of the P Reg. Environmental Relevant Activity 16 extracting and screening activities for dredging more than 1000 tonnes of material in a year may be triggered depending on works (P Reg Shd 10, Part 5, Div 2, Item 1). FHA management area A is located in the site area. Operational work completely or partly in a declared fish habitat area is assessable development, unless the work is accepted development under shd 7, part 3, section 7 of the P Reg. The operational works are exempt from assessment against the local planning scheme as the works would be undertaken by or on behalf of a public sector entity (TMR) (Shd 6 Part 3, Section 8 of P Reg). The works are located in the open space zone of the Mackay City Planning Scheme. A code assessable material change of use application will be required for the works to be assessed under the planning scheme. Dugong protection area and mangrove protection area under local planning scheme. Reserve tenure.	
Consultation feedback	None received	
Indicative cost (excl. GST) (to ±50%)	Water-based infrastructure	$2,040,000
	Land-based infrastructure	$1,740,000



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PORT NEWRY ROAD

SEAFORTH PORT NEWRY ROAD

VICTORIA CREEK ROAD

Paper Size A3

0 5 10 20 30 40 50

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

LEGEND

- Populated Places
- State controlled road
- Cadastre
- Carpark
- Pontoon
- Boat Ramp

Department of Transport and Main Roads
Queensland Recreational Boating Demand Study

Job Number	41-30098
Revision	A
Date	15 Dec 2016

Boating facility
Victor Creek Road, Seaforth

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Table 30 – Priority 3 – Sandy Creek, Chelona

Site name	Sandy Creek, Chelona
Existing formal facility?	No
Location	On the south bank of Sandy Creek, approximately 300m downstream of the Bruce Highway bridge.
Current tidal status	All-tide, depth-limited open-water access
Site characteristics	This site is located just east of the Bruce Highway, approximately 15km south of Mackay. The site is currently undeveloped riverbank contained within the Christensens Rd road reserve. Part of the site appears to be mowed grass, the remainder is vegetated with trees and shrubs. The site is adjacent to residential properties. Sand shoals are visible in the Creek, however aerial photography indicates that they are reasonably stable. The water level in the creek at the site is affected by higher tides – the site appears to always have water depth as the downstream sand shoals act as a weir which is drowned on higher tides. A detailed investigation of the site and the watercourse to confirm suitability for a boat ramp is required.
Proposed works	1 lane boat ramp, informal parking.
Increase in effective lanes provided by works	1 effective lanes
Rationale	This facility would provide access into the estuarine reaches of Sandy Creek for communities between Mackay and Sarina. Under high tide conditions access to the ocean would be possible but unlikely due to severe constraints with downstream water depths. As the site is not expected to attract large usage, retention of informal CTU parking is recommended.
Environmental and planning constraints	Greenfield site – potential impact. Native title claim under Yuwibara People, NNTT QC2013/007. DATSIP Cultural Heritage Database search required. Category R reef regrowth watercourse vegetation. Exemptions apply for clearing native vegetation on land generally that is clearing for the construction or maintenance of community infrastructure mentioned in Shd 21, Part 1, Section 14 (b) of P Reg that is government supported transport infrastructure. Operational Works for tidal works or works within a coastal management district is triggered under P Act for the works in the tidal area. Works are considered accepted development under the P Reg Shd 7 Part 3, Item 10 (b) for tidal works that is undertaken by TMR. Accepted development works are to comply with the requirements for the work prescribed under the Coastal Act, Section 167(5)(b). Marine plants are established along the waterway and this area is mapped accordingly under the local planning scheme as an area of high ecological significance. Removal of marine plants will require an Operational Works permit for the removal, destruction or damage of marine plants under P Act (Shd 10 Part 17 Item 28 of P Reg). May be accepted development if works can comply with the requirements under Shd 7 Item 8 of the P Reg. Environmental Relevant Activity 16 extracting and screening activities for dredging more than 1000 tonnes of material in a year may be triggered depending on works (P Reg Shd 10, Part 5, Div 2, Item 1). The works are located in the rural zone of the Mackay City Planning Scheme. A code assessable material change of use

Site name	Sandy Creek, Chelona	
	application may be required for the works to be assessed under the planning scheme. The operational works are exempt from assessment against the local planning scheme as the works would be undertaken by or on behalf of a public sector entity (TMR) (Shd 6 Part 3, Section 8 of P Reg). Road reserve and unallocated state land.	
Consultation feedback	None received	
Indicative cost (excl. GST) (to ±50%)	Water-based infrastructure	$220,000
	Land-based infrastructure	$ -

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Paper Size A3

0 5 10 20 30 40 50

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

LEGEND

- Populated Places
- Boat Ramp
- State controlled road
- Cadastre

Department of Transport and Main Roads
Queensland Recreational Boating Demand Study

Job Number	41-30098
Revision	A
Date	15 Dec 2016

Boating facility
Sandy Creek, Chelona

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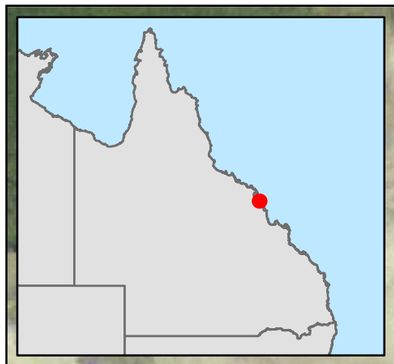
Table 31 – Priority 3 – Belmunda Road, Belmunda

Site name	Belmunda Road, Belmunda
Existing formal facility?	No
Location	On an unnamed creek adjacent to Belmunda Road, approximately 7.4km south-east of Seaforth.
Current tidal status	Part-tide, open-water access
Site characteristics	This site is an existing informal launching site on reserve land located on the northern bank of an unnamed creek at the eastern end of Belmunda Rd. A track that is used to access properties at Belmunda Beach continues through the site along the creek bank. The area along the creek bank is low lying and is backed by an extensive area of salt pan. At the western end of the site, close to the end of Belmunda Road, the land is higher and more elevated. The area is not fenced and at present vehicles access the creek and the salt pan all along the track. No bathymetric information is available for the waterway to confirm tidal availability, however preliminary assessment indicates that near-all-tide access at the ramp may not be achievable.
Proposed works	1-lane boat ramp, informal parking.
Increase in effective lanes provided by works	0.5 effective lanes
Rationale	This site is already used as a boat ramp for access to the ocean and into the estuary. Formalisation of a 1-lane ramp at the site would reduce damage to the bank from uncontrolled launching. As the site is not expected to attract large usage, retention of informal CTU parking is recommended.
Environmental and planning constraints	Native title claim under Yuwibara People, NNTT QC2013/007. DATSIP Cultural Heritage Database search required. Category B remnant vegetation mapped over site, being essential habitat and of concern REs 8.1.3 and 8.1.2. Exemptions apply for clearing native vegetation on land generally that is clearing for the construction or maintenance of community infrastructure mentioned in Shd 21, Part 1, Section 14 (b) of P Reg that is government supported transport infrastructure. Operational Works for tidal works or works within a coastal management district is triggered under P Act for the works in the tidal area. Works are considered accepted development under the P Reg Shd 7 Part 3, Item 10 (b) for tidal works that is undertaken by TMR. Accepted development works are to comply with the requirements for the work prescribed under the Coastal Act, Section 167(5)(b). Marine plants are established along the waterway and this area is mapped accordingly under the local planning scheme as an area of high ecological significance. Removal of marine plants will require an Operational Works permit for the removal, destruction or damage of marine plants under P Act (Shd 10 Part 17 Item 28 of P Reg). May be accepted development if works can comply with the requirements under Shd 7 Item 8 of the P Reg. Environmental Relevant Activity 16 extracting and screening activities for dredging more than 1000 tonnes of material in a year may be triggered depending on works (P Reg Shd 10, Part 5, Div 2, Item 1). The operational works are exempt from assessment against the local planning scheme as the works would be undertaken

Site name	Belmunda Road, Belmunda	
	by or on behalf of a public sector entity (TMR) (Shd 6 Part 3, Section 8 of P Reg). FHA on site boundary – not impacted by works Dugong protection area and mangrove protection area under local planning scheme. The works are located in the open space zone of the Mackay City Planning Scheme. A code assessable material change of use application will be required for the works to be assessed under the planning scheme. The works are located within the Great Barrier Reef Marine Park. Marine park permit may be required for the works. Reserve tenure.	
Consultation feedback	None received	
Indicative cost (excl. GST) (to ±50%)	Water-based infrastructure	$260,000
	Land-based infrastructure	$ -



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BELMUNDA ROAD

Paper Size A3

0 5 10 20 30 40 50

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

LEGEND

- Populated Places
- Boat Ramp
- State controlled road
- Cadastre

Department of Transport and Main Roads
Queensland Recreational Boating Demand Study

Job Number 41-30098
Revision A
Date 15 Dec 2016

Boating facility
Belmunda Road, Belmunda

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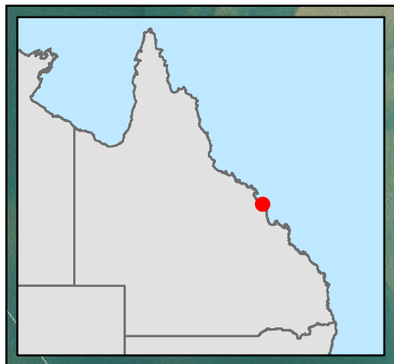
7.7 Priority 4 sites

Table 32 – Priority 4 – East Point, Mackay

Site name	East Point, Mackay
Existing formal facility?	No
Location	Northern bank of the Pioneer River, Mackay, 1km upstream of the mouth.
Current tidal status	Near all-tide, open-water access
Site characteristics	This site is an undeveloped reserve. Land access to the site is via a future residential development. The site comprises sand dunes, bordered by areas of mangroves. The river is trained in the vicinity of the site.
Proposed works	Once road access is resolved, a 2-lane boat ramp with a floating walkway, supported by CTU parking.
Increase in effective lanes provided by works	2 effective lanes
Rationale	The adjoining site has been identified as a future development site for several years, however no plans are in place for this to occur. When the site is developed, road access to the river will be provided as a condition of development to allow construction of the new boating facility.



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Paper Size A3

0 12.5 25 50 75 100

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

LEGEND

- Populated Places
- State controlled road
- Cadastre

Department of Transport and Main Roads
Queensland Recreational Boating Demand Study

Job Number	41-30098
Revision	A
Date	16 Dec 2016

Boating facility
East Point, Mackay

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Table 33 – Priority 4 – Boat Ramp Road, Campwin Beach

Site name	Boat Ramp Road, Campwin Beach
Existing formal facility?	Yes
Location	At the northern end of Boat Ramp Road, Campwin Beach.
Current tidal status	Near all-tide, open-water access
Site characteristics	The site is located on Council-owned freehold land on the eastern bank of the mouth of Cabbage Tree Creek, Campwin Beach, approximately 11km northeast of Sarina. It is approximately 300m east of the facility at Grasstree Beach, although by road the distance is more than 13km. It is protected from direct wave action by Coral Point and launching is directly into the main Creek channel. Tides in the area exceed 7m; accordingly, the current speeds in the Creek can be strong and make launching and retrieval processes difficult. The existing 1-lane boat ramp is serviced by unformed CTU parking. The remainder of the site is well-vegetated.
Proposed works	Add 1-lane to the boat ramp, install a pontoon, expand parking.
Increase in effective lanes provided by works	1.2 effective lanes
Rationale	This ramp is one of four facilities that service the beach communities of Hay Point; Grasstree, Campwin and Sarina Beaches; and the town of Sarina (collectively referred to as Sarina area facilities). Community stakeholders have requested upgrades to all four facilities to increase capacity. The travel time between all facilities is no more than 30 minutes. Campwin Beach is centrally located within the Sarina area facilities, with travel time to this facility from Hay Point less than 30 minutes, and only 15 minutes from the other townships. Compared to the other facilities, increasing the capacity of the Campwin Beach facility to meet the wider community demand can be achieved relatively simply. The timing for this upgrade could be swapped with that recommended for Grasstree Beach (see Priority 1 recommendations). This site provides access to the ocean as well as the Cabbage Tree Creek estuary. Installation of a pontoon as a queuing facility is recommended to assist launching and retrieval under strong cross-currents.

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Paper Size A3

0 5 10 20 30 40 50

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

LEGEND

- Populated Places
- State controlled road
- Cadastre

Department of Transport and Main Roads
Queensland Recreational Boating Demand Study

Job Number	41-30098
Revision	A
Date	15 Dec 2016

Boating facility
Boat Ramp Road, Campwin Beach

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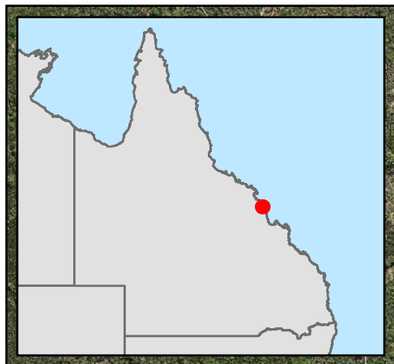
Table 34 – Priority 4 – Alligator Creek

Site name	Alligator Creek
Existing formal facility?	No
Location	There are several sites on Alligator Creek that have potential for a boat ramp.
Current tidal status	Part-tide, depth-limited open-water access
Site characteristics	The banks of Alligator Creek are fringed with mangroves. Much of the bank is Reserve, whilst other areas are unallocated state land. All areas are generally low-lying. The waterway is very shallow and is only accessible for part of the tidal range.
Proposed works	1-lane boat ramp, informal parking.
Increase in effective lanes provided by works	0.5 effective lanes
Rationale	One of the sites is already used as a boat ramp for access to the estuary. Formalisation of a 1-lane ramp would allow access into the waterway and assist in meeting demand from the local community. As the site is not expected to attract large usage, retention of informal CTU parking is recommended.



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Paper Size A3

0 12.5 25 50 75 100

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

LEGEND

- Populated Places
- State controlled road
- Cadastre

Department of Transport and Main Roads
Queensland Recreational Boating Demand Study

Job Number	41-30098
Revision	A
Date	16 Dec 2016

Boating facility
Alligator Creek

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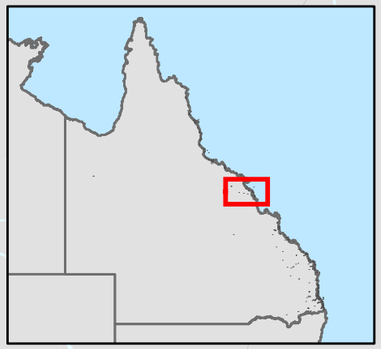
Appendices

Appendix A – Locality plan, existing facilities



HAMILTON ISLAND
PROSERPINE
CALEN
SEAFORTH
SHOAL POINT
EIMEO
BUCASIA
BLACKS BEACH
FARLEIGH
GLENELLA
MACKAY
FINCH HATTON
MIRANI
MARIAN
WALKERSTON
BAKERS CREEK
ETON
HECTOR
HALF TIDE BEACH
GRASSTREE BEACH
CAMPWIN BEACH
SARINA BEACH
SARINA
GLENDEN
NEBO

Paper Size A3

0 12.5 25

Kilometres

Horizontal Datum: GDA 1994
Grid: GCS GDA 1994

N

LEGEND

- Boating Facilty
- State controlled road
- Local Government Area
- Water

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Queensland Recreational Boating Demand Study

Job Number 41-30098
Revision C
Date 20 Dec 2016

Mackay Regional Council

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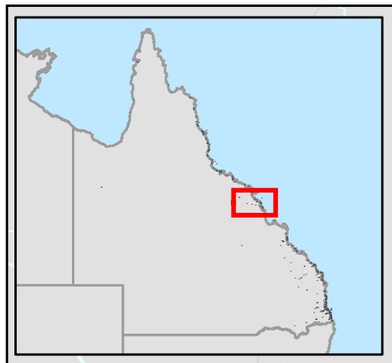

HAMILTON ISLAND
PROSERPINE
CALEN
SEAFORTH
SHOAL POINT
EIMEO
BUCASIA
BLACKS BEACH
FARLEIGH
GLENELLA
FINCH HATTON
MIRANI
MARIAN
WALKERSTON
MACKAY
BAKERS CREEK
ETON
HECTOR
HALF TIDE BEACH
GRASSTREE BEACH
CAMPWIN BEACH
SARINA BEACH
SARINA
GLENDEN
NEBO

Paper Size A3

0 12.5 25

Kilometres

Horizontal Datum: GDA 1994
Grid: GCS GDA 1994

N

LEGEND

- Deep-draught/tender landing
- Water
- State controlled road
- Local Government Area

Based on or contains data provided by the State of Queensland (Department of Natural Resources and Mines) 2016.
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Department of Transport and Main Roads
Queensland Recreational Boating Demand Study

Job Number 41-30098
Revision C
Date 21 Dec 2016

Mackay Regional Council

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Data source: DNRM: Cadastre/2016, Populated Places, Local Government Area/2016; TMR: Facilities/2016, GA Mainland, Islands/2007. DTMR: State Controlled Road/2015. Created By: IH

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Appendix B – Capacity assessment, existing facilities

Facility ID	Facility name*	Tidal access (at ramp)	# Existing lanes	Queuing facility	Effective lanes after tidal access adjustment	# CTU	Effective lanes after adjustment for tidal access, queuing facility and # CTUs		Constraint	Comment
							Waterside	CTU		
	Open-water access									
MK20	Mulherin Drive, Port Binnli, Mackay	All-tide	4	Floating walkway	4	98	6	4.5	CTU	Temporary overflow parking not considered in CTU calculations
	+ MIIP Upgrades as at Dec 16	*All-tide*	*4*	*Floating walkway*	4	*98*	*6*	*4.5*	*CTU*	*Second floating walkway added*
SA31	Tug Harbour Road, Hay Point	All-tide	2	No	2	38	2	1.5	CTU	
MK11	River Street, Mackay	Near all-tide	3	No	2.4	22	2.4	1.5	CTU	
	+ MIIP Upgrades as at Dec 16	*Near all-tide*	*3*	*Floating walkway*	2.4	*22*	*3.6*	*1.5*	*CTU*	*Loss of one ramp lane for floating walkway*
PI21	Victor Creek Road, Seaforth	Near all-tide	4	Floating walkway	3.2	70	4.8	3	CTU	
MK70	Kunapipi Road, Laguna Quays	Near all-tide	2	No	1.6	45	1.6	2	Waterside	
SA22	The Esplanade, Grasstree Beach	Near all-tide	1	No	0.8	16	0.8	1	Waterside	
SA21	Boat Ramp Road, Campwin Beach	Near all-tide	1	No	0.8	Unformed	0.8	Unformed	Waterside	
SA12	North Ramp, Sunset Drive, Sarina Beach	Near all-tide	2	No	1.6	20	1.6	1	CTU	
MR31	Miran Kahn Drive, Freshwater Point	Part-tide	1	No	0.5	25	0.5	1.5	Waterside	
PI11	Sunset Boulevard, Eimeo	Part-tide	1	No	0.5	4	0.5	0.5	Waterside	
	SUBTOTAL		***19***		***15.8***		***22.6***	***16.5****		

Facility ID	Facility name*	Tidal access (at ramp)	# Existing lanes	Queuing facility	Effective lanes after tidal access adjustment	# CTU	Effective lanes after adjustment for tidal access, queuing facility and # CTUs		Constraint	Comment
							Waterside	CTU		
	Depth-limited open-water access									
MK41	Aspley Way, Andergrove	Part-tide	1	No	0.5	15	0.5	1	Waterside	
MK51	Landing Road, Horseshoe Bend, Murray Creek	Part-tide	1	No	0.5	20	0.5	1	Waterside	
PI12	The Esplanade, Bucasia	Part-tide	2	Beach	1	32	1	1.8	Waterside	
PI14	Dunnrock Esplanade, Dunnrock	Part-tide	1	No	0.5	15	0.5	1	Waterside	
PI45	Howells Road, Constant Creek	Part-tide	1	No	0.5	15	0.5	1	Waterside	
SA14	Landings Road, Rocky Dam Creek, Sarina	Part-tide	1	No	0.5	10	0.5	1	Waterside	
	SUBTOTAL		***7***		***3.5***		***3.5***	***6.8****		
	Beach ramps									
SA11	South Ramp, Sunset Drive, Sarina Beach	Beach	1	No	0.8	12	0.5	1	Waterside	
PI31	Ramp Road, St. Helens Beach	Beach	1	No	0.5	Unformed	0.5	Unformed	Waterside	
	SUBTOTAL		***2***		***1.3***		***1***	***1****		

Facility ID	Facility name*	Tidal access (at ramp)	# Existing lanes	Queuing facility	Effective lanes after tidal access adjustment	# CTU	Effective lanes after adjustment for tidal access, queuing facility and # CTUs		Constraint	Comment
							Waterside	CTU		
	No open-water access									
MK60	Kinchant Dam	Fresh water	1	No	1	Unmarked	1	Unmarked	Waterside	
MK55	Teemburra Dam	Fresh water	1	No	1	26	1	1.5	Waterside	
MR11	Eungella Dam	Fresh water	1	No	1	Unformed	1	Unformed	Waterside	
	SUBTOTAL		***3***		***3***		***3***	***1.5****		
			Total effective capacity				***23.2****			

**Capacity following upgrades planned in the 2016-17 to 2017-18 MIIP are shown in italics.*

**CTU calculation does not include unformed or unmarked parking spaces.*

**The effective capacity of each facility is shaded.*

Appendix C – Demand assessment (Economic Associates)

Recreational Boating Facilities Demand Forecasting Study - 2016 Census Update

Final Report

December 2017

ECONOMIC ASSOCIATES

Recreational Boating Facilities Demand Forecasting Study - 2016 Census Update

Final Report

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16042

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ECONOMIC ASSOCIATES

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1 INTRODUCTION

1.1 Purpose of study

Economic Associates (as a sub consultant to GHD Pty Ltd) were engaged by the Department of Transport and Main Roads (TMR) to undertake an assessment of the demand for recreational boating facilities at the local government area (LGA) level. Demand projections have been prepared at five year intervals to 2036 (that is, 2016, 2021, 2026, 2031 and 2036) and take into account current and future demand for recreational boat ramps and landings.

This study represents an update to the *Recreational Boating Facilities Demand Forecasting Study 2016*, taking into account 2016 Census data.

1.2 Report structure

The report has been structured as follows:

- Section 1: Introduction: Provides an outline of the purpose of the study and report structure
- Section 2: Projected size of recreational boating fleet: Provides an overview of the assumptions utilised in preparing estimates of the projected recreational boating fleet by LGA
- Section 3: Infrastructure demand assessment: Provides an overview of the assumptions utilised in preparing estimates of the demand for new or upgraded boat ramps and landings by LGA
- Section 4: References: Provides a summary of the references utilised in preparing this report.

1.3 Disclaimer

This report is based on the most up to date readily available information. Sources are documented in the report. Economic Associates has applied due professional care and diligence in accordance with generally accepted standards of professional practice in undertaking analysis and interpretation of source information. Economic Associates is not liable for damages arising from any errors or omissions arising from use of these information sources.

As this report involves future projections which can be affected by a number of unforeseen circumstances, it represent our best possible estimates and no warranty is given that these particular projections will eventuate.

2 PROJECTED SIZE OF RECREATIONAL BOATING FLEET

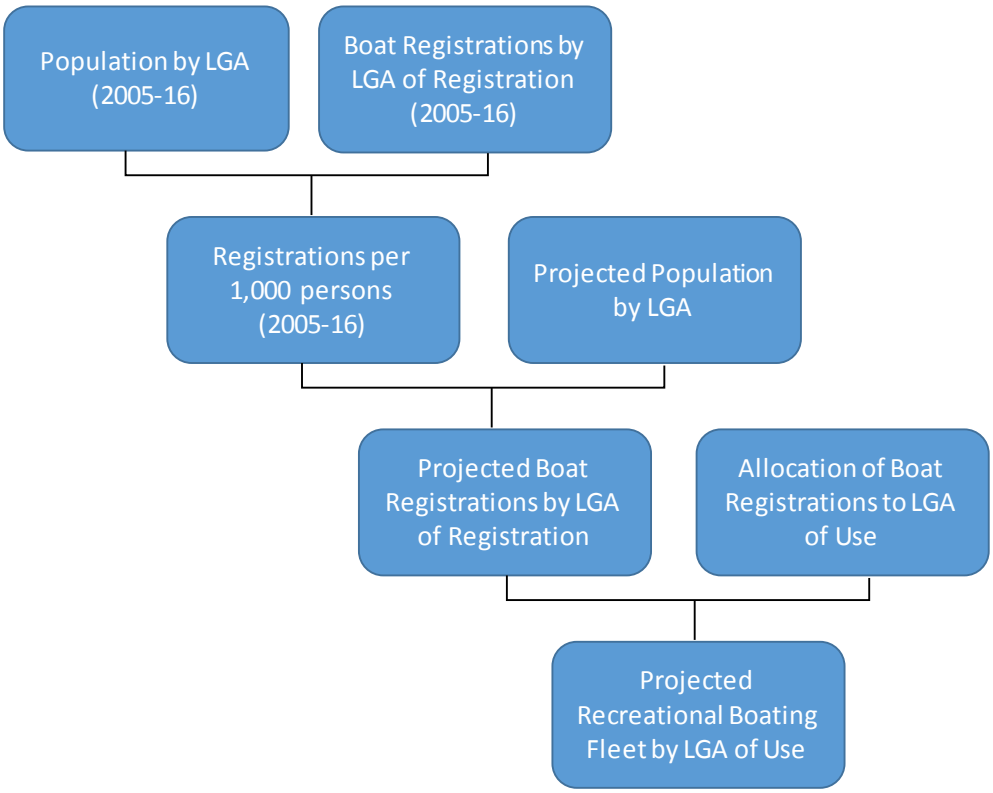
This section of the report provides a summary of the projected size of the recreational boating fleet by LGA, including a detailed explanation relating to the assumptions made in preparing the projections.

2.1 Methodology

In estimating the projected size of the recreational boating fleet, the assessment has made a number of assumptions relating to the current and projected size of the trailable and non-trailable fleet and the relationship between LGA of registration and LGA of waterway/facility use.

Figure 2.1 below outlines the methodology utilised in preparing the projected size of the recreational boating fleet by LGA of use.

Figure 2.1: Methodology utilised in projecting recreational boating fleet by LGA of use



2.2 Assumptions

2.2.1 Current size of recreational boating fleet

TMR provided data relating to historical boat registrations for the 2005 to 2016 period for the following categories:

- sail boats
- boats without sails, including:
  - motor boats without sails
  - speed boats
  - jet skis (or personal watercraft).

The data was provided by LGA of registration. This data was used to generate historical estimates of the size of the trailable and non-trailable boat fleet for each LGA, including the following sub-categories:

- trailable fleet, which comprises the following sub-categories:
  - boats up to 4.5 metres in length (including jet skis)
  - boats 4.5 – 8 metres in length
- non-trailable fleet (vessels most likely to be berthed at marinas or private moorings).

The trailable boat fleet has been estimated for two sub-classes to identify vessels that tend to be used inshore (vessels up to 4.5 metres in length) versus vessels which have the ability to travel offshore (vessels 4.5 – 8 metres in length). The 4.5 metre cut-off length was identified through consultation with LGA and port/water storage officers undertaken by GHD as part of this study, and confirmed by TMR officers as being reasonable and accepted for intended uses of the study.

Table 2.1 below summarises our assumptions in relation to the split of trailable boats and non-trailable boats based on the data provided by TMR. This assessment assumes that all boats greater than eight metres in length are non-trailable and that all jet skis are within the trailable boat fleet.

The incidence of trailable and non-trailable boats eight metres or less in length is consistent with the assumptions made in the *Recreational Boating Facilities Demand Forecasting Study 2011*.

Table 2.1: Estimated proportion of trailable and non-trailable boats, 2005-2016

Length	Trailable		Non-trailable	
	sail boats	Boats without sail	Sail boats	Boats without sail
<3 metres	100.0%	100.0%	0.0%	0.0%
3-5 metres	90.0%	100.0%	10.0%	0.0%
5-8 metres	50.0%	85.0%	50.0%	15.0%
8-10 metres	0.0%	0.0%	100.0%	100.0%
10-12 metres	0.0%	0.0%	100.0%	100.0%
12-15 metres	0.0%	0.0%	100.0%	100.0%
15-25 metres	0.0%	0.0%	100.0%	100.0%
>25 metres	0.0%	0.0%	100.0%	100.0%

Source: Economic Associates estimates

In 2016, there were 996 vessel registrations that were not assigned to an LGA in Queensland[1], comprising 983 interstate registrations, five overseas registrations and eight unknown registrations. For this assessment, the following assumptions have been made for the allocation of these registrations to the trailable and non-trailable boat fleets:

- *Interstate registrations:* Interstate registrations have been allocated in the manner outlined in Table 2.1 above, as it is considered likely that the majority of interstate registrations of a trailable length are within northern NSW.
- *Overseas and unknown registrations:* The assessment has assumed that all overseas and unknown registrations are of a non-trailable nature.

Based on the assumptions presented in Table 2.1 above and the allocation of interstate, overseas and unknown registrations, the estimated size of the recreational boating fleet in Queensland was 279,586 vessels in 2016, comprising:

- 184,835 trailable boats up to 4.5 metres in length (including jet skis)
- 73,462 trailable boats 4.5 – 8 metres in length
- 21,289 non-trailable boats.

Not surprisingly, the size of the recreational boating fleet was highest in a number of South-east Queensland councils, Mackay Regional Council, Townsville City Council, and Cairns Regional Council.

Table 2.2 below presents the estimated size of the recreational boating fleet in Queensland and each of the component LGAs in 2016.

Table 2.2: Estimated size of recreational boating fleet by LGA, Queensland, 2016

LGA of registration	Trailable		Non-trailable	Total
	Up to 4.5m	4.5-8m		
Aurukun (S)	9	9	0	18
Balonne (S)	229	93	14	336
Banana (S)	928	371	54	1,353
Barcaldine (R)	120	46	6	172
Barcoo (S)	22	7	2	31
Blackall-Tambo (R)	73	24	3	100
Boulia (S)	11	2	0	13
Brisbane (C)	18,600	7,539	3,009	29,148
Bulloo (S)	10	2	0	12
Bundaberg (R)	7,483	1,711	418	9,612
Burdekin (S)	2,560	887	123	3,570
Burke (S)	34	14	2	50
Cairns (R)	6,650	3,584	996	11,229
Carpentaria (S)	148	79	14	241
Cassowary Coast (R)	2,718	1,576	298	4,592
Central Highlands (R)	1,507	720	120	2,347
Charters Towers (R)	524	170	23	717
Cherbourg (S)	0	1	0	1
Cloncurry (S)	125	55	6	186
Cook (S)	304	177	67	548
Croydon (S)	11	4	0	15
Diamantina (S)	6	0	1	7

[1] The 996 vessel registrations not registered in an LGA in Queensland accounted for less than 0.4% of the total recreational fleet in 2016.

LGA of registration	Trailable		Non-trailable	Total
	Up to 4.5m	4.5-8m		
Doomadgee (S)	2	2	0	4
Douglas (S)	908	664	175	1,747
Etheridge (S)	38	12	1	51
Flinders (S)	83	30	7	120
Fraser Coast (R)	7,252	2,902	821	10,975
Gladstone (R)	5,148	2,435	538	8,121
Gold Coast (C)	24,407	8,121	3,739	36,266
Goondiwindi (R)	659	202	25	886
Gympie (R)	2,656	937	235	3,828
Hinchinbrook (S)	1,428	635	118	2,180
Hope Vale (S)	17	14	4	35
Ipswich (C)	4,537	1,630	282	6,449
Isaac (R)	1,381	611	111	2,103
Kowanyama (S)	8	1	0	9
Livingstone (S)	2,821	1,507	504	4,831
Lockhart River (S)	7	5	4	16
Lockyer Valley (R)	1,285	461	78	1,824
Logan (C)	8,691	3,593	789	13,074
Longreach (R)	191	59	7	257
Mackay (R)	9,909	3,515	814	14,238
McKinlay (S)	48	21	4	73
Mapoon (S)	8	5	0	13
Maranoa (R)	544	180	22	746
Mareeba (S)	838	353	79	1,270
Moreton Bay (R)	16,249	5,992	1,637	23,878
Mornington (S)	16	13	2	31
Mount Isa (C)	700	402	43	1,145
Murweh (S)	137	46	6	189
Napranum (S)	7	4	0	11
Noosa (S)	2,564	1,175	290	4,029
North Burnett (R)	633	182	26	841
Northern Peninsula Area (R)	25	46	9	80
Palm Island (S)	43	37	6	86
Paroo (S)	40	12	2	54
Pormpuraaw (S)	3	1	0	4
Quilpie (S)	32	8	1	41
Redland (C)	7,692	3,897	1,473	13,061
Richmond (S)	45	20	2	66
Rockhampton (R)	3,777	1,405	292	5,473
Scenic Rim (R)	1,300	490	122	1,912
Somerset (R)	1,037	356	68	1,461
South Burnett (R)	1,447	450	66	1,963
Southern Downs (R)	1,119	314	42	1,475
Sunshine Coast (R)	12,641	4,148	1,225	18,013
Tablelands (R)	1,695	704	150	2,548
Toowoomba (R)	4,522	1,593	250	6,365
Torres (S)	107	172	32	311
Torres Strait Island (R)	6	9	2	17
Townsville (C)	8,289	3,998	916	13,203
Weipa (T)	230	237	37	504
Western Downs (R)	1,525	643	86	2,254
Whitsunday (R)	3,387	1,904	750	6,041
Winton (S)	32	11	2	45
Woorabinda (S)	3	0	0	3
Wujal Wujal (S)	4	4	0	8
Yarrabah (S)	36	25	3	64
Interstate	560	201	223	983
Overseas	0	0	5	5
Unknown	0	0	8	8
Total	**184,835**	**73,462**	**21,289**	**279,586**

Note: All registrations with an overseas or unknown address were classified as non-trailable as they were likely to be stored in marinas or dry storage facilities. Source: Economic Associates estimates based on data provided by TMR.

2.2.2 Historical incidence of boat ownership

To determine the projected number of boat registrations in each LGA, the boat registration data, in conjunction with historical population data, has been analysed to calculate the historical incidence of boat ownership (that is, the number of boat registrations per 1,000 persons). The historical incidence of boat ownership was calculated for the trailable and non-trailable fleets, as defined in Section 2.1.1 above.

In the 2005 to 2016 period, the average incidence of boat ownership was as follows:

- trailable boats up to 4.5 metres in length (including jet skis): 0.00 – 140.93 boats/1,000 persons
- trailable boats 4.5 – 8 metres in length: 0.26 – 81.45 boats/1,000 persons
- non-trailable boats: 0.00 – 22.39 boats/1,000 persons.

The historical incidence of boat ownership is highest in coastal communities such as Hinchinbrook Shire, Burdekin Shire, Cook Shire, Douglas Shire, Cassowary Coast, Livingstone Shire, Town of Weipa, and Whitsunday. Of these coastal communities, only Cook Shire recorded a decline in the incidence of boat ownership between 2005 and 2016.

Table 2.3 below summarises the average historical incidence of boat ownership by vessel class in the 2005 to 2016 period, by LGA.

Table 2.3: Historical incidence of boat ownership (registrations / 1,000 persons) by LGA, 2005-2016

LGA of registration	Trailable		Non-trailable	Change in incidence of boat ownership, 2005-2016		
	Up to 4.5m	4.5-8m		Trailable up to 4.5m	Trailable 4.5-8m	Non-trailable
Aurukun (S)	10.04	4.02	0.38	Decrease	Decrease	Decrease
Balonne (S)	40.95	17.04	2.49	Increase	Increase	Increase
Banana (S)	57.80	21.42	3.19	Increase	Increase	Increase
Barcaldine (R)	35.58	11.60	1.44	Increase	Increase	Increase
Barcoo (S)	51.88	10.19	0.79	Increase	Increase	Increase
Blackall-Tambo (R)	33.64	10.24	1.24	Increase	Increase	Increase
Boulia (S)	24.48	7.22	1.21	Increase	Decrease	Decrease
Brisbane (C)	15.62	6.91	2.83	Decrease	Decrease	Decrease
Bulloo (S)	28.32	5.12	0.81	Increase	Increase	Increase
Bundaberg (R)	74.12	16.67	4.32	Increase	Increase	Increase
Burdekin (S)	140.93	42.78	5.86	Increase	Increase	Increase
Burke (S)	57.71	19.99	3.16	Increase	Increase	Increase
Cairns (R)	39.61	20.12	5.61	Increase	Increase	Increase
Carpentaria (S)	78.97	36.00	5.52	Decrease	Decrease	Increase
Cassowary Coast (R)	89.70	47.12	9.85	Increase	Increase	Increase
Central Highlands (R)	49.70	23.49	3.81	Increase	Increase	Increase
Charters Towers (R)	40.01	11.72	1.44	Increase	Increase	Increase
Cherbourg (S)	0.00	0.26	0.00	Decrease	Increase	Decrease
Cloncurry (S)	34.44	13.93	1.73	Increase	Increase	Increase
Cook (S)	95.67	50.50	17.49	Decrease	Decrease	Decrease
Croydon (S)	52.07	18.63	1.98	Increase	Increase	Increase
Diamantina (S)	4.63	3.52	3.97	Increase	Decrease	Increase
Doomadgee (S)	0.89	0.48	0.09	Increase	Increase	Increase
Douglas (S)	73.99	42.56	13.53	Increase	Increase	Increase
Etheridge (S)	37.89	10.53	1.15	Increase	Increase	Increase
Flinders (S)	46.87	13.61	2.29	Increase	Increase	Increase

LGA of registration	Trailable		Non-trailable	Change in incidence of boat ownership, 2005-2016		
Fraser Coast (R)	66.53	26.79	7.61	Increase	Increase	Increase
Gladstone (R)	79.06	35.29	8.60	Increase	Increase	Increase
Gold Coast (C)	37.91	15.37	6.89	Increase	Decrease	Increase
Goondiwindi (R)	56.75	16.61	1.96	Increase	Increase	Increase
Gympie (R)	53.76	19.88	5.72	Increase	Decrease	Decrease
Hinchinbrook (S)	127.50	47.34	8.75	Increase	Increase	Increase
Hope Vale (S)	9.23	12.70	2.24	Increase	Increase	Increase
Ipswich (C)	22.38	8.70	1.50	Increase	Decrease	Decrease
Isaac (R)	66.00	27.22	4.91	Decrease	Increase	Increase
Kowanyama (S)	12.03	1.04	0.19	Increase	Increase	Increase
Livingstone (S)	76.25	35.82	11.49	Increase	Increase	Increase
Lockhart River (S)	13.47	9.89	3.44	Increase	Increase	Increase
Lockyer Valley (R)	28.06	10.09	1.64	Increase	Increase	Increase
Logan (C)	24.97	11.89	3.11	Increase	Increase	Decrease
Longreach (R)	44.70	11.47	1.31	Increase	Increase	Increase
Mackay (R)	80.15	26.34	7.12	Increase	Increase	Increase
McKinlay (S)	44.64	21.46	2.75	Increase	Increase	Increase
Mapoon (S)	11.81	20.58	2.47	Increase	Increase	Increase
Maranoa (R)	33.16	10.21	1.05	Increase	Increase	Increase
Mareeba (S)	41.49	15.42	3.37	Decrease	Increase	Increase
Moreton Bay (R)	35.99	14.15	3.83	Increase	Increase	Increase
Mornington (S)	13.72	8.46	0.69	Increase	Increase	Increase
Mount Isa (C)	34.93	16.02	1.80	Increase	Increase	Increase
Murweh (S)	24.34	7.78	0.96	Increase	Increase	Increase
Napranum (S)	2.55	1.05	0.10	Increase	Increase	Increase
Noosa (S)	49.02	20.44	5.63	Increase	Increase	Decrease
North Burnett (R)	56.88	14.71	2.21	Increase	Increase	Increase
Northern Peninsula Area (R)	13.50	16.20	2.89	Increase	Increase	Increase
Palm Island (S)	16.22	10.97	1.26	Increase	Increase	Increase
Paroo (S)	18.54	4.45	0.68	Increase	Increase	Increase
Pormpuraaw (S)	8.67	1.63	0.46	Increase	Increase	Decrease
Quilpie (S)	31.95	4.81	1.14	Increase	Increase	Increase
Redland (C)	45.06	25.97	9.87	Increase	Increase	Increase
Richmond (S)	54.01	21.46	1.50	Increase	Increase	Increase
Rockhampton (R)	38.81	15.38	3.87	Increase	Increase	Increase
Scenic Rim (R)	29.04	11.75	3.48	Increase	Decrease	Decrease
Somerset (R)	36.11	11.96	2.16	Increase	Increase	Increase
South Burnett (R)	37.61	12.34	1.85	Increase	Increase	Increase
Southern Downs (R)	26.78	7.78	1.01	Increase	Increase	Increase
Sunshine Coast (R)	39.41	14.10	4.13	Increase	Increase	Increase
Tablelands (R)	59.99	22.48	4.76	Increase	Increase	Increase
Toowoomba (R)	24.81	8.34	1.32	Increase	Increase	Increase
Torres (S)	36.94	52.51	8.75	Decrease	Decrease	Decrease
Torres Strait Island (R)	1.24	2.16	0.38	Increase	Increase	Increase
Townsville (C)	45.60	19.29	4.71	Decrease	Increase	Increase
Weipa (T)	94.96	81.45	13.46	Increase	Increase	Increase
Western Downs (R)	39.52	16.37	2.15	Increase	Increase	Increase
Whitsunday (R)	95.32	47.25	22.39	Increase	Increase	Increase
Winton (S)	26.57	7.06	1.06	Increase	Increase	Increase
Woorabinda (S)	17.89	4.02	0.24	Increase	Decrease	Decrease
Wujal Wujal (S)	18.41	8.76	1.27	Increase	Increase	Increase
Yarrabah (S)	14.68	5.85	0.80	Increase	Increase	Increase

Note: Decrease – a decline in the incidence of boat ownership per 1,000 persons between 2005 and 2016, Increase – an increase in the incidence of boat ownership per 1,000 persons between 2005 and 2016.
Source: Economic Associates estimates based on data provided by TMR

2.2.3 Projected population by LGA

To project boat registrations by LGA, this analysis assumes that the incidence of new boat registrations post 2016 is consistent with the 2005-2016 average (as outlined in Table 2.3 above).

The assessment has relied on the latest projections prepared by the Queensland Government Statistician's office (Queensland Government 2015, Population Projections by LGA, medium series), rebased to take into consideration the 2016 population estimates published by the Australian Bureau of Statistics (released subsequent to the 2016 Census of Population and Housing).

Table 2.4 below outlines the projected population of each LGA in Queensland.

Table 2.4: Projected population by LGA, medium series, 2016-2036

	2016	2021	2026	2031	2036
Aurukun (S)	1,323	1,348	1,429	1,508	1,583
Balonne (S)	4,480	4,424	4,391	4,370	4,360
Banana (S)	14,607	14,871	15,147	15,394	15,610
Barcaldine (R)	2,909	2,917	2,930	2,944	2,961
Barcoo (S)	272	260	250	241	233
Blackall-Tambo (R)	1,924	1,936	1,957	1,978	2,004
Boulia (S)	437	431	426	419	413
Brisbane (C)	1,184,215	1,253,917	1,313,403	1,382,062	1,442,700
Bulloo (S)	360	346	332	319	306
Bundaberg (R)	94,453	99,443	105,027	110,562	116,082
Burdekin (S)	17,313	17,584	17,932	18,237	18,482
Burke (S)	342	366	390	414	436
Cairns (R)	162,451	176,549	192,763	209,532	226,125
Carpentaria (S)	2,051	2,066	2,088	2,112	2,136
Cassowary Coast (R)	29,396	29,217	29,215	29,362	29,623
Central Highlands (R)	28,783	30,502	32,128	33,686	35,239
Charters Towers (R)	12,074	12,228	12,368	12,536	12,697
Cherbourg (S)	1,296	1,327	1,370	1,423	1,475
Cloncurry (S)	3,114	3,129	3,164	3,212	3,250
Cook (S)	4,424	4,460	4,489	4,500	4,501
Croydon (S)	300	303	311	318	324
Diamantina (S)	297	290	283	276	270
Doomadgee (S)	1,474	1,554	1,639	1,724	1,811
Douglas (S)	11,997	12,618	13,350	14,121	14,903
Etheridge (S)	819	801	797	793	789
Flinders (S)	1,569	1,523	1,482	1,443	1,409
Fraser Coast (R)	102,953	109,451	117,758	126,200	133,958
Gladstone (R)	63,288	71,179	79,595	88,257	96,407
Gold Coast (C)	576,918	637,516	716,113	800,916	888,608
Goondiwindi (R)	10,837	10,911	11,014	11,125	11,241
Gympie (R)	50,292	52,742	55,650	58,570	61,556
Hinchinbrook (S)	10,990	10,588	10,172	9,728	9,274
Hope Vale (S)	967	1,042	1,118	1,191	1,263
Ipswich (C)	200,123	239,761	312,287	397,611	494,461
Isaac (R)	21,563	22,822	24,381	26,033	27,637
Kowanyama (S)	984	1,016	1,049	1,082	1,115
Livingstone (S)	37,055	40,446	44,904	49,930	55,691
Lockhart River (S)	747	833	926	1,021	1,115
Lockyer Valley (R)	39,486	43,477	47,824	52,301	56,757
Logan (C)	313,785	343,395	386,764	432,492	493,469
Longreach (R)	3,727	3,622	3,530	3,441	3,360
Mackay (R)	117,703	126,031	136,237	147,596	159,564
McKinlay (S)	810	830	849	865	879

	2016	2021	2026	2031	2036
Mapoon (S)	322	333	345	357	369
Maranoa (R)	12,928	13,611	14,438	15,292	16,147
Mareeba (S)	22,157	22,293	22,459	22,581	22,684
Moreton Bay (R)	438,313	484,280	536,815	584,862	627,462
Mornington (S)	1,196	1,277	1,358	1,435	1,511
Mount Isa (C)	19,332	20,060	20,821	21,553	22,266
Murweh (S)	4,391	4,306	4,235	4,167	4,109
Napranum (S)	1,001	1,025	1,049	1,068	1,086
Noosa (S)	54,033	55,976	58,591	60,599	62,406
North Burnett (R)	10,623	10,454	10,367	10,273	10,169
Northern Peninsula Area (R)	2,952	3,153	3,352	3,537	3,707
Palm Island (S)	2,602	2,724	2,854	2,981	3,105
Paroo (S)	1,686	1,605	1,534	1,468	1,408
Pormpuraaw (S)	785	828	874	919	964
Quilpie (S)	833	798	766	735	706
Redland (C)	151,987	162,352	173,030	180,987	185,065
Richmond (S)	800	761	730	703	680
Rockhampton (R)	81,589	85,694	90,105	94,555	99,104
Scenic Rim (R)	40,975	45,769	51,157	57,608	63,336
Somerset (R)	25,173	27,640	30,367	33,183	35,991
South Burnett (R)	32,747	34,237	36,000	37,783	39,542
Southern Downs (R)	35,622	36,827	38,046	39,262	40,452
Sunshine Coast (R)	303,389	338,162	379,049	423,122	467,945
Tablelands (R)	25,312	26,192	27,315	28,489	29,659
Toowoomba (R)	164,595	173,366	183,672	194,109	204,314
Torres (S)	3,789	3,900	4,028	4,161	4,301
Torres Strait Island (R)	4,785	4,836	4,898	4,958	5,022
Townsville (C)	192,058	211,600	233,015	255,311	278,025
Weipa (T)	4,024	4,373	4,646	5,008	5,347
Western Downs (R)	34,197	35,682	37,248	38,794	40,283
Whitsunday (R)	34,626	37,290	40,187	42,964	45,873
Winton (S)	1,156	1,118	1,085	1,055	1,028
Woorabinda (S)	992	1,014	1,045	1,077	1,114
Wujal Wujal (S)	296	303	310	316	321
Yarrabah (S)	2,703	2,835	3,006	3,184	3,363
Total	**4,848,877**	**5,246,746**	**5,728,030**	**6,240,301**	**6,764,941**

Source: Queensland Treasury (2016), ABS (2017b)

2.3 Projected size of recreational boating fleet

2.3.1 Projected size of fleet by LGA of registration

Based on the assumptions outlined above, the projected size of the recreational boating fleet registered in Queensland is projected to increase from 279,586 boats in 2016 to 381,988 boats in 2036, with the composition in 2036 anticipated to be as follows:

- 251,600 trailable boats up to 4.5 metres in length
- 100,795 trailable boats 4.5 – 8 metres in length
- 29,594 non-trailable boats.

Growth in the number of registrations is anticipated to be highest in a number of South-east Queensland councils, Cairns Regional Council, Townsville City Council and Mackay Regional Council.

Table 2.5 below summarises the projected size of the recreational boating fleet in Queensland by LGA of registration, between 2016 and 2036.

Table 2.5: Projected size of recreational boating fleet by LGA of registration, 2016-2036

	Trailable Fleet up to 4.5 metres					Trailable Fleet 4.5 - 8 metres					Non-Trailable Fleet				
	2016	2021	2026	2031	2036	2016	2021	2026	2031	2036	2016	2021	2026	2031	2036
Aurukun (S)	9	9	10	11	12	9	9	9	9	10	0	0	0	1	1
Balonne (S)	229	227	225	225	224	93	92	92	91	91	14	14	14	14	14
Banana (S)	928	943	959	973	986	371	377	382	388	392	54	55	56	57	57
Barcaldine (R)	120	120	121	121	122	46	46	46	46	47	6	6	6	6	6
Barcoo (S)	22	21	21	20	20	7	7	7	7	7	2	2	2	2	2
Blackall-Tambo (R)	73	73	74	75	76	24	24	24	25	25	3	3	3	3	3
Boulia (S)	11	11	11	11	10	2	2	2	2	2	0	0	0	0	0
Brisbane (C)	18,600	19,688	20,615	21,686	22,630	7,539	8,022	8,436	8,914	9,337	3,009	3,207	3,377	3,573	3,746
Bulloo (S)	10	10	9	9	8	2	2	2	1	1	0	0	0	0	0
Bundaberg (R)	7,483	7,853	8,267	8,677	9,086	1,711	1,794	1,887	1,980	2,072	418	440	464	488	511
Burdekin (S)	2,560	2,598	2,647	2,690	2,724	887	899	914	927	937	123	125	127	128	130
Burke (S)	34	35	37	38	39	14	14	15	15	16	2	2	3	3	3
Cairns (R)	6,650	7,208	7,850	8,514	9,172	3,584	3,867	4,194	4,531	4,865	996	1,075	1,166	1,260	1,353
Carpentaria (S)	148	149	151	153	155	79	80	81	81	82	14	14	14	14	14
Cassowary Coast (R)	2,718	2,702	2,702	2,715	2,739	1,576	1,567	1,567	1,574	1,586	298	296	296	298	300
Central Highlands (R)	1,507	1,592	1,673	1,751	1,828	720	761	799	836	872	120	126	132	138	144
Charters Towers (R)	524	530	536	542	549	170	172	174	176	177	23	23	23	24	24
Cherbourg (S)	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0
Cloncurry (S)	125	126	127	128	130	55	55	56	56	57	6	6	6	6	6
Cook (S)	304	307	310	311	311	177	179	180	181	181	67	68	68	69	69
Croydon (S)	11	11	12	12	12	4	4	4	4	4	0	0	0	0	0
Diamantina (S)	6	6	6	6	6	0	0	0	0	0	1	1	1	1	1
Doomadgee (S)	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0
Douglas (S)	908	954	1,008	1,065	1,123	664	691	722	755	788	175	183	193	204	214
Etheridge (S)	38	37	37	37	37	12	11	11	11	11	1	1	1	1	1
Flinders (S)	83	81	79	77	75	30	30	29	28	28	7	7	7	7	6
Fraser Coast (R)	7,252	7,685	8,237	8,799	9,315	2,902	3,076	3,299	3,525	3,733	821	870	933	997	1,056
Gladstone (R)	5,148	5,772	6,437	7,122	7,766	2,435	2,713	3,010	3,316	3,604	538	606	679	753	823
Gold Coast (C)	24,407	26,704	29,684	32,899	36,224	8,121	9,052	10,260	11,564	12,911	3,739	4,156	4,698	5,282	5,887
Goondiwindi (R)	659	663	669	675	682	202	203	204	206	208	25	26	26	26	26
Gympie (R)	2,656	2,787	2,944	3,101	3,261	937	986	1,044	1,102	1,161	235	249	266	282	299
Hinchinbrook (S)	1,428	1,376	1,323	1,267	1,209	635	616	596	575	553	118	114	111	107	103
Hope Vale (S)	17	18	18	19	20	14	15	16	17	18	4	4	4	4	4
Ipswich (C)	4,537	5,423	7,046	8,955	11,122	1,630	1,975	2,606	3,349	4,192	282	342	450	578	723
Isaac (R)	1,381	1,464	1,567	1,676	1,782	611	646	688	733	777	111	117	124	132	140
Kowanyama (S)	8	8	9	9	10	1	1	1	1	1	0	0	0	0	0
Livingstone (S)	2,821	3,079	3,419	3,803	4,242	1,507	1,628	1,788	1,968	2,174	504	543	594	652	718
Lockhart River (S)	7	8	9	11	12	5	6	7	8	9	4	4	4	5	5
Lockyer Valley (R)	1,285	1,397	1,519	1,644	1,770	461	501	545	590	635	78	85	92	99	106
Logan (C)	8,691	9,431	10,514	11,655	13,178	3,593	3,945	4,461	5,005	5,730	789	881	1,016	1,158	1,347
Longreach (R)	191	186	182	178	175	59	58	57	56	55	7	6	6	6	6
Mackay (R)	9,909	10,577	11,395	12,305	13,265	3,515	3,734	4,003	4,302	4,617	814	873	946	1,027	1,112
McKinlay (S)	48	49	50	50	51	21	21	22	22	22	4	4	4	4	4
Mapoon (S)	8	8	8	8	9	5	5	5	5	6	0	0	1	1	1
Maranoa (R)	544	567	594	622	651	180	187	196	204	213	22	23	23	24	25
Mareeba (S)	838	844	851	856	860	353	355	358	360	361	79	79	80	80	80

	Trailable Fleet up to 4.5 metres					Trailable Fleet 4.5 - 8 metres					Non-Trailable Fleet				
	2016	**2021**	**2026**	**2031**	**2036**	**2016**	**2021**	**2026**	**2031**	**2036**	**2016**	**2021**	**2026**	**2031**	**2036**
Moreton Bay (R)	16,249	17,903	19,793	21,523	23,056	5,992	6,642	7,386	8,065	8,668	1,637	1,813	2,014	2,198	2,361
Mornington (S)	16	17	18	19	20	13	13	14	15	15	2	2	2	2	2
Mount Isa (C)	700	725	752	778	802	402	413	425	437	449	43	45	46	47	49
Murweh (S)	137	135	133	131	130	46	46	45	45	44	6	6	6	5	5
Napranum (S)	7	7	7	7	7	4	4	4	4	4	0	0	0	0	0
Noosa (S)	2,564	2,659	2,787	2,886	2,974	1,175	1,214	1,268	1,309	1,346	290	301	316	327	338
North Burnett (R)	633	623	618	613	607	182	180	178	177	175	26	26	25	25	25
Northern Peninsula Area (R)	25	28	30	33	35	46	49	52	55	58	9	10	10	11	11
Palm Island (S)	43	45	47	49	51	37	38	40	41	42	6	6	6	7	7
Paroo (S)	40	38	37	36	35	12	11	11	11	10	2	2	2	2	2
Pormpuraaw (S)	3	3	4	4	5	1	1	1	1	1	0	0	0	0	0
Quilpie (S)	32	31	30	29	28	8	8	8	8	7	1	1	1	1	1
Redland (C)	7,692	8,159	8,640	8,998	9,182	3,897	4,166	4,444	4,650	4,756	1,473	1,575	1,680	1,759	1,799
Richmond (S)	45	43	41	40	39	20	19	18	17	17	2	1	1	1	1
Rockhampton (R)	3,777	3,936	4,107	4,280	4,456	1,405	1,468	1,536	1,604	1,674	292	307	325	342	359
Scenic Rim (R)	1,300	1,439	1,596	1,783	1,949	490	547	610	686	753	122	139	157	180	200
Somerset (R)	1,037	1,126	1,224	1,326	1,428	356	386	419	452	486	68	73	79	85	91
South Burnett (R)	1,447	1,503	1,569	1,636	1,702	450	469	490	512	534	66	69	72	75	78
Southern Downs (R)	1,119	1,151	1,184	1,216	1,248	314	323	333	342	351	42	44	45	46	47
Sunshine Coast (R)	12,641	14,011	15,623	17,360	19,126	4,148	4,638	5,214	5,836	6,468	1,225	1,368	1,537	1,720	1,905
Tablelands (R)	1,695	1,748	1,815	1,885	1,956	704	723	749	775	801	150	154	159	165	170
Toowoomba (R)	4,522	4,739	4,995	5,254	5,507	1,593	1,666	1,752	1,839	1,924	250	262	276	289	303
Torres (S)	107	111	116	121	126	172	177	184	191	198	32	33	34	36	37
Torres Strait Island (R)	6	6	6	6	6	9	9	9	10	10	2	2	2	2	2
Townsville (C)	8,289	9,180	10,156	11,173	12,209	3,998	4,375	4,788	5,218	5,656	916	1,008	1,109	1,214	1,321
Weipa (T)	230	263	289	323	356	237	265	287	317	344	37	42	46	50	55
Western Downs (R)	1,525	1,584	1,646	1,707	1,766	643	667	693	718	743	86	89	92	96	99
Whitsunday (R)	3,387	3,641	3,917	4,182	4,459	1,904	2,030	2,167	2,298	2,436	750	809	874	936	1,002
Winton (S)	32	31	30	29	29	11	11	11	10	10	2	2	2	2	2
Woorabinda (S)	3	3	4	5	5	0	0	0	0	0	0	0	0	0	0
Wujal Wujal (S)	4	4	4	4	4	4	4	4	4	4	0	0	0	0	0
Yarrabah (S)	36	38	40	43	46	25	26	27	28	29	3	3	3	3	4
Interstate	560	563	566	570	573	201	202	203	205	206	223	224	226	228	229
Overseas	0	0	0	0	0	0	0	0	0	0	5	5	5	5	5
Unknown	0	0	0	0	0	0	0	0	0	0	8	8	8	8	8
Total	**184,835**	**198,834**	**215,790**	**233,554**	**251,600**	**73,462**	**79,223**	**86,171**	**93,430**	**100,795**	**21,289**	**23,068**	**25,180**	**27,382**	**29,594**

Source: Economic Associates estimate, derived from Table 2.3 and Table 2.4

2.3.2 Allocation of recreational boating fleet to LGA of use

The projected recreational boating fleet estimates presented in Table 2.4 above outline the projected number of boat registrations in each LGA in Queensland, that is, the number of boat registrations by place of residence. However, boat owners may utilise their boat in multiple LGAs, including LGAs other than their place of residence.

In allocating boat registrations to LGA of use, the assessment undertook a review of the distribution of boating infrastructure throughout Queensland and was informed by consultation with LGA and port/water storage officers undertaken by GHD as part of this project.

Two matrices were compiled which outline the distribution of boat registrations to the relevant LGA/s of use, one for trailable boat registrations and the other for non-trailable boat registrations. These two matrices are presented in Appendix A.

In the case of trailable boat registrations, allocations were made only to those LGAs with identified public boating infrastructure. Based on information provided by GHD, the following LGAs in Table 2.6 did not appear to have any public boating infrastructure, and hence were not allocated any boat registrations for use in that LGA.

Table 2.6: LGAs with no boating infrastructure for trailable vessels

Barcoo (S)	Flinders (S)
Blackall-Tambo (R)	Longreach (R)
Boulia (S)	Mareeba (S)
Bulloo (S)	Paroo (S)
Cherbourg (S)	Quilpie (S)
Cloncurry (S)	Richmond (S)
Croydon (S)	Winton (S)
Etheridge (S)	Woorabinda (S)

Non-trailable boats, on the other hand, were assumed to be used only in the coastal LGAs listed in Table 2.7 below.

Table 2.7: Coastal LGAs capturing non-trailable boat registrations

Brisbane (C)	Gold Coast (C)	
Bundaberg (R)	Gympie (R)	Northern Peninsula Area (R)
Burdekin (S)	Hinchinbrook (S)	Palm Island (S)
Burke (S)	Hope Vale (S)	Redland (C)
Cairns (R)	Isaac (R)	Rockhampton (R)
Carpentaria (S)	Livingstone (S)	Sunshine Coast (R)
Cassowary Coast (R)	Lockhart River (S)	Torres (S)
Cook (S)	Mackay (R)	Torres Strait Island (R)
Douglas (S)	Moreton Bay (R)	Townsville (C)
Fraser Coast (R)	Mornington (S)	Whitsunday (R)
Gladstone (R)	Noosa (S)	Yarrabah (S)

2.3.3 Projected size of fleet by LGA of use

Based on 2016 data, the size of the recreational boating fleet in Queensland is projected to increase from 272,472 boats in 2016 to 371,328 boats in 2036. The size of the recreational boating fleet in Queensland is approximately 3% lower than total boats registered in Queensland

as a result of vessel registration leakage, predominantly from the Gold Coast to northern New South Wales.

A number of LGAs are anticipated to record significant registration inflows, including:

- Redland City Council (net inflow of 8,740 vessels in 2016, increasing to 14,247 vessels in 2036)
- Gold Coast City Council (net inflow of 4,594 vessels in 2016, increasing to 7,844 vessels in 2036)
- Somerset Regional Council (net inflow of 3,075 vessels in 2016, increasing to 3,697 vessels in 2036)
- Sunshine Coast Regional Council (net inflow of 1,966 vessels in 2016, increasing to 2,314 vessels in 2036)
- Hinchinbrook Shire Council (net inflow of 1,894 vessels in 2016, increasing to 2,858 vessels in 2036)
- Scenic Rim Regional Council (net inflow of 1,559 vessels in 2016, increasing to 1,608 vessels in 2036)
- Cassowary Coast Regional Council (net inflow of 1,131 vessels in 2016, increasing to 1,350 vessels in 2036).

Table 2.8 below summarises the projected size of the recreational boating fleet by LGA of use, between 2016 and 2036.

Table 2.8: Projected Size of Recreational Boating Fleet by LGA of Use, 2016-2036

	Trailable fleet up to 4.5 metres					Trailable fleet 4.5 - 8 metres					Non-trailable fleet				
	2016	2021	2026	2031	2036	2016	2021	2026	2031	2036	2016	2021	2026	2031	2036
Aurukun (S)	9	9	10	11	12	9	9	9	9	10	0	0	0	1	1
Balonne (S)	46	45	45	45	45	19	18	18	18	18	0	0	0	0	0
Banana (S)	450	460	471	481	491	184	189	193	197	201	0	0	0	0	0
Barcaldine (R)	281	275	269	264	260	91	90	88	87	86	0	0	0	0	0
Barcoo (S)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackall-Tambo (R)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boulia (S)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brisbane (C)	15,698	16,831	18,050	19,401	20,712	6,292	6,779	7,298	7,871	8,426	2,761	2,959	3,156	3,374	3,578
Bulloo (S)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bundaberg (R)	7,454	7,837	8,267	8,695	9,118	1,810	1,906	2,013	2,119	2,224	456	480	508	535	562
Burdekin (S)	2,853	2,937	3,035	3,130	3,219	1,060	1,091	1,128	1,164	1,199	184	191	199	208	216
Burke (S)	34	35	37	38	39	14	14	15	15	16	2	2	3	3	3
Cairns (R)	7,171	7,713	8,339	8,986	9,627	3,785	4,058	4,373	4,700	5,023	1,058	1,134	1,223	1,314	1,405
Carpentaria (S)	469	478	489	501	512	248	252	257	262	267	65	66	68	69	70
Cassowary Coast (R)	3,447	3,460	3,496	3,546	3,605	1,878	1,883	1,899	1,922	1,950	398	401	406	413	421
Central Highlands (R)	927	973	1,018	1,060	1,103	431	453	474	494	513	0	0	0	0	0
Charters Towers (R)	347	347	348	349	350	118	118	118	118	118	0	0	0	0	0
Cherbourg (S)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cloncurry (S)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cook (S)	509	514	519	521	523	264	267	269	270	271	11	11	11	11	11
Croydon (S)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diamantina (S)	6	6	6	6	6	0	0	0	0	0	0	0	0	0	0
Doomadgee (S)	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0
Douglas (S)	1,388	1,450	1,523	1,599	1,675	873	907	947	989	1,031	338	354	370	388	406
Etheridge (S)	0	0	0	0	0	12	11	11	11	11	0	0	0	0	0
Flinders (S)	0	0	0	0	0	30	30	29	28	28	0	0	0	0	0
Fraser Coast (R)	7,467	7,902	8,454	9,015	9,533	2,912	3,083	3,302	3,524	3,729	847	897	961	1,025	1,084
Gladstone (R)	5,514	6,108	6,743	7,396	8,011	2,499	2,760	3,039	3,326	3,597	558	622	690	760	826
Gold Coast (C)	26,541	29,038	32,440	36,153	40,195	9,501	10,545	11,964	13,509	15,198	4,818	5,322	5,985	6,705	7,473
Goondiwindi (R)	690	693	698	704	710	219	220	222	223	225	0	0	0	0	0
Gympie (R)	2,916	3,083	3,284	3,489	3,694	1,041	1,103	1,178	1,254	1,330	297	316	339	362	386
Hinchinbrook (S)	2,609	2,702	2,806	2,914	3,023	1,205	1,246	1,292	1,340	1,389	260	271	284	297	310
Hope Vale (S)	17	18	18	19	20	14	15	16	17	18	4	4	4	4	4
Ipswich (C)	1,179	1,410	1,832	2,328	2,892	424	514	678	871	1,090	0	0	0	0	0
Isaac (R)	1,715	1,822	1,953	2,093	2,232	730	772	824	879	934	153	162	173	185	197
Kowanyama (S)	8	8	9	9	10	1	1	1	1	1	0	0	0	0	0
Livingstone (S)	3,230	3,492	3,822	4,188	4,602	1,639	1,760	1,914	2,085	2,277	539	578	627	682	743
Lockhart River (S)	7	8	9	11	12	5	6	7	8	9	4	4	4	5	5
Lockyer Valley (R)	450	489	532	576	619	161	175	191	207	222	0	0	0	0	0
Logan (C)	2,173	2,358	2,628	2,914	3,295	898	986	1,115	1,251	1,432	0	0	0	0	0
Longreach (R)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mackay (R)	9,185	9,803	10,558	11,396	12,279	3,299	3,505	3,756	4,034	4,327	787	843	913	989	1,069
McKinlay (S)	48	49	50	50	51	21	21	22	22	22	0	0	0	0	0

	Trailable fleet up to 4.5 metres					Trailable fleet 4.5 - 8 metres					Non-trailable fleet				
	2016	**2021**	**2026**	**2031**	**2036**	**2016**	**2021**	**2026**	**2031**	**2036**	**2016**	**2021**	**2026**	**2031**	**2036**
Mapoon (S)	8	8	8	8	9	5	5	5	5	6	0	0	1	1	1
Maranoa (R)	326	340	356	373	390	108	112	117	123	128	0	0	0	0	0
Mareeba (S)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Moreton Bay (R)	15,743	17,253	18,933	20,506	21,904	5,804	6,395	7,053	7,669	8,216	1,649	1,814	1,997	2,169	2,322
Mornington (S)	16	17	18	19	20	13	13	14	15	15	2	2	2	2	2
Mount Isa (C)	526	544	562	581	598	294	302	311	319	327	0	0	0	0	0
Murweh (S)	263	258	254	250	247	82	81	80	79	78	0	0	0	0	0
Napranum (S)	7	7	7	7	7	4	4	4	4	4	0	0	0	0	0
Noosa (S)	2,923	3,071	3,259	3,426	3,586	1,251	1,309	1,382	1,447	1,509	339	356	378	397	416
North Burnett (R)	534	527	523	519	514	156	154	153	152	151	11	11	11	11	11
Northern Peninsula Area (R)	25	28	30	33	35	46	49	52	55	58	9	10	10	11	11
Palm Island (S)	43	45	47	49	51	37	38	40	41	42	6	6	6	7	7
Paroo (S)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pormpuraaw (S)	3	3	4	4	5	1	1	1	1	1	0	0	0	0	0
Quilpie (S)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Redland (C)	13,870	14,948	16,310	17,667	18,993	6,030	6,549	7,187	7,805	8,389	1,901	2,062	2,256	2,437	2,602
Richmond (S)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rockhampton (R)	4,228	4,439	4,674	4,917	5,169	1,669	1,757	1,855	1,957	2,063	418	442	469	496	525
Scenic Rim (R)	2,570	2,736	2,924	3,134	3,328	901	962	1,032	1,110	1,183	0	0	0	0	0
Somerset (R)	3,327	3,529	3,747	3,972	4,191	1,209	1,280	1,356	1,435	1,511	0	0	0	0	0
South Burnett (R)	1,302	1,353	1,412	1,473	1,532	406	423	442	462	482	0	0	0	0	0
Southern Downs (R)	1,319	1,373	1,433	1,494	1,554	556	577	601	625	648	0	0	0	0	0
Sunshine Coast (R)	13,897	15,342	17,026	18,808	20,593	4,685	5,209	5,820	6,465	7,110	1,397	1,551	1,730	1,920	2,110
Tablelands (R)	678	699	726	754	782	281	289	299	310	321	0	0	0	0	0
Toowoomba (R)	904	948	999	1,051	1,101	319	333	350	368	385	0	0	0	0	0
Torres (S)	107	111	116	121	126	172	177	184	191	198	32	33	34	36	37
Torres Strait Island (R)	6	6	6	6	6	9	9	9	10	10	2	2	2	2	2
Townsville (C)	7,073	7,785	8,566	9,379	10,207	3,359	3,660	3,990	4,333	4,683	779	853	933	1,017	1,103
Weipa (T)	230	263	289	323	356	237	265	287	317	344	0	0	0	0	0
Western Downs (R)	1,095	1,132	1,173	1,215	1,255	440	455	471	486	502	0	0	0	0	0
Whitsunday (R)	3,900	4,180	4,490	4,795	5,115	2,039	2,170	2,315	2,457	2,605	754	814	879	942	1,008
Winton (S)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Woorabinda (S)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wujal Wujal (S)	4	4	4	4	4	4	4	4	4	4	0	0	0	0	0
Yarrabah (S)	36	38	40	43	46	25	26	27	28	29	3	3	3	3	4
Total	**179,803**	**193,341**	**209,700**	**226,820**	**244,200**	**71,825**	**77,399**	**84,104**	**91,102**	**98,196**	**20,844**	**22,580**	**24,638**	**26,781**	**28,932**

Source: Economic Associates estimates, derived from Table 2.5, Table A.1 and Table A.2

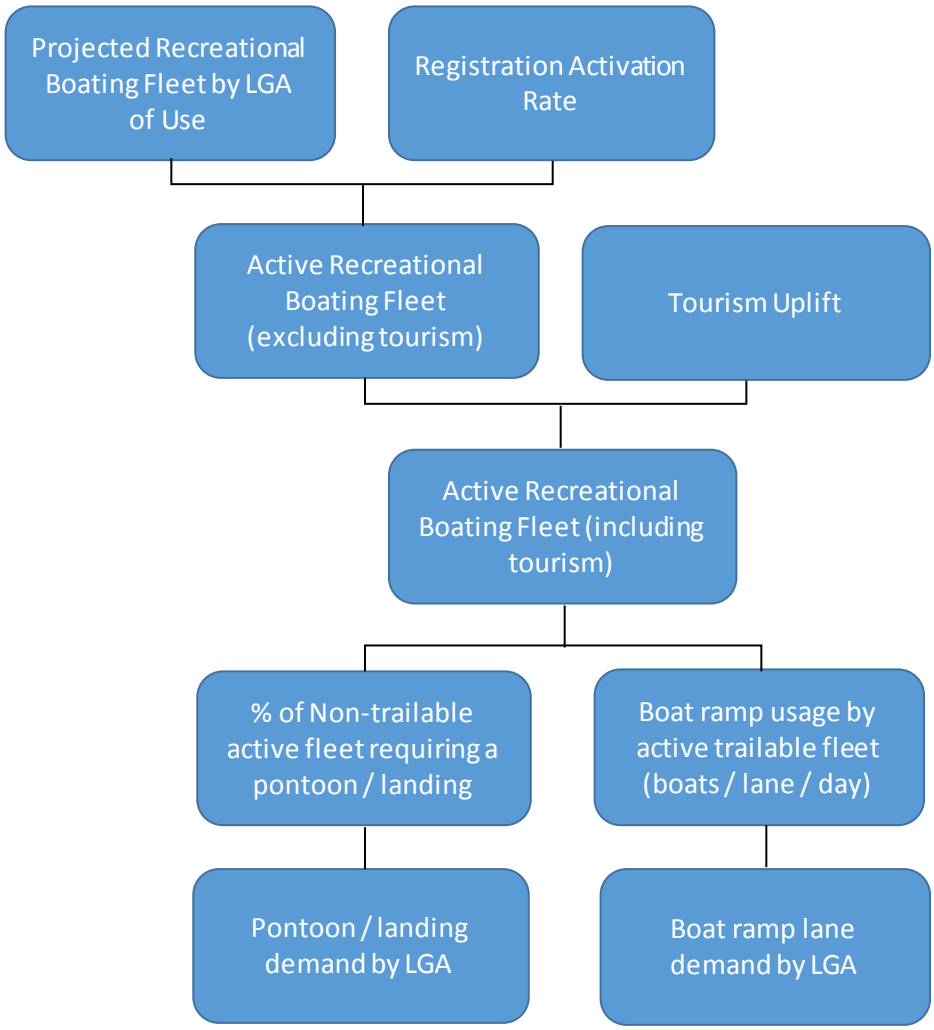
3 INFRASTRUCTURE DEMAND ASSESSMENT

This section converts recreational boating fleet projections into infrastructure demand projections for boat ramp lanes and landings (i.e. publically accessible deep-draught vessel pontoons) at the LGA level.

In determining infrastructure demand, the assessment estimates the likely number of boats being utilised on a day of average demand. This estimate is described as the active fleet. From here, assumptions are made relating to the relationship between trailable boats and boat ramp lane demand, and the relationship between non-trailable boats and likely landings demand.

Figure 3.1 below outlines the methodology utilised to calculate boat ramp lane and landings demand.

Figure 3.1: Methodology to calculate boat ramp lane and landings demand at the LGA level



3.1 Size of active fleet assumptions

3.1.1 Registration activation rate

TMR recognises three levels of demand for marine facilities, namely:

- off-peak demand – typical weekday usage
- average demand – taken to be demand for a facility on weekends (and, for certain regional locations, other busy periods)
- peak demand – demand for a facility at peak holiday periods or for special events.

The *Recreational Boating Facilities Demand Forecasting Study 2011* identified the proportion of the recreational boating fleet likely to use boating facilities for each level of demand (referred to herein as the registration activation rate):

- off-peak demand: 8%
- average demand: 14%
- peak demand: 20%.

TMR policy on catering for marine facility demand is as follows:

> *TMR expects off-peak demand at a given facility to be met in almost all circumstances. Its program of works is aimed at satisfying average demand.*
>
> *TMR does not cater for peak demand. This is because funds (provided largely by collection of recreational boat registration fees) are stretched meeting demand for basic marine infrastructure such as dredging, landings, breakwaters and boat ramps around the state, and local managing authorities cannot allocate sufficient resources (land and funds) for peak demand days. Scarce foreshore land is in intense demand for other purposes, as is funding.*

An initial assessment of demand identified that applying the average demand activation rate state-wide substantially overestimated the current and projected demand for facilities in some LGAs, based on complaints and observed levels of congestion at various facilities in those LGAs.

Therefore, unlike the *Recreational Boating Facilities Demand Forecasting Study 2011*, this study has considered differing registration activation rates by LGA.

This approach has been taken to recognise that the level of boat usage is likely to differ by LGA, depending on a range of factors, including access to recreational boating facilities, the range of recreational activities other than boating available to the community, the recreational time available to boat users (for example, retirees are likely to have more available time to undertake boating activities than persons employed on a fulltime basis), and nature of employment (for example, persons who finish work in the early afternoon are likely to have more available time to undertake boating activities than persons who finish work in the evening).

The consultation with LGA and port/water storage managers undertaken by GHD as part of this study indicated that recreational boaters typically use their boat to go fishing. A literature review was undertaken to identify the socio-economic and demographic characteristics of persons who participated in recreational fishing.

Ormsby, Jayne (2004) undertook a survey to identify the social, motivational and experiential aspects of recreational fishing by anglers from Queensland. The survey identified that just under

a quarter of respondents were classified as tradespersons and related workers, significantly higher than any other occupational class.

The Australian Bureau of Statistics (ABS) (2010) considers the participation rate of Australians in a number of sports, including fishing. This research identified that the participation rate for fishing was highest for the 55-64 year age cohort, followed by the 45-54 year age cohort. Interestingly, this result directly contradicts the findings of Department of Agriculture and Fisheries (2014), which identifies recreational fishing participation rates as being highest for the 5-14 year age cohort, and lowest for the 60+ year age cohort.

Participation rates in both studies represent the proportion of persons that participate in fishing in a given year, but do not provide insight as to the frequency of participation in that year. This means that while a certain age cohort may have a high participation rate, these persons may only go fishing once a year, while other age cohorts might have lower participation rates but higher frequency of participation. The literature review did not identify any information in relation to the frequency of participation in fishing or recreational boating by age cohort.

Our assessment has assumed that a higher average age is likely to correspond with a higher frequency of recreational boat usage, due to the greater availability of time for recreational pursuits, such as fishing and boating.

Within each LGA, the following factors were considered in refining the appropriate registration activation rate.

- incidence of blue collar employment (based on 2016 Census)
- average age of residents (based on 2016 Census)
- remoteness classification by local government area (Accessibility/Remoteness Index of Australia (ARIA+))
- whether the LGA was coastal.

ARIA+ is an index of remoteness derived from measures of road distances between populated localities to each of five categories of service centre, namely:

- distance between populated locality and population centre of 250,000+ persons
- distance between populated locality and population centre of 48,000-249,999 persons
- distance between populated locality and population centre of 18,000-47,999 persons
- distance between populated locality and population centre of 5,000-17,999 persons
- distance between populated locality and population centre of 1,000-4,999 persons.

The five distance measurements, one to each level of service centre, is recorded for each populated locality and standardised to a ratio. The ratio is calculated by dividing the measured distance for a given locality by the Australian average (mean) for that category. After applying a threshold of three to each of the ratios, all ratios are summed to produce the ARIA+ score for each populated locality across Australia. An interpolation procedure is then used to derive the index values for larger geographic areas such as LGAs.

ARIA+ is the endorsed measure of remoteness utilised by the ABS.

The fit between the ARIA+ remoteness classifications and our classification is summarised in Table 3.1 below.

Table 3.1: Fit between ARIA+ remoteness classification and EA classification

ARIA+ remoteness classification	EA classification
Highly accessible / accessible	Metropolitan
Moderately accessible	Regional centre
Remote	Remote
Very remote	Very Remote

To determine the appropriate registration activation rate, the following steps were taken:

- All LGAs with an ARIA+ classification of highly accessible or accessible (we have called metropolitan) were assigned a registration activation rate of 8%.
- All LGAs with an ARIA+ classification of moderately accessible (we have called regional centre) were assigned a registration activation rate as follows:
  - If the LGA has a higher incidence of blue collar workers and a higher average age than Queensland – registration activation rate is 12%.
  - For all other LGAs – registration activation rate is 10%.
- All LGAs with an ARIA+ classification of remote were assigned a registration activation rate as follows:
  - If the LGA has a higher incidence of blue collar workers and a higher average age than Queensland – registration activation rate is 14%.
  - All other LGAs – registration activation rate is 12%.
- All LGAs with an ARIA+ classification of very remote were assigned a registration activation rate of 14%.

After completing this first assessment, the registration activation rates were then adjusted to reflect whether the LGA was coastal or not. If the LGA was coastal, the registration activation rate remained unchanged. However, if the LGA was non-coastal, the registration activation rate was adjusted downwards by 2% (for example, if the registration activation rate was 12% and the LGA was non-coastal, the adjusted activation rate was 10%). This adjustment was made to reflect the extra travel distance required to access recreational boating facilities relative to persons who resided in coastal LGAs. It is considered that the further a person has to travel to access recreational boating facilities, the less often these facilities will typically be utilised. If the registration activation rate was already 8%, the rate remained unchanged.

A further reduction in activation was applied to a number of coastal LGAs in South-east Queensland with a broad offering of recreational activities, including boating, where it was determined that the appropriate registration activation rate was in the order of 6%-7%.

Based on the above criteria, Table 3.2 below summarises the activation rates applied to each LGA in Queensland.

Table 3.2: Assumed activation rate by LGA, Queensland

	% Blue collar workers	Average age	Remoteness	Coastal?	Activation rate
Aurukun (S)	33.6%	29.2	Very Remote	y	14%
Balonne (S)	35.1%	38.9	Remote	n	12%
Banana (S)	45.5%	37.5	Remote	n	10%
Barcaldine (R)	35.1%	39.6	Very Remote	n	12%
Barcoo (S)	50.0%	41.4	Very Remote	n	12%
Blackall-Tambo (R)	34.7%	42.9	Very Remote	n	12%
Boulia (S)	54.1%	34.1	Very Remote	n	12%
Brisbane City	22.0%	36.8	Metropolitan	y	6%
Bulloo (S)	42.5%	33.8	Very Remote	n	12%
Bundaberg (R)	37.7%	42.9	Regional Centre	y	12%
Burdekin (S)	42.9%	42.5	Regional Centre	y	12%
Burke (S)	38.8%	39.3	Very Remote	y	14%
Cairns (R)	30.5%	37.3	Regional Centre	y	10%
Carpentaria (S)	41.2%	37.1	Very Remote	y	14%
Cassowary Coast (R)	44.1%	41.7	Remote	y	14%
Central Highlands (R)	47.9%	33.4	Remote	n	10%
Charters Towers (R)	40.3%	39.3	Remote	n	12%
Cherbourg (S)	30.0%	25.2	Very Remote	n	12%
Cloncurry (S)	48.8%	35.6	Very Remote	n	12%
Cook (S)	38.3%	39.1	Remote	y	14%
Croydon (S)	40.7%	35.6	Very Remote	n	12%
Diamantina (S)	45.3%	32.9	Very Remote	n	12%
Doomadgee (S)	27.2%	23.7	Very Remote	y	14%
Douglas (S)	35.7%	41.4	Regional Centre	y	12%
Etheridge (S)	43.0%	39.5	Very Remote	n	12%
Flinders (S)	37.2%	40.5	Very Remote	n	12%
Fraser Coast (R)	34.4%	44.7	Regional Centre	y	12%
Gladstone (R)	46.8%	35.6	Regional Centre	y	10%
Gold Coast (C)	29.8%	39.1	Metropolitan	y	6%
Goondiwindi (R)	37.8%	39.2	Regional Centre	n	10%
Gympie (R)	40.1%	42.9	Metropolitan	y	8%
Hinchinbrook (S)	40.9%	46.1	Remote	y	14%
Hope Vale (S)	42.2%	28.3	Very Remote	y	14%
Ipswich (C)	37.7%	34.2	Metropolitan	n	8%
Isaac (R)	55.6%	32.0	Remote	y	12%
Kowanyama (S)	34.8%	29.8	Very Remote	y	14%
Livingstone (S)	38.2%	40.6	Very Remote	y	14%
Lockhart River (S)	35.3%	25.6	Very Remote	y	14%
Lockyer Valley (R)	43.4%	38.7	Metropolitan	n	8%
Logan (C)	40.3%	35.4	Metropolitan	n	8%
Longreach (R)	32.0%	39.6	Very Remote	n	12%
Mackay (R)	43.4%	37.5	Regional Centre	y	10%
McKinlay (S)	40.2%	36.6	Very Remote	n	12%
Mapoon (S)	26.8%	32.6	Very Remote	y	14%
Maranoa (R)	35.4%	37.4	Remote	n	10%
Mareeba (S)	36.6%	41.4	Remote	n	12%
Moreton Bay (R)	33.4%	38.0	Metropolitan	y	7%
Mornington (S)	30.8%	29.1	Very Remote	y	14%
Mount Isa (C)	47.2%	32.4	Very Remote	n	12%
Murweh (S)	37.6%	38.8	Very Remote	n	12%
Napranum (S)	52.3%	28.7	Very Remote	y	14%
Noosa (S)	30.8%	44.9	Metropolitan	y	8%
North Burnett (R)	40.3%	43.7	Regional Centre	n	10%
Northern Peninsula Area (R)	32.3%	26.0	Very Remote	y	14%
Palm Island (S)	28.0%	27.4	Very Remote	y	14%
Paroo (S)	28.0%	41.2	Very Remote	n	12%
Pormpuraaw (S)	33.3%	30.5	Very Remote	y	14%
Quilpie (S)	40.0%	37.9	Very Remote	n	12%
Redland (C)	32.0%	40.3	Metropolitan	y	6%
Richmond (S)	39.6%	34.9	Very Remote	n	12%
Rockhampton (R)	38.1%	37.5	Regional Centre	y	10%

	% Blue collar workers	Average age	Remoteness	Coastal?	Activation rate
Scenic Rim (R)	37.9%	41.8	Metropolitan	n	8%
Somerset (R)	43.1%	40.4	Metropolitan	n	8%
South Burnett (R)	39.2%	42.5	Regional Centre	n	10%
Southern Downs (R)	39.5%	42.6	Regional Centre	n	10%
Sunshine Coast (R)	31.6%	41.6	Metropolitan	y	6%
Tablelands (R)	35.0%	43.6	Remote	n	12%
Toowoomba (R)	34.1%	39.1	Metropolitan	n	8%
Torres (S)	26.6%	30.6	Very Remote	y	14%
Torres Strait Island (R)	30.3%	27.7	Very Remote	y	14%
Townsville (C)	32.2%	36.0	Regional Centre	y	10%
Weipa (T)	56.5%	30.4	Very Remote	y	14%
Western Downs (R)	39.8%	37.8	Regional Centre	n	8%
Whitsunday (R)	43.7%	38.8	Remote	y	14%
Winton (S)	36.2%	44.2	Very Remote	n	12%
Woorabinda (S)	30.4%	25.3	Very Remote	n	12%
Wujal Wujal (S)	25.0%	32.7	Remote	y	12%
Yarrabah (S)	26.6%	26.8	Regional Centre	y	10%
Queensland	31.8%	38.2			

Note: Highlighted cells have a higher incidence of blue collar workers / higher average age than Queensland

3.1.2 Tourism Adjustment

The following LGAs were considered to record a significant uplift in boating infrastructure demand as a result of tourism activity:

- first tier LGAs:
  - Douglas Shire
  - Cairns Regional Council
  - Whitsunday Regional Council
- second tier LGAs:
  - Townsville City Council
  - Fraser Coast Council
  - Mackay Regional Council
  - Livingstone Shire Council.

The assumed uplift in boat lane demand was assumed to be as follows:

- first tier LGAs: 20% uplift in boat ramp lane and pontoon/landing demand
- second tier LGAs: 10% uplift in boat ramp lane and pontoon/landing demand.

Consultation also identified that the northern coastal LGAs of Burke, Cook and Carpentaria Shire record significant increases in demand for boating infrastructure during winter, with significant inflows of grey nomads. However, it was also identified that boating infrastructure within these LGAs was more than sufficient to accommodate these inflows.

3.2 Projected size of active fleet

Based on the above assumptions, the projected size of the active fleet in Queensland on a day of average demand is projected to increase from 24,298 vessels in 2016 to 32,524 vessels in 2036.

The size of the active fleet on a day of average demand is anticipated to be largest in the following LGAs, reflecting the large population residing in the South-east Queensland area:

- Gold Coast City Council (2,442 vessels in 2016, increasing to 3,764 vessels in 2036)
- Moreton Bay Regional Council (1,628 vessels in 2016, increasing to 2,268 vessels in 2036)
- Brisbane City Council (1,480 vessels in 2016, increasing to 1,969 vessels in 2036)
- Redland City Council (1,314 vessels in 2016, increasing to 1,803 vessels in 2036)
- Sunshine Coast Regional Council (1,195 vessels in 2016, increasing to 1,783 vessels in 2036).

Table 3.3 below summarises the size of the active fleet on a day of average demand between 2016 and 2036.

Table 3.3: Projected size of active fleet on a day of average demand, 2016-2036

	Trailable Fleet up to 4.5 metres					Trailable Fleet 4.5 - 8 metres					Non-Trailable Fleet				
	2016	2021	2026	2031	2036	2016	2021	2026	2031	2036	2016	2021	2026	2031	2036
Aurukun (S)	1	1	1	2	2	1	1	1	1	1	0	0	0	0	0
Balonne (S)	5	5	5	5	5	2	2	2	2	2	0	0	0	0	0
Banana (S)	45	46	47	48	49	18	19	19	20	20	0	0	0	0	0
Barcaldine (R)	34	33	32	32	31	11	11	11	10	10	0	0	0	0	0
Barcoo (S)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackall-Tambo (R)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boulia (S)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brisbane (C)	942	1,010	1,083	1,164	1,243	378	407	438	472	506	160	180	180	200	220
Bulloo (S)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bundaberg (R)	894	940	992	1,043	1,094	217	229	242	254	267	60	60	60	60	60
Burdekin (S)	342	352	364	376	386	127	131	135	140	144	20	20	20	20	20
Burke (S)	5	5	5	5	6	2	2	2	2	2	0	0	0	0	0
Cairns (R)	860	925	1,001	1,079	1,156	454	487	524	564	602	120	140	140	160	160
Carpentaria (S)	66	67	69	70	72	35	35	36	37	37	0	0	0	0	0
Cassowary Coast (R)	483	484	489	496	505	263	264	266	269	273	60	60	60	60	60
Central Highlands (R)	93	97	102	106	110	43	45	47	49	51	0	0	0	0	0
Charters Towers (R)	42	42	42	42	42	14	14	14	14	14	0	0	0	0	0
Cherbourg (S)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cloncurry (S)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cook (S)	71	72	73	73	73	37	37	38	38	38	0	0	0	0	0
Croydon (S)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diamantina (S)	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
Doomadgee (S)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Douglas (S)	200	209	220	230	241	126	131	137	143	149	40	40	40	40	40
Etheridge (S)	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0
Flinders (S)	0	0	0	0	0	4	4	3	3	3	0	0	0	0	0
Fraser Coast (R)	986	1,043	1,115	1,190	1,258	384	407	436	465	493	120	120	140	140	160
Gladstone (R)	551	611	674	740	801	250	276	304	333	360	60	60	60	80	80
Gold Coast (C)	1,592	1,742	1,946	2,169	2,412	570	633	718	811	912	280	320	360	400	440
Goondiwindi (R)	69	69	70	70	71	22	22	22	22	23	0	0	0	0	0
Gympie (R)	233	247	263	279	296	83	88	94	100	106	20	20	20	20	40
Hinchinbrook (S)	365	378	393	408	423	169	174	181	188	194	40	40	40	40	40
Hope Vale (S)	2	2	3	3	3	2	2	2	2	3	0	0	0	0	0
Ipswich (C)	94	113	147	186	231	34	41	54	70	87	0	0	0	0	0
Isaac (R)	206	219	234	251	268	88	93	99	105	112	20	20	20	20	20
Kowanyama (S)	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
Livingstone (S)	497	538	589	645	708	252	271	295	321	351	80	80	80	120	120
Lockhart River (S)	1	1	1	1	2	1	1	1	1	1	0	0	0	0	0
Lockyer Valley (R)	36	39	43	46	50	13	14	15	17	18	0	0	0	0	0
Logan (C)	174	189	210	233	264	72	79	89	100	115	0	0	0	0	0
Longreach (R)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mackay (R)	1,010	1,078	1,162	1,254	1,351	363	385	414	443	476	80	80	120	120	120
McKinlay (S)	6	6	6	6	6	2	3	3	3	3	0	0	0	0	0
Mapoon (S)	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0

	Trailable Fleet up to 4.5 metres					Trailable Fleet 4.5 - 8 metres					Non-Trailable Fleet				
	2016	**2021**	**2026**	**2031**	**2036**	**2016**	**2021**	**2026**	**2031**	**2036**	**2016**	**2021**	**2026**	**2031**	**2036**
Maranoa (R)	33	34	36	37	39	11	11	12	12	13	0	0	0	0	0
Mareeba (S)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Moreton Bay (R)	1,102	1,208	1,325	1,435	1,533	406	448	494	537	575	120	120	140	160	160
Mornington (S)	2	2	3	3	3	2	2	2	2	2	0	0	0	0	0
Mount Isa (C)	63	65	67	70	72	35	36	37	38	39	0	0	0	0	0
Murweh (S)	32	31	30	30	30	10	10	10	10	9	0	0	0	0	0
Napranum (S)	1	1	1	1	1	0	1	1	1	1	0	0	0	0	0
Noosa (S)	234	246	261	274	287	100	105	111	116	121	20	20	40	40	40
North Burnett (R)	53	53	52	52	51	16	15	15	15	15	0	0	0	0	0
Northern Peninsula Area (R)	4	4	4	5	5	6	7	7	8	8	0	0	0	0	0
Palm Island (S)	6	6	7	7	7	5	5	6	6	6	0	0	0	0	0
Paroo (S)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pormpuraaw (S)	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0
Quilpie (S)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Redland (C)	832	897	979	1,060	1,140	362	393	431	468	503	120	120	140	140	160
Richmond (S)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rockhampton (R)	423	444	467	492	517	167	176	186	196	206	40	40	40	40	60
Scenic Rim (R)	206	219	234	251	266	72	77	83	89	95	0	0	0	0	0
Somerset (R)	266	282	300	318	335	97	102	108	115	121	0	0	0	0	0
South Burnett (R)	130	135	141	147	153	41	42	44	46	48	0	0	0	0	0
Southern Downs (R)	132	137	143	149	155	56	58	60	62	65	0	0	0	0	0
Sunshine Coast (R)	834	921	1,022	1,129	1,236	281	313	349	388	427	80	100	100	120	120
Tablelands (R)	81	84	87	90	94	34	35	36	37	38	0	0	0	0	0
Toowoomba (R)	72	76	80	84	88	25	27	28	29	31	0	0	0	0	0
Torres (S)	15	16	16	17	18	24	25	26	27	28	0	0	0	0	0
Torres Strait Island (R)	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
Townsville (C)	778	856	943	1,032	1,123	370	403	439	476	515	80	80	120	120	140
Weipa (T)	32	37	40	45	50	33	37	40	44	48	0	0	0	0	0
Western Downs (R)	88	91	94	97	100	35	36	38	39	40	0	0	0	0	0
Whitsunday (R)	655	702	755	805	859	342	365	389	413	438	120	140	140	160	160
Winton (S)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Woorabinda (S)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wujal Wujal (S)	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0
Yarrabah (S)	4	4	4	4	5	2	3	3	3	3	0	0	0	0	0
Total	**15,987**	**17,118**	**18,476**	**19,892**	**21,333**	**6,571**	**7,042**	**7,599**	**8,180**	**8,771**	**1,740**	**1,860**	**2,060**	**2,260**	**2,420**

Source: Economic Associates estimates

3.3 Relationship between active fleet and boating infrastructure demand

3.3.1 Conversion of active trailable fleet to boat ramp lane demand

Converting active trailable fleet estimates into boat ramp lane demand has been undertaken based on throughput rates of ramps. In SKM (1988) and Rose et. al. (2009), a rate of 30 boats per lane per day is considered to provide unhampered overall amenity, whereas a rate of 50 boats per lane per day represents congested operations.

It has been assumed that the midpoint (40) between unhampered overall amenity (30 boats per lane per day) and congested operations (50 boats per lane per day) would represent the ideal scenario, as it balances the needs and wants of trailable boat owners against the costs incurred by local governments, port authorities, water storage managers, state governments and the private sector in providing boat ramps.

This assumption is consistent with the assumption made in the *Recreational Boating Facilities Demand Forecasting Study 2011*.

3.3.2 Relationship between active non-trailable fleet and pontoon/landing demand

The literature review did not uncover any literature relating to public pontoon/landing demand.

Public pontoon/landing demand is driven by the size of the non-trailable fleet. The assessment has assumed that on a given day, an estimated 5% of the active non-trailable fleet is anticipated to demand a public pontoon/landing.

3.4 Projected boat ramp lane demand

Total boat ramp lane demand in Queensland is projected to increase from 563 lanes in 2016 to 757 lanes in 2036 (refer to Table 3.4 below). The LGAs anticipated to record the highest demand for boat ramps are:

- Gold Coast City Council (54 boat ramp lanes in 2016, 83 boat ramp lanes in 2036)
- Moreton Bay Regional Council (38 boat ramp lanes in 2016, 52 boat ramp lanes in 2036)
- Brisbane City Council (33 boat ramp lanes in 2016, 44 boat ramp lanes in 2036)
- Redland City Council (30 boat ramp lanes in 2016, 42 boat ramp lanes in 2036)
- Mackay Regional Council (34 boat ramp lanes in 2016, 46 boat ramp lanes in 2036)
- Fraser Coast Regional Council (34 boat ramp lanes in 2016, 44 boat ramp lanes in 2036)
- Cairns Regional Council (33 boat ramp lanes in 2016, 45 boat ramp lanes in 2036)
- Townsville City Council (29 boat ramp lanes in 2016, 42 boat ramp lanes in 2036)
- Sunshine Coast Regional Council (28 boat ramp lanes in 2016, 42 boat ramp lanes in 2036)
- Bundaberg Regional Council (27 boat ramp lanes in 2016, 34 boat ramp lanes in 2036).

Table 3.4 below identifies that some LGAs have demand for less than one boat ramp lane. These LGAs currently have either little or no public boating infrastructure but recorded vessel registrations.

Table 3.4: Projected boat ramp lane demand by LGA, 2016-2036

	Trailable Fleet up to 4.5 metres					Trailable Fleet 4.5 - 8 metres					Total				
	2016	2021	2026	2031	2036	2016	2021	2026	2031	2036	2016	2021	2026	2031	2036
Aurukun (S)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Balonne (S)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Banana (S)	1	1	1	1	1	<1	<1	<1	1	1	1	1	1	2	2
Barcaldine (R)	1	1	1	1	1	<1	<1	<1	<1	<1	1	1	1	1	1
Barcoo (S)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Blackall-Tambo (R)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Boulia (S)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Brisbane (C)	24	25	27	29	31	9	10	11	12	13	33	35	38	41	44
Bulloo (S)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bundaberg (R)	22	24	25	26	27	5	6	6	6	7	27	30	31	32	34
Burdekin (S)	9	9	9	9	10	3	3	3	4	4	12	12	12	13	14
Burke (S)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cairns (R)	22	23	25	26	29	11	12	13	14	16	33	35	38	40	45
Carpentaria (S)	2	2	2	2	2	1	1	1	1	1	3	3	3	3	3
Cassowary Coast (R)	12	12	12	12	13	7	7	7	7	7	19	19	19	19	20
Central Highlands (R)	2	2	3	3	3	1	1	1	1	1	3	3	4	4	4
Charters Towers (R)	1	1	1	1	1	<1	<1	<1	<1	<1	1	1	1	1	1
Cherbourg (S)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cloncurry (S)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cook (S)	2	2	2	2	2	1	1	1	1	1	3	3	3	3	3
Croydon (S)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Diamantina (S)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Doomadgee (S)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Douglas (S)	5	5	6	6	6	4	4	4	4	4	9	9	10	10	10
Etheridge (S)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Flinders (S)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Fraser Coast (R)	24	26	28	30	32	10	10	11	12	12	34	36	39	42	44
Gladstone (R)	14	15	17	19	20	6	7	8	8	9	20	22	25	27	29
Gold Coast (C)	40	44	49	54	60	14	16	18	20	23	54	60	67	74	83
Goondiwindi (R)	2	2	2	2	2	1	1	1	1	1	3	3	3	3	3
Gympie (R)	6	6	7	7	7	2	2	2	3	3	8	8	9	10	10
Hinchinbrook (S)	9	9	10	10	11	4	4	5	5	5	13	13	15	15	16
Hope Vale (S)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ipswich (C)	2	3	4	5	6	1	1	1	2	2	3	4	5	7	8
Isaac (R)	5	5	6	6	7	2	2	2	3	3	7	7	8	9	10
Kowanyama (S)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Livingstone (S)	12	13	14	17	18	7	7	8	8	9	19	20	22	25	27
Lockhart River (S)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Lockyer Valley (R)	1	1	1	1	1	<1	<1	<1	<1	<1	1	1	1	1	1
Logan (C)	4	5	5	6	7	2	2	2	3	3	6	7	7	9	10
Longreach (R)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Mackay (R)	25	28	29	32	34	9	10	10	11	12	34	38	39	43	46
McKinlay (S)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

	Trailable Fleet up to 4.5 metres					Trailable Fleet 4.5 - 8 metres					Total				
	2016	**2021**	**2026**	**2031**	**2036**	**2016**	**2021**	**2026**	**2031**	**2036**	**2016**	**2021**	**2026**	**2031**	**2036**
Mapoon (S)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Maranoa (R)	1	1	1	1	1	<1	<1	<1	<1	<1	1	1	1	1	1
Mareeba (S)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Moreton Bay (R)	28	30	33	36	38	10	11	12	13	14	38	41	45	49	52
Mornington (S)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Mount Isa (C)	2	2	2	2	2	1	1	1	1	1	3	3	3	3	3
Murweh (S)	1	1	1	1	1	<1	<1	<1	<1	<1	1	1	1	1	1
Napranum (S)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Noosa (S)	6	6	7	7	7	3	3	3	3	3	9	9	10	10	10
North Burnett (R)	1	1	1	1	1	<1	<1	<1	<1	<1	1	1	1	1	1
Northern Peninsula Area (R)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Palm Island (S)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Paroo (S)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Pormpuraaw (S)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Quilpie (S)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Redland (C)	21	22	24	27	29	9	10	11	12	13	30	32	35	39	42
Richmond (S)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Rockhampton (R)	11	11	12	12	13	4	4	5	5	5	15	15	17	17	18
Scenic Rim (R)	5	5	6	6	7	2	2	2	2	2	7	7	8	8	9
Somerset (R)	7	7	8	8	8	2	3	3	3	3	9	10	11	11	11
South Burnett (R)	3	3	4	4	4	1	1	1	1	1	4	4	5	5	5
Southern Downs (R)	3	3	4	4	4	1	1	2	2	2	4	4	6	6	6
Sunshine Coast (R)	21	23	26	28	31	7	8	9	10	11	28	31	35	38	42
Tablelands (R)	2	2	2	2	2	1	1	1	1	1	3	3	3	3	3
Toowoomba (R)	2	2	2	2	2	1	1	1	1	1	3	3	3	3	3
Torres (S)	<1	<1	<1	<1	<1	1	1	1	1	1	1	1	1	1	1
Torres Strait Island (R)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Townsville (C)	20	21	23	25	29	9	10	11	12	13	29	31	34	37	42
Weipa (T)	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2
Western Downs (R)	2	2	2	2	3	1	1	1	1	1	3	3	3	3	4
Whitsunday (R)	17	18	19	20	22	8	10	10	11	11	25	28	29	31	33
Winton (S)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Woorabinda (S)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Wujal Wujal (S)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Yarrabah (S)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total	**401**	**425**	**464**	**496**	**536**	**162**	**176**	**190**	**207**	**221**	**563**	**601**	**654**	**703**	**757**

Note: Economic Associates estimates, derived from Table 3.3

3.5 Projected pontoon/landing demand

In Queensland, total pontoon/landing demand is projected to increase from 87 pontoons/landings in 2016 to 121 pontoons/landings in 2036.

The LGAs anticipated to have the most significant demand for pontoons/landings are Gold Coast City, Brisbane City, Redland City, Sunshine Coast Regional Council, Cairns Regional Council, Fraser Coast Regional Council and Whitsunday Regional Council.

Table 3.5 below summarises the projected pontoon/landing demand by LGA between 2016 and 2036.

Table 3.5: Projected pontoon / landing demand by LGA, 2016-2036

	2016	2021	2026	2031	2036
Aurukun (S)	0	0	0	0	0
Balonne (S)	0	0	0	0	0
Banana (S)	0	0	0	0	0
Barcaldine (R)	0	0	0	0	0
Barcoo (S)	0	0	0	0	0
Blackall-Tambo (R)	0	0	0	0	0
Boulia (S)	0	0	0	0	0
Brisbane (C)	8	9	9	10	11
Bulloo (S)	0	0	0	0	0
Bundaberg (R)	3	3	3	3	3
Burdekin (S)	1	1	1	1	1
Burke (S)	<1	<1	<1	<1	<1
Cairns (R)	6	7	7	8	8
Carpentaria (S)	<1	<1	<1	<1	<1
Cassowary Coast (R)	3	3	3	3	3
Central Highlands (R)	0	0	0	0	0
Charters Towers (R)	0	0	0	0	0
Cherbourg (S)	0	0	0	0	0
Cloncurry (S)	0	0	0	0	0
Cook (S)	<1	<1	<1	<1	<1
Croydon (S)	0	0	0	0	0
Diamantina (S)	0	0	0	0	0
Doomadgee (S)	0	0	0	0	0
Douglas (S)	2	2	2	2	2
Etheridge (S)	0	0	0	0	0
Flinders (S)	0	0	0	0	0
Fraser Coast (R)	6	6	7	7	8
Gladstone (R)	3	3	3	4	4
Gold Coast (C)	14	16	18	20	22
Goondiwindi (R)	0	0	0	0	0
Gympie (R)	1	1	1	1	2
Hinchinbrook (S)	2	2	2	2	2
Hope Vale (S)	<1	<1	<1	<1	<1
Ipswich (C)	<1	<1	<1	<1	<1
Isaac (R)	1	1	1	1	1
Kowanyama (S)	0	0	0	0	0
Livingstone (S)	4	4	4	6	6
Lockhart River (S)	<1	<1	<1	<1	<1
Lockyer Valley (R)	0	0	0	0	0
Logan (C)	<1	<1	<1	<1	<1
Longreach (R)	0	0	0	0	0
Mackay (R)	4	4	6	6	6
McKinlay (S)	0	0	0	0	0
Mapoon (S)	0	0	0	0	0

	2016	2021	2026	2031	2036
Maranoa (R)	0	0	0	0	0
Mareeba (S)	0	0	0	0	0
Moreton Bay (R)	6	6	7	8	8
Mornington (S)	<1	<1	<1	<1	<1
Mount Isa (C)	0	0	0	0	0
Murweh (S)	0	0	0	0	0
Napranum (S)	0	0	0	0	0
Noosa (S)	1	1	2	2	2
North Burnett (R)	0	0	0	0	0
Northern Peninsula Area (R)	<1	<1	<1	<1	<1
Palm Island (S)	<1	<1	<1	<1	<1
Paroo (S)	0	0	0	0	0
Pormpuraaw (S)	0	0	0	0	0
Quilpie (S)	0	0	0	0	0
Redland (C)	6	6	7	7	8
Richmond (S)	0	0	0	0	0
Rockhampton (R)	2	2	2	2	3
Scenic Rim (R)	0	0	0	0	0
Somerset (R)	0	0	0	0	0
South Burnett (R)	0	0	0	0	0
Southern Downs (R)	0	0	0	0	0
Sunshine Coast (R)	4	5	5	6	6
Tablelands (R)	0	0	0	0	0
Toowoomba (R)	0	0	0	0	0
Torres (S)	<1	<1	<1	<1	<1
Torres Strait Island (R)	<1	<1	<1	<1	<1
Townsville (C)	4	4	6	6	7
Weipa (T)	<1	<1	<1	<1	<1
Western Downs (R)	0	0	0	0	0
Whitsunday (R)	6	7	7	8	8
Winton (S)	0	0	0	0	0
Woorabinda (S)	0	0	0	0	0
Wujal Wujal (S)	0	0	0	0	0
Yarrabah (S)	<1	<1	<1	<1	<1
Total	**87**	**93**	**103**	**113**	**121**

Source: Economic Associates estimates, derived from Table 3.3

4 REFERENCES

ABS (2010) *Participation in Sport and Physical Recreation, Australia, 2009-10*, Cat. No. 4177.0, Australian Bureau of Statistics, Canberra

ABS (2017a) *2016 Census of Population and Housing, Basic Community Profile*, Cat. No. 2001.0, Australian Bureau of Statistics, Canberra

ABS (2017b) *Estimated Resident Population, Australia, 2015-16*, Cat. No. 3218.0, Australian Bureau of Statistics, Canberra

Department of Agriculture and Fisheries (2014) *Statewide Recreational Fishing Survey 2013-14 – Key Findings*, https://www.daf.qld.gov.au/fisheries/monitoring-our-fisheries/statewide-and-regional-recreational-fishing-survey/key-findings, last accessed 17 October 2016

Department of Transport and Main Roads (various years) *Recreational Vessels Registrations by Local Government Area*, 2005-2016

Department of Transport and Main Roads (2013) *Marine Facilities and Infrastructure Plan*, 22 February 2013 version

Ormsby, Jayne (2004) *A review of the social, motivational and experiential characteristics of recreational anglers from Queensland and the Great Barrier Reef Region*, Research Publication No. 78, prepared on behalf of the Great Barrier Reef Marine Park Authority, Townsville

Queensland Parks and Wildlife Service (2010)

Queensland Treasury (2016) *Queensland Government Population Projections by LGA, medium series*, prepared by Queensland Government Statistician's Office

Rose, T., R. Powell & J. Yu (2009). *Identification of the Present and Future Recreational Boating Infrastructure in Redland City – A 10 Year Infrastructure Plan*- Griffith University

SKM (1998) *Public Boat Ramps Central Queensland Strategic Plan - Volume One - Demand Forecasting - Noosa to Yeppoon*. Sinclair Knight Merz, March 1998.

University of Adelaide (2016a) *ARIA (Accessibility/Remoteness Index of Australia),* available at: https://www.adelaide.edu.au/apmrc/research/projects/category/about_aria.html, last accessed 17 October 2016

University of Adelaide (2016b) *ARIA+ Scores by 2011 Census Geographic Boundaries*, http://www.spatialonline.com.au/ARIA_2011/default.aspx, last accessed 17 October 2016

APPENDIX A

DISTRIBUTION OF BOAT REGISTRATIONS TO LGAS OF USE

Table A.1: Distribution of boat registrations to LGAs of use, trailable boat registrations

| | LGA Registration Address | | |

Table A.2: Distribution of boat registrations to LGAs of use, non-trailable boat registrations

| | LGA Registration Address | | |

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