

PORT OF AIRLIE MARINA DEVELOPMENT

2. Project Description

2.1 Overview

2.1.1 Location

The project site is in Boathaven Bay (also known as Muddy Bay), at the eastern end of the tourist commercial and retail precinct of Airlie Beach (see **Figure 2-1**).

The town of Airlie Beach is located on the Whitsunday coast approximately 24km by road from Proserpine on the Proserpine-Shute Harbour Road.

Airlie Beach is the primary tourist destination on the Whitsunday Coast and is a tourist destination in its own right providing a range of tourist accommodation, tourist retail, travel agencies and booking offices, restaurants and cafes and a small number of commercial offices. The town is providing an increasing range of land and water based tourist activities. Airlie Beach is the jumping off point for visits to the Whitsunday Islands and the Whitsunday section of the Great Barrier Reef.

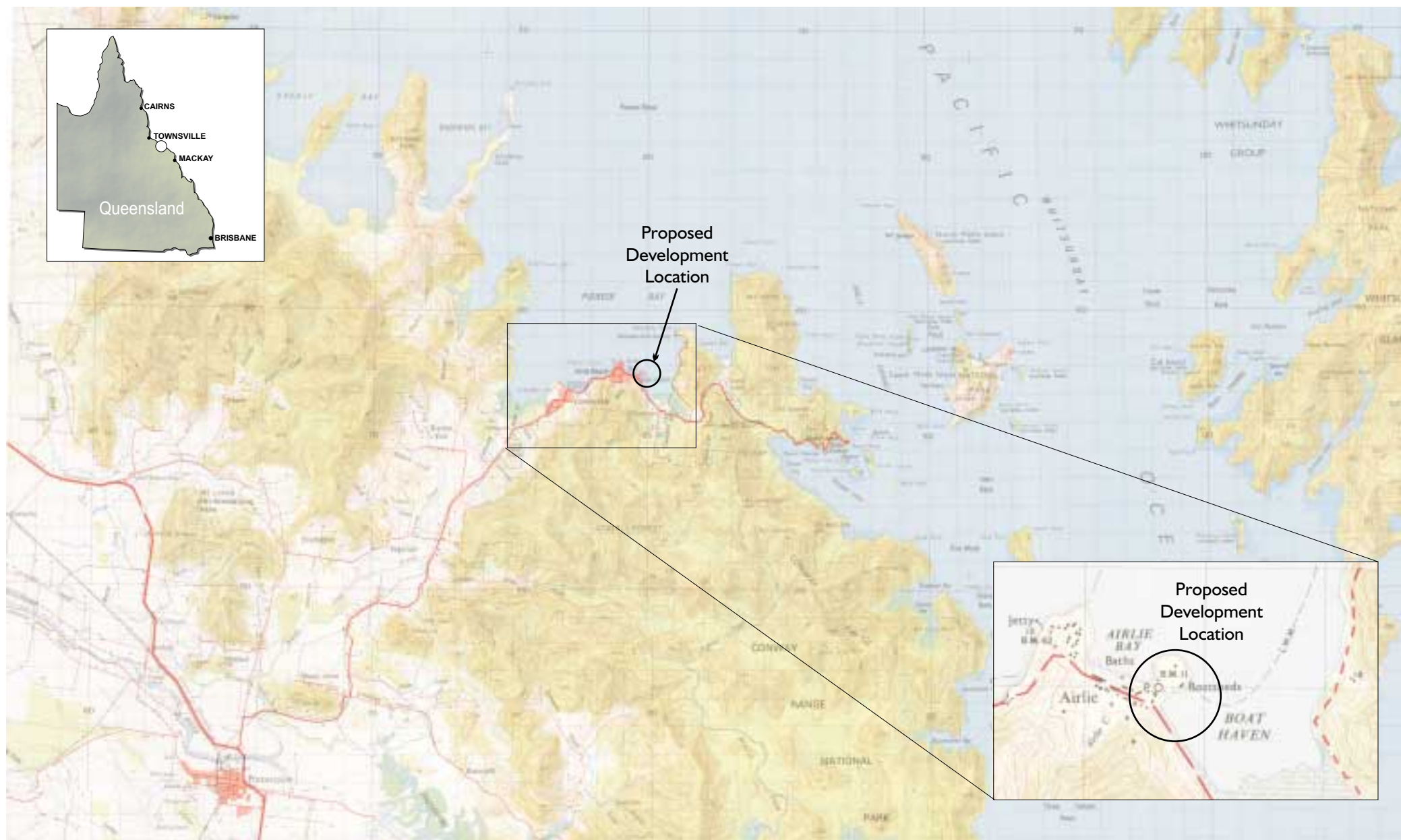
In addition to many travelling boats, Airlie Beach is also the home port for over 450 commercial and private yachts, 235 of which are berthed in the only marina at Abel Point and the remainder are moored in Pioneer Bay off Airlie Beach.

The majority of inter-island ferries, cruise and charter boats currently leave from Shute Harbour, 10 km east of Airlie Beach. However Shute Harbour has negligible tourist accommodation and tourist facilities and further landward expansion is severely limited by the very steep coastal topography and the encircling Conway National Park.

The Project is located below the high water mark in Boathaven Bay, a shallow embayment at the eastern end of the main commercial precinct in Airlie Beach. The site is bounded by Shute Harbour Road to the south-east, Coconut Grove Road and Airlie Headland to the west and Pioneer Bay to the north and east. Immediately south east of the site is a large recreational complex.

The primary access to the proposed Port of Airlie marina will be from an intersection on Shute Harbour Road approximately mid-way between Coconut Grove and Hermitage Drive. A second, ancillary access to the marina and private residential areas will be from the intersection at Airlie Esplanade and Coconut Grove.

Figure 2-2 provides an aerial overview of the proposed development.



SINCLAIR KNIGHT MERZ

PORT OF AIRLIE MARINA



Development Location

Figure 2-1



SINCLAIR KNIGHT MERZ

PORT OF AIRLIE MARINA



Indicative Project View - Block Modelling Only

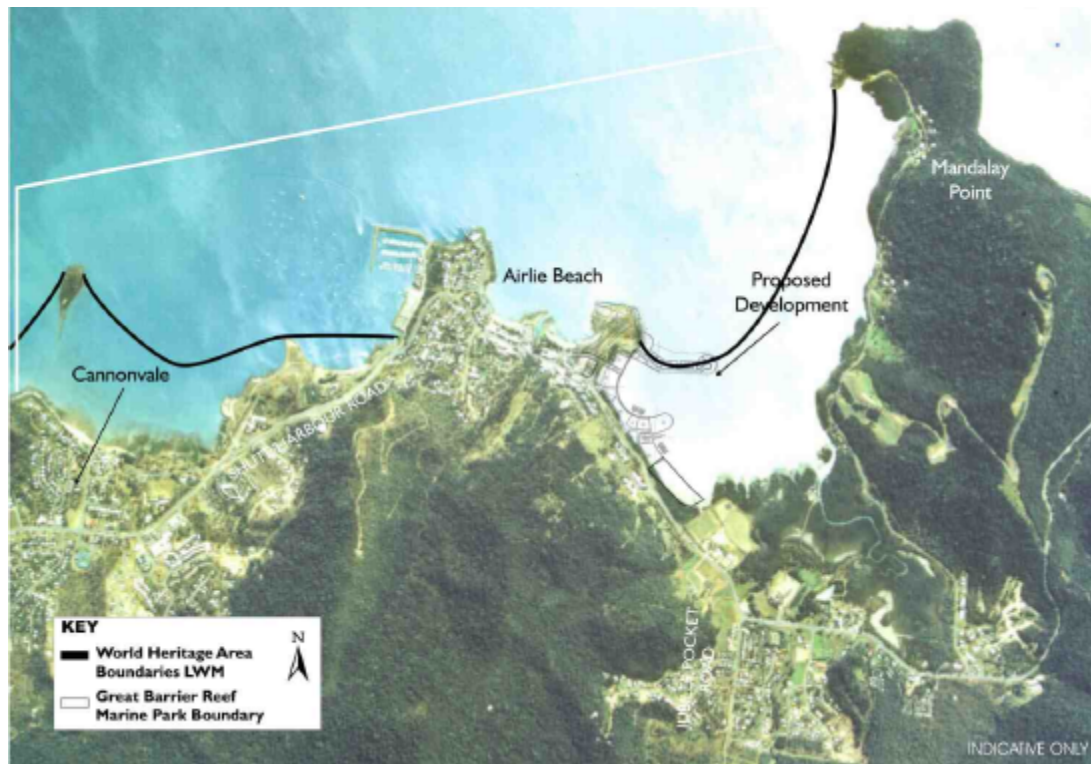
Figure 2-2

PORT OF AIRLIE MARINA DEVELOPMENT

2.1.2 Current Land Tenure

The project site lies within a 130ha Permit to Occupy (No.206577) over the seabed below the high water mark, issued by the then Queensland Department of Lands on 4 January 1996. **Figure 2-3** shows the Great Barrier Reef Marine Park Boundary and the World Heritage Area Boundary. The World Heritage Area Boundary is not mapped in this area but is based on the mean low water mark (LWM).

A copy of the Permit to Occupy is provided in **Appendix B**.



■ **Figure 2-3 Great Barrier Reef Marine Park and World Heritage Area Boundary**

2.2 Project Master Plan

The Proponent proposes a marina development that integrates boating, marine and tourism facilities with a mix of residential and commercial developments designed to complement and augment existing development and activities in Airlie Beach and the Whitsunday region.

A number of key development principles form the foundation of the proposal:

- ❑ The development must be integrated into the existing town, particularly with respect to the tourist retail and accommodation precincts.
- ❑ The development is focussed on marine based activities including a safe and secure harbour (with cyclone refuge) and an integrated transport interchange between land based and sea based transportation.
- ❑ The development will have a balanced and integrated mix of maritime, leisure, commercial, retail and residential facilities.

PORT OF AIRLIE MARINA DEVELOPMENT

- ❑ There will be an emphasis on public open space areas and a focus on pedestrian and disabled access and circulation with public access to the majority of waterfront areas.
- ❑ The influences of climate, water, steep surrounding hillsides and vistas to and from the sea will dictate the scale, shape and appearance of the built environment.
- ❑ The development has been carefully planned and located to minimise intrusion into the Great Barrier Reef World Heritage Area and maximise social and economic benefits while minimising impacts on the environment.
- ❑ Landscaping of the development will be in accordance with the Vision Airlie Masterplan.
- ❑ The development will be staged to ensure commercially viable growth and to meet market demand.

The Masterplan for the proposed development is shown in **Figure 1-1** in **Section 1.2**. The main components of the development are shown on the plan and are as follows:

- ❑ 240 berth marina for vessels up to 30m in length;
- ❑ Associated marina facilities, including marina administration centre, showers, laundry, toilets, refuelling berth, sewage pumpout, maintenance area, carparking for 96 cars;
- ❑ Passenger ferry terminal for inter-island ferries and tourist charters;
- ❑ Marine Training Academy;
- ❑ Public boat ramp with 45 cars/trailer parks;
- ❑ Public transportation interchange for long distance tourist buses, local buses, taxis and pedestrians;
- ❑ Carparks for over 1,200 cars;
- ❑ A pedestrian village square linking the harbour and other facilities to the existing commercial and tourist area of Airlie Beach;
- ❑ Public open space including landscaped parklands, a beach, harbour promenades and boardwalks around the marina foreshore;
- ❑ A footpath/cycleway through the development linking it with the existing town centre;
- ❑ 4,400m² of marina retail and commercial space;
- ❑ 170 bed apartment hotel;
- ❑ Approximately 300-350 serviced tourist apartments and residential apartments, apportioned in a 65% tourist and 35% residential apartments split;
- ❑ 16 villas and 7 detached residences;
- ❑ A 3ha reclaimed area for disposal of spoil from the entrance channel dredging and soft surface mud from the excavation of the marina basin. This area is intended for future use; and
- ❑ A 1.5ha area for disposal of dredged spoil for maintenance dredging operations

The proposed marina will incorporate a range of public access facilities to enhance public open space available to local residents and visitors. These will include:

- ❑ A public boat ramp (see **Section 2.5.5**);
- ❑ An open village square in the heart of the commercial precinct;
- ❑ A boardwalk and promenade surrounding the harbour's edge and connecting the range of precincts;
- ❑ Parklands totalling 27,995m², including a park and lookout at the end of the seaward breakwater;

PORT OF AIRLIE MARINA DEVELOPMENT

- ❑ A new public beach along the seaward edge of the breakwater;
- ❑ 96 dedicated secure parking spaces for marina users; and
- ❑ A new marine training academy (see **Section 2.5.4**).

A detailed description of the major components of the proposed development is given in **Section 2.4**. **Appendix R** contains a development description for each development site of the project. ID numbers in **Appendix R** relate to the development site ID numbers in **Table 2-1**.

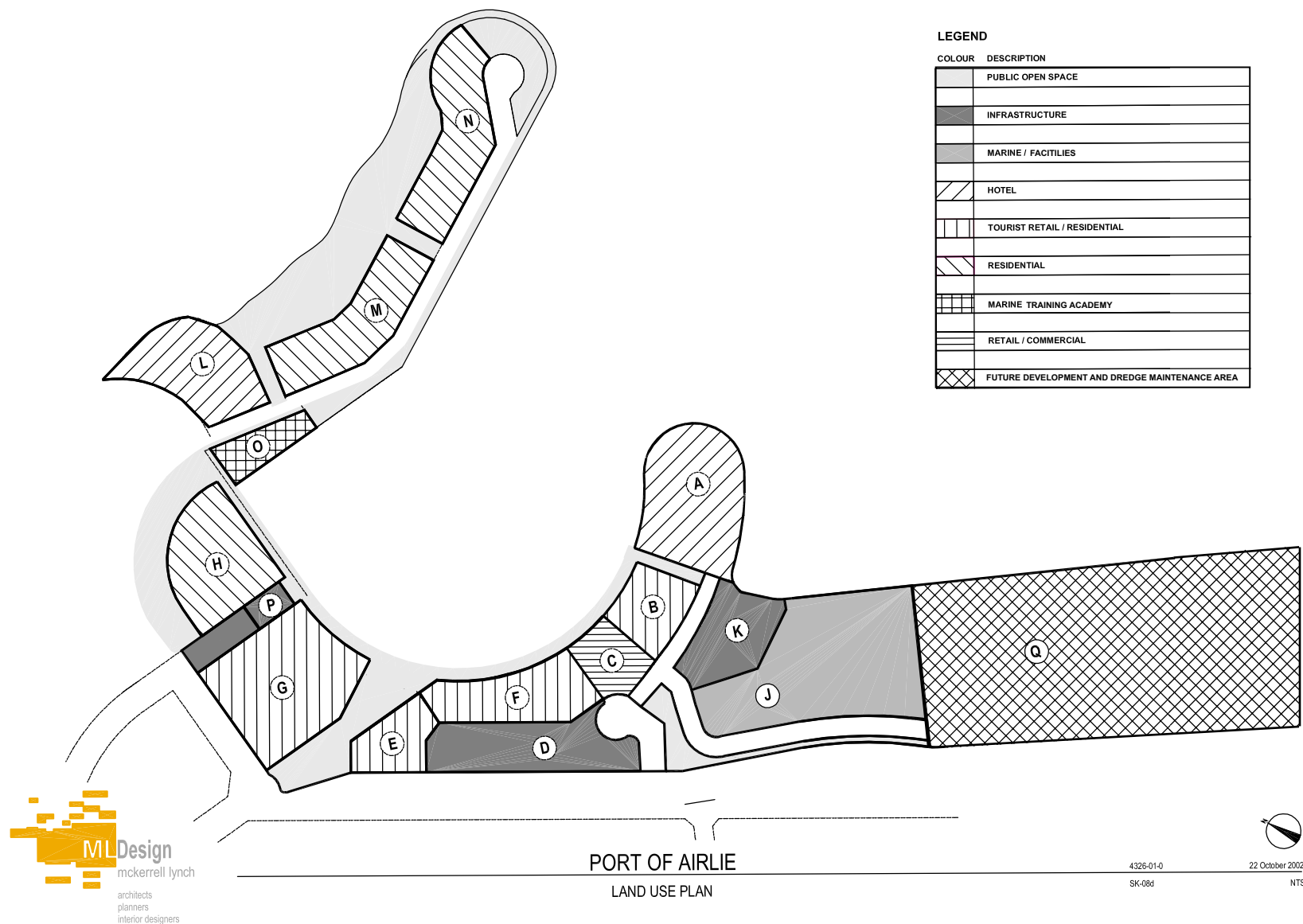
2.3 Proposed Land Use

The distribution of the various land uses is shown on **Figure 2-4**. Land use areas are shown in **Table 2-1**.

■ **Table 2-1 Land Use Areas**

(1)	Development Site	Site Area (m ²)	Gross Floor Area m ²	Proposed Building Height (Storeys)
A	Landmark Hotel	8,425	9,500	Six
B	Harbour Serviced Apartments	3,545	4,050	Five
C	Sea Terminal	2,530	900	One-two
D	Public Carpark & Bus Transit Facility	8,370	200	
E	Harbourfront Mixed Use	2,900	4,865	Five
F	Harbourfront Mixed Use	5,305	8,470	Five
G	Harbourfront Mixed Use & Public Carpark	9,855	12,910	One & Five
H	Harbourfront Residential	6,685	8,390	Two & Five
J	Marine Industrial	14,315	5,800	One
K	Public Boat Ramp and Carpark	4,390		
L	Seaview Residential Tower	6,205	5,650	Six
M	Seaview Residential Villas	6,450	4,000	Two
N	Seaview Residential Lots	6,850	6,850	Two
O	Marine Training Academy	2,075	2,075	Two
P	Marina Access	755	755	

Land Component	Site Area (m2)		
Future development area (spoil disposal)	30,000	-	-
Maintenance dredging spoil disposal area	15,000	-	-
Public Beach	11,700	-	-
Headland Park	2,390	-	-
Park at Site H	4,600	-	-
Village Square	4,740	-	-
Boardwalk Promenade	5,150	-	-
Extension of Airlie Esplanade	1,310	-	-
Spit Road to Headland (including waterfront pedestrian/cycle path)	8,355	-	-
Road to Hotel and Marine Industrial	9,530	-	-
Landscape Buffer (between Proserpine Shute Harbour Rd and site)	2,935	-	-
Landscape Buffer / Beach access (between sites L and M)	590	-	-
Landscape Buffer /Beach access (between sites M and N)	630	-	-
Total land area:	18.5 hectares		



SINCLAIR KNIGHT MERZ

PORT OF AIRLIE MARINA



Land Use Plan

Figure 2-4

PORT OF AIRLIE MARINA DEVELOPMENT

2.4 Proposed Land Tenure

Following release of the Coordinator-General's report, the proponent will apply to Department of Natural Resources and Mines (DNRM) for a Development Lease under Section 476 of the *Land Act 1994*. The development lease will permit construction of the marina, marina protection works, entrance channel and reclamation of all land areas. On satisfactory completion of these works the proponent will apply to DNRM to:

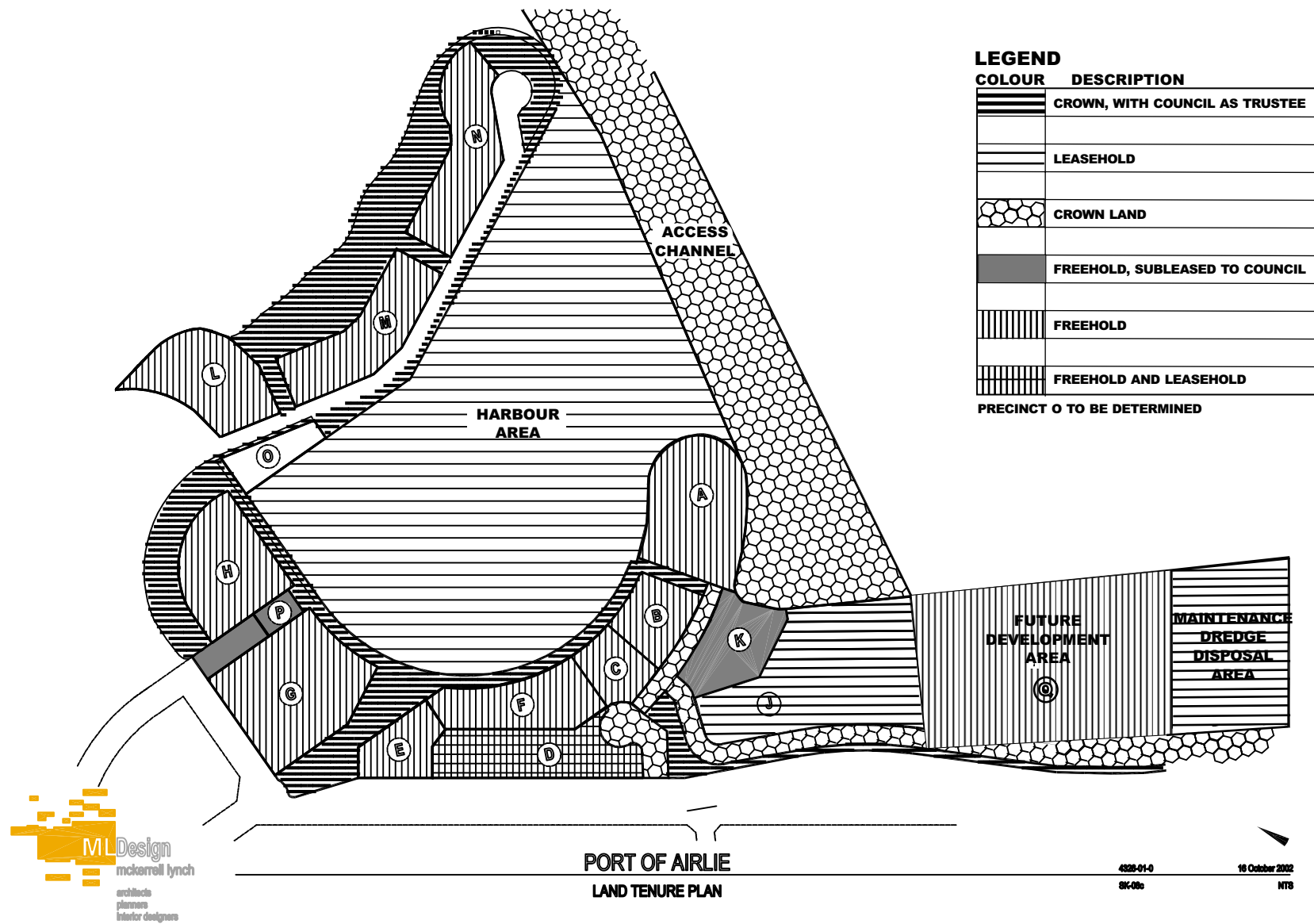
- ❑ purchase freehold land for development of the commercial, retail and residential components;
- ❑ dedicate public land components to the Crown to be managed by Whitsunday Shire Council; and
- ❑ grant a long term marina lease over the harbour area and long term leases over the marina facilities area and maintenance dredging spoil area.

Figure 2-5 shows the proposed land tenure. **Table 2-2** provides total areas of tenure for each type of tenure.

■ **Table 2-2 Land Tenure**

Land Use	Tenure	Area m ²
Public open space (promenades, bikeways, parks)	Crown Land with Council as trustee	27,995
Residential and Commercial	Freehold	62,349
Marina (water)	Leasehold	120,000
Access Channel	Crown Land	
Marina facilities	Leasehold	15,257
Future Development Area	Freehold	30,000
Marine Channel Maintenance Area	Leasehold	15,000
Marine Training Academy	To be determined	2,000
Ferry terminal	Freehold	2,515
Transport Interchange and Public Carpark	Combination of freehold and leasehold	8,384
Public Roads	Crown Land with Council as trustee	19,195
Public Boat Ramp	Freehold with sublease to Council ⁽¹⁾	4,203

(1) Note that a new, dedicated boat ramp will be provided in Stage 2, should Stage 2 go ahead



SINCLAIR KNIGHT MERZ

PORT OF AIRLIE MARINA



Land Tenure Plan

Figure 2-5

PORT OF AIRLIE MARINA DEVELOPMENT

2.5 Description of Development Components

2.5.1 Marina

The marina basin will have an area of approximately 12ha with a minimum water depth 3.5m at Lowest Astronomical Tide (LAT). The marina will accommodate:

- ❑ Approximately 240 private and commercial berths varying in size from 10-30 metres;
- ❑ Up to 28 berths to be owned by the Whitsunday Sailing Club attached to the Marine Academy;
- ❑ 12 large berths for visiting super yachts, located adjacent to the Village Square; and
- ❑ 6 commercial wharves adjacent to Ferry Terminal.

All marina berths and commercial wharves will be floating pontoons, designed to allow vertical movement over the 3.5m+ tidal range. A number of proprietary systems for the marina berths are being investigated and evaluated.

All marina berths and commercial wharves will be provided with potable water supply, and electrical power. Waste collection receptacles will be provided on the pontoons and designed to prevent access by birds and animals and minimise odour releases.

The marina will be able to provide temporary mooring for up to 150 further boats with shelter during cyclones.

A marina administration centre will be located on the ground floor of the Harbourfront Retail and Residential Building (Component G) adjacent to the marina gangway. The administration centre will include a sales office, offices for marina management staff and key operated laundry, showers and toilets for use by the marina patrons.

96 carparks will be provided for marina patrons under Harbourfront Retail and Residential Building (Component G). The carpark will also include a temporary parking/loading zone for an additional approximately 6 cars on grade at the entrance to the marina (access via Coconut Grove entry).

The marina access channel will be on crown land but it will be a condition of the marina lease that the marina operator maintain the channel and provide free and unrestricted access through the channel to the marina and boat ramp.

An Environmental Authority will be required under the *Environmental Protection Act 1994* for operation of a marina. This will be issued to the marina lessee and will bind environmental management of all aspects of marina operation.

There are no formal codes of practice or guidelines for marina facilities on the Whitsunday Coast. However the following exist and will be complied with wherever appropriate in design and operation of the Marina:

- ❑ AS3962:2001 – Guidelines for the Design of Marinas;
- ❑ GBRMPA Environmental Guidelines for Marinas within the Great Barrier Reef Marine Park (1994).

PORT OF AIRLIE MARINA DEVELOPMENT

- ❑ GBRMPA Draft policy for Structures on reefs within the Park (April 2002); and
- ❑ Brisbane City Council Pollution Solutions for Marina Operators and Boat Maintenance and Repairers (April 2000)

In relation to GBRMPA policies and guidelines, these are not directly applicable to the project as it is not located within the GBRMP, however these are taken to represent best practice for marina developments in tropical waters and will be applied as far as practicable to the project.

2.5.2 Marina Facilities Area

The Marina Facilities Area will be located within a security fenced compound at the south eastern end of the development area. A landscape buffer zone and service road will separate the low-rise marine services area from Shute Harbour Road. The marina facilities will include:

- ❑ 2 floating wharves for servicing of inter-island passenger ferries;
- ❑ 2 floating wharves for servicing charter yachts;
- ❑ 80 tonne ship lift;
- ❑ 20m wide slipway;
- ❑ hardstand area for boat repairs;
- ❑ Sewage pumpout and refuelling berth;
- ❑ Workshops and storage facilities for maintenance equipment; and
- ❑ Storage for petrol and diesel fuel.

An Environmental Authority will be required under the *Environmental Protection Act 1994* for operation of a boat maintaining or repairing facility. This will be issued to the marina lessee and will bind environmental management of all aspects of marina facilities area operation.

Standards and guidelines listed in **Section 2.5.1** also apply to design and operation of the Marina Facilities Area.

Boat Maintenance and Repair Facilities

Floating wharves will be provided for the cleaning and provisioning passenger ferries and charter yachts. Commercial operators of these vessels will not be permitted to undertake these tasks in the main marina.

All boat maintenance and repair with the exception of internal fit-outs or repairs will be undertaken at the boat maintenance and repair facility. The floating wharves may be used to remove and replace engines or masts. All other work will be undertaken on the sealed hardstand, the level of which will be above the Highest Astronomical Tide (HAT). Boats will be lifted onto the hardstand using a ship lift or slipway.

Receptacles will be provided on the hardstand for engine oil and oily sump waste which will be collected by an oil recycling contractor. Management of these issues will be included in the EPA Environmental Authority for the marina facilities area.

Hull wash down water, including antifouling and marine growth will drain to a collection sump and will be treated in a proprietary water treatment system to remove oil and solids from the water. Oily solids will be further dewatered and disposed of off-site at the Whitsunday Shire Council landfill. Water which meets standards set in the Environmental Authority will be discharged to the marina basin.

PORT OF AIRLIE MARINA DEVELOPMENT

The hardstand area will be bunded to prevent contaminated water from by-passing the collecting sump and returning to the marina basin untreated. The containment system will be designed to contain rainfall events up to the 1 in 2 year event. The first flush flows from the hardstand areas will still be directed to the collection sump in more severe rainfall events, minimising risk from stormwater runoff. Hydraulic modelling including rainfall and runoff intensity will be undertaken as part of the detailed design process to provide input into the design capacity of stormwater systems in this area. Further detail is provided in **Section 2.7.2**.

Spray painting and sand blasting will be carried out in an enclosed booth to prevent the dispersion of sand, paint and other material into the boat yard and surrounding area. Stormwater and washdown water from this area will drain to the collection sump.

Refuelling and Sewage Pump-out

A double sided refuelling berth capable of berthing boats up to 40m in length will be provided with the following facilities:

- ☐ Standard flow diesel pump
- ☐ High flow diesel pump
- ☐ Standard flow petrol pump
- ☐ Sewage pump-out
- ☐ Bilge pump-out
- ☐ Fuel spill minimisation equipment
- ☐ Automatic shut-off valves in the event of a fuel line rupture
- ☐ Spill trays under each pump
- ☐ Roof over the pumps.

A separate refuelling facility will be provided for the larger commercial boats at the commercial maintenance berths.

The operator of the refuelling facility will be required to hold an Environmental Authority for the storage of more than 10,000L of petroleum product, which is issued by Whitsunday Shire Council. Information on proposed methods for management of contaminants will be required to be submitted as part of the application for an Environmental Authority and will be considered in issuing the Authority. Requirements for management and monitoring will be incorporated into the Environmental Authority and the operator(s) will be required by law to comply with these conditions. This Environmental Authority may be combined with that issued for boat repair facilities if operated by the same entity.

In addition to compliance with the Environmental Authority and standards and guidelines listed in **Section 2.5.1**, the requirements of AS1940: Storage and handling of flammable and combustible liquids will be adhered to in design and operation of the facility. Measures to ensure environmental protection may include:

- ☐ double containment fuel lines;
- ☐ underground double skin fuel storage tanks for petrol and diesel fuel;
- ☐ drip trays to be located underneath bowsers to collect fuel drips. Trays will be emptied daily or sooner if they become full;

PORT OF AIRLIE MARINA DEVELOPMENT

- ❑ emergency fuel spill kits, including hydrocarbon containment booms ready for rapid deployment; and
- ❑ training of operating staff in hydrocarbon spill response.

The location of the refuelling facilities is such that prevailing winds will carry any spills into the harbour rather than out to Pioneer Bay. In the event of a spill, this will further minimise the risk of release of fuel to the marine environment.

Sewage and bilge pump out facilities will be located at the refuelling dock. A vacuum pump will evacuate the sewage holding tanks on the boats and discharge the sewage into the main pumping station for the development. Here it will be diluted by thorough mixing with sewage from the commercial and residential developments before being discharged into the Whitsunday Shire Council's pumping main adjacent to the site for transmission to the Cannonvale Sewage Treatment Plant. Saline bilge water will be pumped through the marina facilities' oil separator before being discharged into the main pumping station for mixing and dilution.

A strict set of guidelines for all boats berthed in and using the marina will be enforced to prevent disposal other than through the provided service. All craft with holding tanks will be required to use the pump out facility. Boats without holding tanks will have their heads sealed by the marina superintendent on entry to the marina. . All vessels are prohibited by law to discharge sewage into coastal waters, the enforcement of which is the responsibility of the Department of Transport and the Great Barrier Reef Marine Park Authority. Marina operators will assist in reporting non-compliance whenever it is noted and will ensure that the marina pump out facility is available to marina users.

The option of sealing heads on boats could be considered if compliance is an issue. On shore ablution and laundry facilities will be provided for the use of all marina patrons at the Marina Administration Centre.

2.5.3 Passenger Ferry Terminal

The ferry terminal (Component C) will be a state of the art passenger terminal for passenger ferry trips to the Whitsunday Islands and day tours to islands and the reef. The ferry terminal will be linked with commercial/tourism facilities at the marina and will also provide for links to cars, taxis and buses at the transport interchange and public carpark as well as pedestrian links (Component D).

The ferry terminal is intended to complement the facilities at Shute Harbour which have been identified as being of inadequate capacity for future demand, without sufficient land side space for expansion and in need of upgrade. The ferry terminal facilities at the Port of Airlie will also provide a closer linkage to the Airlie Beach township.

The ferry terminal building will be 2 storeys with a GFA of 900m². The building will have an underground parking area with spaces for 64 cars, intended for use by staff and visitors to the facility. The terminal will have the capacity to process an average 4,000 passengers per day at final development. It is proposed that the ferry wharves in front of the terminal will be accessible via gangways wide enough for vehicular and separated pedestrian access. Access for people with a disability will be provided throughout the ferry terminal.

PORT OF AIRLIE MARINA DEVELOPMENT

2.5.4 Marine Training Academy

An area of 2,000 m² has been allocated in the master plan for development of a marine training academy. It is intended that the marine training academy will offer a wide range of professional and recreational boating courses. Professional training will lead to qualifications enabling graduates to work on passenger, charter and other vessels.

2.5.5 Public Boat Ramp

The public boat ramp will have two lanes and a central queuing pontoon at least 20m in length where users may secure boats while parking or collecting trailers for boat launching and retrieval. Adequate space will be provided at the head of the ramp for de-rigging sailing boats and hosing down.

The boat ramps will be operational at all states of the tide with a minimum of 1m water depth at the bottom of the ramp at Lowest Astronomical Tide. Maintenance dredging will be carried out as required to maintain this level. As discussed in **Section 5**, it is expected that maintenance dredging will be required every 10 to 15 years.

The ramp will be fully protected from wave action by the breakwater and reclamation constructed across the seaward side of the marina basin. It is anticipated that the maximum wave heights will be a significant wave height of 0.2m under storm conditions.

Car/trailer parking will be provided for 45 units. This may be staged to meet the actual demand. It should be noted that the proposed boat ramp location is expected to be temporary. In the event that a proposed Stage 2 development goes ahead, the boat ramp will be relocated and additional parking provided.

The boat ramp will be designed and constructed in accordance with the requirements of Queensland Transport. The pontoon design will be such that it can operate effectively with large boats and not be compromised by weather conditions. The advice of Queensland Transport will be sought on the final design and construction of the pontoon.

Lighting at the boat ramp will be in accordance with Australian standards for public facilities. Navigational aids will be in accordance with the requirements of Marine Safety Queensland. Final turning circles for boats at the boat ramp will be in accordance with the requirements of the Harbour Master.

The boat ramp will be managed by Whitsunday Shire Council.

2.5.6 Public Transportation Interchange

The public transport interchange will be a major tourist-oriented transport hub incorporating public carparking, a tour bus and taxi interchange and access to water-based charter, ferry and tour facilities.

The interchange will be built above an underground public carpark for 315 cars. The main level bus/transit loop will have parking for 6 large coaches, plus taxi and mini-bus stands and a covered waiting and loading area. Covered walkways, lined with opportunities for tour operator kiosks, will provide convenient pedestrian access from

PORT OF AIRLIE MARINA DEVELOPMENT

the transit interchange to the Village Square at the northern end of the interchange, and to the Ferry Terminal at the southern end.

2.5.7 Public Open Space

The public focus of the waterfront will be a wedge-shaped Village Square, which will form the arrival point to the development, located at the intersection of the boardwalk promenade and a pedestrian mall on the alignment of Shute Harbour Road. The Village Square effectively extends the existing commercial main street of Airlie Beach to the waterfront, and is designed to integrate the new development into the existing community.

Other public open space areas will also include:

- ❑ landscaped parklands, a beach, harbour promenades and boardwalks around the marina foreshore;
- ❑ Public access will be maintained to the entire harbour frontage with the exception of the marine academy site and the marine servicing area which has restricted access for safety reasons. Transportation nodes include a pedestrian/bicycle link with the main Airlie Beach tourist and foreshore precincts, aimed at minimising movements of vehicle traffic; and
- ❑ Public parks are positioned in several locations as indicated on **Figure 1-1** in **Section 1.2** and will include facilities for active and passive recreation. The breakwater beach will be open to the public.

2.5.8 Marina Retail and Commercial

Mixed-use commercial and residential development is proposed around the perimeter of the boardwalk promenade and along the Shute Harbour Road pedestrian mall.

Retail and commercial buildings are designed to define the boardwalk and mall as a dynamic urban waterfront. Gaps in the built form around the perimeter of the harbour are designed to allow pedestrian permeability and to frame key vistas into the marina.

Ground floor uses on the waterfront will be slightly raised on semi-basement carparking podiums and set back from the edge of the boardwalk promenade. This will allow for outdoor dining terraces in the activated commercial waterfront located between the Arrival Plaza and the Sea Terminal, and a landscaped buffer strip in the residential areas to the north of the plaza. Outdoor dining will take place on freehold land connected to the commercial precincts.

The range of activities to be undertaken in the commercial complexes cannot be determined at this time, but will depend on commercial operators attracted to the site and the final management scheme for the three complexes. It is envisaged that commercial activities will complement, rather than compete with, the existing mix of retail activities in Airlie Beach. Activities may include:

- ❑ Speciality restaurants;
- ❑ Boutique retail facilities;
- ❑ Tourist-related retail facilities;
- ❑ Boating related retail facilities;
- ❑ Tour and travel operators; and
- ❑ Medical and other professional services.

PORT OF AIRLIE MARINA DEVELOPMENT

Carparking for retail and commercial users will be provided under each building.

Commercial facilities will be linked to the ferry terminal, marina, public areas and other residential areas by a promenade and boardwalk. Pedestrian access will also be provided from Shute Harbour Road and Coconut Grove linking the development with the main Airlie Beach township.

2.5.9 Marina Apartment Hotel

The 170 room resort apartment hotel will be developed as an anchor to commercial development. The hotel, located on the headland adjacent to the Transport Terminal, will be of 3 to 4 star standard, with extensive entertainment and conference facilities and landscaping. Basement parking will be provided for employees and patrons. The hotel will have a maximum height of 6 storeys.

2.5.10 Residential and Tourism

A range of residential and accommodation development, including multi-storey apartments, low-rise villas and a limited number of exclusive waterfront lots will be developed as follows;

- ❑ Approximately 230 tourist apartments (subject to market demand) in Buildings B, E, F and G, located around the harbour front, above the ground floor retail and commercial space;
- ❑ Approximately 125 (subject to market demand) residential apartments in Buildings H and L. Building H will be five storeys with a harbour front focus and Building L will be 6 storeys with an ocean focus; and
- ❑ 16 low density villas and 7 residential blocks along the ocean breakwater with frontage onto a pedestrian walkway along the new north-facing public beach.

The break up of tourist and residential units is based on known demand for tourism and residential units, at a rate of approximately 65% tourist and 35% residential (Christie Leet, PRD Pers Com.)

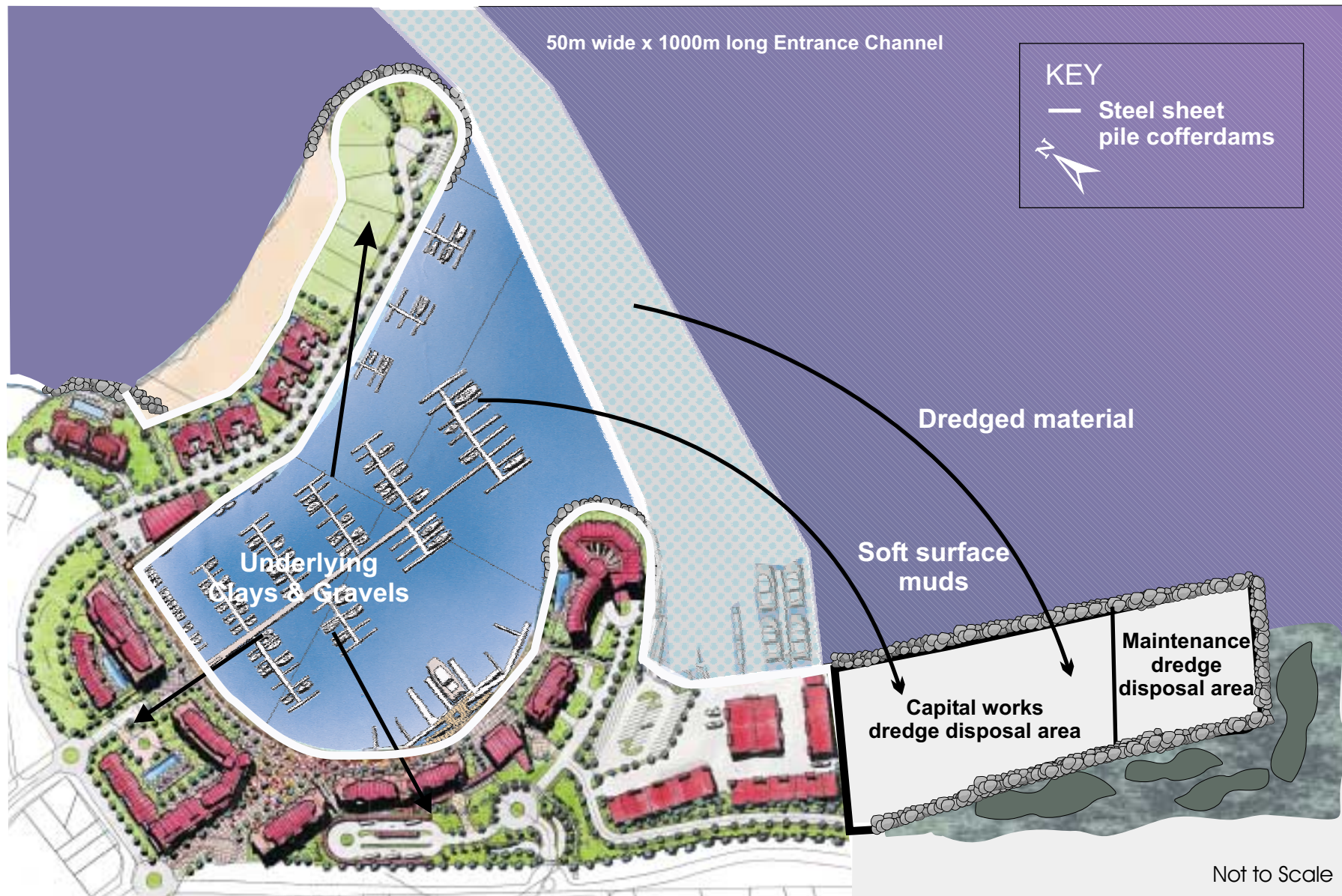
The five storey residential buildings around the perimeter of the harbour will be designed with the three main residential floors set back from the ground level commercial base, and a top floor garden apartment. The rooftop apartment level of each building will feature extensive roof terraces around a smaller building footprint, resulting in a reduction of the visual mass of the buildings. The residential precincts will include swimming pools, courtyard areas, gymnasiums and other private recreation facilities.

The two landmark buildings that will visually anchor each end of the boardwalk promenade are proposed as the six-storey hotel and the six-storey residential building at the western end of the spit. The buildings are designed to provide a comfortable backdrop to the activated waterfront, given the scale of the marina basin.

Carparking for residential units will be provided beneath each building.

2.5.11 Future Development Area

A compacted earth embankment will be constructed around a 3ha area, east of the Marina Maintenance area (shown on **Figure 2-6**) to be used for the disposal of dredged material from the entrance channel and soft surface muds from excavation of the marina basin.



PORT OF AIRLIE MARINA DEVELOPMENT

The external faces and top of the embankments will be protected by armour rock or sheet piled walls. After dewatering the area will be topsoiled and grassed and left for a period of years to allow consolidation of the placed material.

This area will be developed in 5 to 10 years after commencement of works on the current proposal. Appropriate permits and approvals will be sought for this development prior to its commencement and, if required, a separate Environmental Impact Statement prepared (see also **Section 1.8**).

2.5.12 Maintenance Dredging Spoil Area

A compacted earth embankment will be constructed around a 1.5 ha area, east of the Future Development Area to be used for the future disposal of dredged material from maintenance dredging of the entrance channel and marina basin (shown **Figure 2-6**). The external faces and top of the embankments will be protected by armour rock.

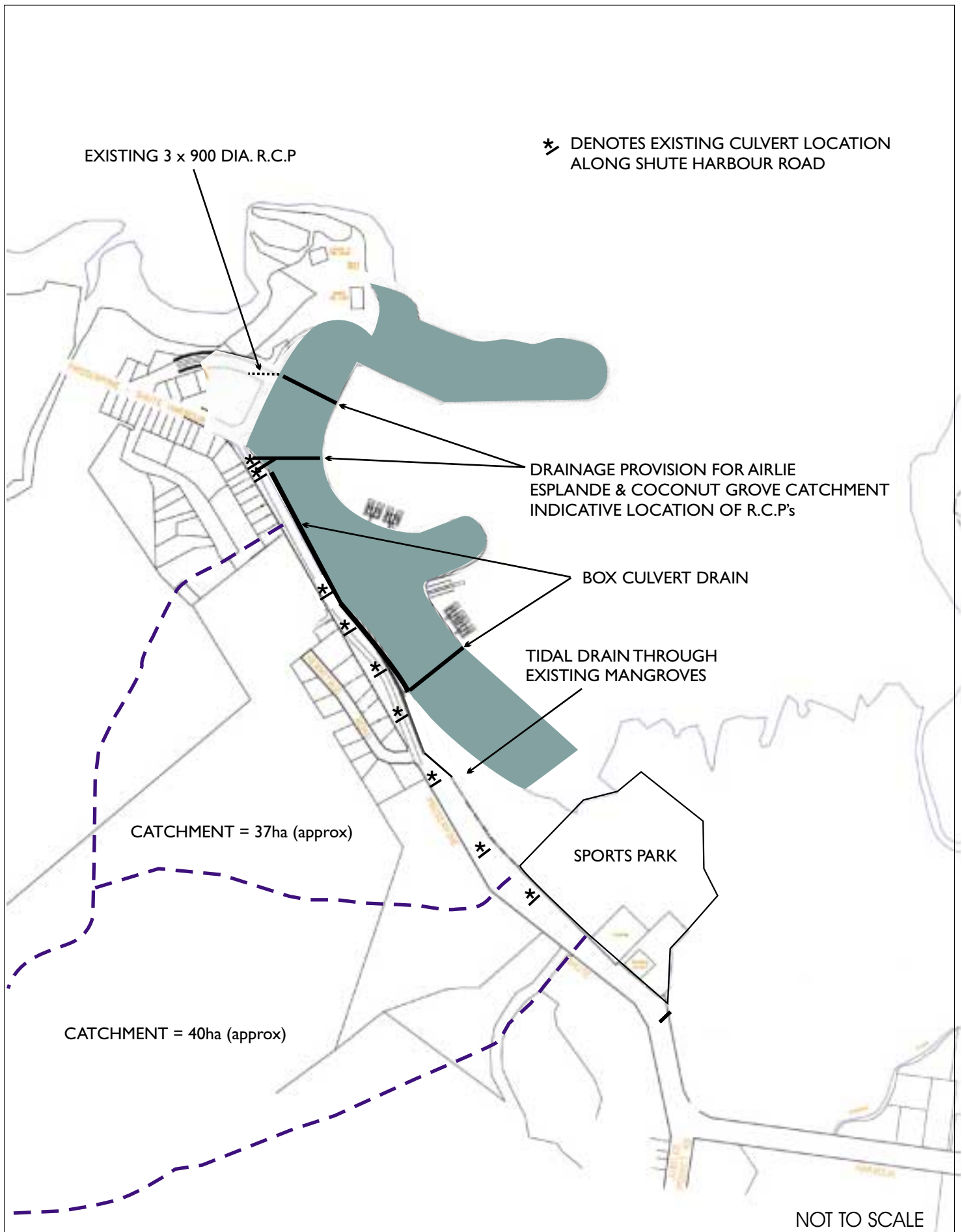
2.6 Infrastructure and Services

2.6.1 Site Drainage

A reinforced concrete culvert drain will be constructed along the boundary of the site, parallel to Shute Harbour Road from the intersection with Coconut Grove to the main site access. The drain will be sized to take all runoff from the catchment along Shute Harbour Road, including all existing outfall drains along Shute Harbour Road (see **Figure 2-7**). A tidal channel will be retained between the marine facilities area/spoil disposal area and Shute Harbour Road and drainage from this area will discharge into this tidal channel. Mangroves will be retained in the tidal channel and will assist in filtering sediment from the stormwater, much as they do at present for stormwater from Shute Harbour Road and upstream areas.

Existing outfall drains along Coconut Grove will be extended to discharge into the Marina Basin. Drainage from the development site will also be discharged into the marina basin, with flows in the marina facility area to pass through oil/sediment separation facilities as described in **Section 2.5.2**. The reclaimed area is small compared to existing catchments in Airlie Beach and all components of the storm water system will be designed to perform in accordance with best practice requirements, including a first flush capability for storm events. All drains that outfall into the marina basin will be constructed with catch pits and trash racks to collect sediments and debris. The catch pits and trash racks will be cleaned out regularly and after heavy rainfall.

During construction all drainage water from the reclaimed areas and the marina excavation will be diverted through the future development area to allow settlement of sediments. The drainage water will then flow to the maintenance dredging disposal area, which will act as final settlement basin. Final discharge will be via a tail-water channel for discharge through a gated outlet into the mangrove area to be retained at the rear of the spoil disposal site at the far eastern end of the development. The discharge will be mostly sea water except during storm events when it will be diluted with some freshwater.



PORT OF AIRLIE MARINA DEVELOPMENT

The quality of the tailwater will be continuously monitored to ensure agreed discharge water quality standards as set in the Environmental Authority are complied with. This is discussed in more detail in **Section 7.2.1**.

2.6.2 Sewage

The proposed development will be staged over a 5 year period from May 2003 and the expected sewage generation from the ultimate development in 2009 is 490ML/day (ADWF) based on a population of 1,717 EP, with generation increasing incrementally over the 6 year development period.

Within the site, the sewage collection system will consist of gravity pipelines, located in the road reserves or in a service corridor around the marina basin. The sewers will discharge into the development's main pumping station and be lifted via a rising main to join the existing Whitsunday Shire Council's sewerage system and pumped via a rising main to the Cannonvale STP, some 5 km from the site.

Pump stations and rising mains within the development will be sized and designed to minimise the risk of overflows of sewage to marine waters using accepted strategies such as:

- ❑ Prevention of stormwater inflows;
- ❑ Storage within the system sized to provide emergency storage;
- ❑ Duplication of pumping capacity; and
- ❑ Back up power supplies.

Sewage and bilge pump out from boats, which constitutes less than 17% of the average daily sewage generation from the final development, will be discharged into a holding tank at the marina facilities area. The sewage will then be pumped to the development's main sewage pumping station where it will be diluted by thorough mixing with sewage from the commercial and residential developments before being discharged into the Council's system. Bilge water will be pumped through an oil separator before being discharged into the holding tank at the marina facilities area.

The Whitsunday Shire Council's response to EPA on the Draft EIA for the much larger, original development proposal (dated March 1999) stated that:

"It is considered that staged headworks contributions may provide the ability to service the development. An analysis of the network and staged impact on the system would be required at Development Application Stage"

Whitsunday Shire Council has confirmed that this is still the case, however the pumping stations and rising main may require upgrading over time to provide adequate capacity for the additional flows from the development. Discussions are currently being held with Council on the requirements for external works, headworks charges and bought forward costs required to connect the development to the councils sewage system. Appropriate headworks contributions will be made and it is expected that this will assist in bringing forward the planned upgrade of Cannonvale STP to meet both the incremental increased demands from the project and the EPA and GBRMPA effluent discharge standards which must be met by 2008.

PORT OF AIRLIE MARINA DEVELOPMENT

2.6.3 Water Supply

The Port of Airlie development will require connection to the Whitsunday Shire Council reticulated water supply.

The Whitsunday Shire Council's response to EPA on the Draft EIA for the much larger, original development proposal (dated March 1999) stated that:

"It is considered that Water Supply would be available to meet the demands of the development with appropriately staged payments of headworks contributions. An analysis of the network will be required at the Development Application Stage to assess any bring forward cost for the provision of the reservoir at Mandalay or Jubilee Pocket based on council's program to provide for upgrading of the system."

The ultimate development will require the supply of 490m³/day average daily flow (ADD) in 2009, with demand increasing incrementally over the 5 year development period. Water supply for all land-based development will be reticulated around the site in the road reservations and within the services corridor that follows the marina boardwalk. Water supply will be provided to all marina berths and to the large commercial wharves of the ferry terminal.

Discussions are currently being held with Whitsunday Shire Council on the requirements for external works and headworks charges required to connect the development to the Council's water supply system. Analysis of the network will be undertaken as a condition of the future Development Lease and the required headworks and external works charges will be included in a Deed of Agreement between the Proponent and Whitsunday Shire Council.

2.6.4 Solid Wastes

Whitsunday Shire Council will provide garbage collection for the residential, commercial and retail areas. Solid waste bins will be provided on the marina pontoons for collection of solid wastes from boats. The marina operator will transfer the wastes to a central sealed container in the marina facilities area for collection by Whitsunday Shire Council.

Industrial wastes from the boat services area will be collected by the marina operator and transported to the Whitsunday Shire Council Waste disposal facility for disposal.

Waste management during operation is discussed in more detail in **Section 12.3**.

2.6.5 Power Supply

The Port of Airlie will be connected to the Queensland electricity grid. All electrical installations will comply with AS 3004 and AS/NXS 3000. Earth leakage circuit breakers will be installed on all electrical circuits.

Final power demand requirements for the proposed development will be determined during detailed design. Appropriate energy efficiency measures will be incorporated into design. This may include:

PORT OF AIRLIE MARINA DEVELOPMENT

- ❑ Design in accordance with appropriate building codes such as the Building Code of Australia, which is expected to be modified to include energy efficient design measures, or other appropriate guidelines
- ❑ Inclusion of energy efficient appliances and fittings.

2.6.6 Transportation

2.6.6.1 Effects on the Existing Road Network

The impacts of the proposed development on the existing road network, including key intersections have been assessed. The assessment determined that the proposed development will impose a minor increase in travel time on through traffic, through changed traffic control on Shute Harbour Road at its intersections with Coconut Grove and the eastern site access.

The development is strongly oriented towards public transport, walking and cycling, and will encourage increased public transport use through improved facilities and accessibility. In addition, the relocation of a large proportion of the ferry activities from Shute Harbour to the heart of the mainland tourist accommodation area is expected to greatly increase the non-motorised proportion of traffic using these facilities as well as reducing the average vehicle trip length.

When fully developed the proposed development will generate approximately 3 000 new vehicle trips per day on the external road network.

The area of influence of the development, in traffic terms will extend along Shute Harbour Road and Waterson Road from the main access to the development to Stewart Drive in Cannonvale. However, the impacts of the additional traffic on the performance of road links and key intersections in this area would be minor, and no change in the interim (2010) or ultimate (2020) configurations would be required to accommodate the development traffic. However the analysis for intermediate years indicates that the development would result in several link and intersection improvements to be brought forward as described in **Section 13.7.1**.

The access and key internal intersections within the site would operate well within capacity and with a good level of service in the proposed configurations. Queue length checks on the circulation road north of the main access to the development eastern site access indicate that the storage space shown on the concept plan would be more than adequate, and the need for weaving in this area can be removed with suitable road design.

Although the roundabouts shown on the development Concept Plan would operate effectively, traffic signal control should be considered on Shute Harbour Road at Coconut Grove and at the main development access to improve safety for pedestrians and cyclists.

The estimated traffic generation during construction, for both heavy and light vehicles, has been derived in **Section 13.2**. In capacity terms, the daily and hourly flows anticipated are very small, and no significant operational impact on either links or intersections is expected. However, a substantial number of heavy vehicle trips will be generated during construction and these will have an effect on pavement life. Based on the current traffic volumes and heavy vehicle percentages, the assessment has shown that heavy vehicle generation of construction of the marina and land

PORT OF AIRLIE MARINA DEVELOPMENT

reclamation will produce assessable impacts. Heavy vehicle traffic generation during the construction of the marina and reclamation of the land will produce pavement impacts on Shute Harbour Road from the site to the relevant existing quarries and sources of construction materials. Preliminary calculations using nominal material sources suggest that the pavement costs imposed by the development will be of the order of \$ 34,000. A more detailed assessment of pavement impacts based on pavement condition reports and actual materials sources will be undertaken before construction commences, in accordance with DMR's *Guidelines for Assessment of Road Impacts of Development Proposals*.

2.6.6.2 Site Specific Roads

Vehicular access to the site is from only 2 entry points. The main access is from Shute Harbour Road at a new roundabout intersection mid way between Coconut Grove and Hermitage Drive. A short length of road will then lead to a second roundabout that will distribute traffic to the Hotel, Serviced Apartments, Ferry Terminal, Transport Interchange and Public Car Park, Marine Facilities and the Public Boat Ramp.

Between the two roundabouts a slip road will take inbound vehicles to the underground carpark under the Transport Interchange and the Retail/Residential Components E and F. Outbound vehicles will exit these carpark through a tunnel and up an access ramp to outbound lane of the access road.

The second vehicular access to the development is from a roundabout at the intersection of Coconut Grove and Airlie Esplanade which will distribute traffic to the residential areas on the breakwater and to a short access road servicing the marina and Harbourfront areas G and H.

The proposed access configuration is supported by Whitsunday Shire Council, see **Appendix L2**.

It is anticipated that there will be very little demand for internal vehicle circulation arising from trips between the individual components within the site because of the short distances between the internal components and the extensive network of pedestrian and bicycle paths will link all development areas. The underground carpark beneath the harbour front components (D,E,F,G and H) will be interconnected with circulation paths throughout, making it quite feasible to drive between any two components without using the external road network, although it is not expected that people will drive around the development.

The preliminary layouts of the internal access roads and intersections has taken into account safety for all road users and operational effectiveness. The traffic volumes within the site are low and road capacities and queuing lengths at internal site intersections and other critical points within the site (for example access points to access controlled parking areas) are satisfactory. The internal road layouts will be confirmed during detailed design and the projects planners have confirmed that the overall development plan can be modified to take into account any required changes in internal road designs required at that stage.

2.6.6.3 Parking Requirements

Parking requirements for land uses within the development have been based on Whitsunday Shire Planning Scheme rates and relevant Australian Standards for the design of boat ramps and marinas. For land uses with no specified rates the parking

PORT OF AIRLIE MARINA DEVELOPMENT

calculations are based on the trip generation methodologies described in **Section 13.5.1**. The calculations for determining parking requirements are based on the assumption that each development component operates in isolation. However the integrated nature of the development suggests a high proportion of complementary, multipurpose trips and its proximity to the main tourist, commercial and accommodation precincts of Airlie Beach suggests that visitors to the site will be pedestrians and will arrive in public transport.

For all uses other than permanent residential, the parking requirements have been discounted for self-containment and pedestrian and public transport use. Permanent residential demand however has been conservatively taken as 100 % of standard rates, which assumes that all unit owners will store a vehicle on site.

For the ferry terminal, the private vehicle parking requirements have been calculated as a proportion of the total daily generation, representing peak accumulation of approximately 92 % of the total vehicles visiting the site in a day. The parking demand for coaches, buses and taxis at the Transport Terminal has been based on present operations at Shute Harbour and at the existing bus terminal in Airlie Beach, plus consideration of likely ferry and long distance coach services in peak hours.

The proposed numbers of car parks, based on Whitsunday Shire Planning Scheme rates and relevant Australian Standards total 1225 as shown in **Appendix R**. The proponent intends to hold further discussions with Whitsunday hire Council to rationalise the carparking requirements, taking into account complementary uses.

2.6.6.4 Pedestrian and Cyclist Facilities

Large numbers of pedestrian movements are expected to be associated with the proposed development. The primary access routes for pedestrian movements are expected to be:

- ❑ from the main tourist retail area on Shute Harbour Road to the pedestrian mall/village square at the entrance to the development adjacent to Grove;
- ❑ along Airlie Esplanade to the marina boardwalk adjacent to the marina entrance; and
- ❑ from Shute Harbour Road into the development at the main access road.

Pedestrian and cycle ways within the site have been planned along the harbour front to provide connections from Coconut Grove to the existing pedestrian and cycle way network east of the site and linking to the transportation interchange and ferry terminal. A pedestrian and cycle way also follows the harbour front along the inside of the breakwater to the headland park and also along the back of the breakwater beach.

Safe crossing facilities particularly over Shute Harbour Road and to a lesser extent Coconut Grove will be a significant concern. The provision of new roundabouts at Coconut Grove Road and the main development access would provide some improvement in safety, by controlling speed and providing traffic islands which pedestrians could use to stage their crossing. However, traffic signal control at these locations would provide a higher level of safety for pedestrians and cyclists, particularly those with reduced mobility, by positively controlling traffic flow to achieve time separation for pedestrians on signalised crossings.

PORT OF AIRLIE MARINA DEVELOPMENT

2.6.6.5 Passenger Ferry Terminal

The ferry terminal will have the capacity to process an average 4,000 passengers per day with peak throughputs of 800 passengers per hour in the morning and afternoon peak periods. Currently the major ferry/day tour operator handles 1,200 passengers per day from Shute Harbour with peak throughputs of 400 passengers per hour during the peak periods of 8.00 to 9.30am and 3.30 to 5.00 pm.

It is proposed that the ferry wharves in front of the terminal will be accessed by gangways wide enough for vehicular and separated pedestrian access which have a maximum slope at Lowest Astronomical Tide of 1 in 7.5. This will enable vehicles transporting baggage and other supplies to the ferries to have access at all times. The slope of the ramp will be 1 in 14 or a flatter slope for 83 % of the time. A specially adapted buggy will be available for use of those with disabilities.

An additional berth facility will be provided adjacent to the boat yard for the berthing and servicing of 4 ferries and this facility will include refuelling and sewage pump-out.

2.6.7 Telecommunications

Telecommunications will be provided through the Airlie Beach exchange. Public telephones will be provided for yachts and other users of the marina and associated facilities.

2.6.8 Emergency Planning and Services

Hazards and risks associated with marina operation may include:

- ❑ Spills of fuel and other chemicals;
- ❑ Fire or explosion associated with fuel storage and dispensing facilities;
- ❑ Fire associated with commercial or residential facilities; and
- ❑ Extreme weather events.

Hazard and risk management at the facility will be dealt with on a number of fronts and issues to be addressed during design of the marina and facilities include:

- ❑ Design of fuel storage and dispensing facilities in accordance with AS 1940: Storage and Handling of Flammable and Combustible Liquids with additional features such as double skins and emergency shut off systems appropriate to use in a marine environment;
- ❑ Inclusion of containment in all areas where fuels or hazardous chemicals may be kept or handled;
- ❑ Design of all buildings and public areas in accordance with relevant fire safety regulations and codes;
- ❑ Fire fighting facilities will be provided in accordance with the requirements of AS 3962:2001, including;
 - Fire hose reels located so that every berth can be reached by a hose;
 - Fire hydrants;
 - Fire extinguishers for chemical/electrical fires which are non-toxic to the marine environment; and
 - Fire alarm system.
- ❑ Design of all features to appropriate cyclone and wave design standards;

PORT OF AIRLIE MARINA DEVELOPMENT

- ❑ Setting of heights of all land and building areas and marina facilities to levels appropriate to the predicted storm surge (see also **Section 2.7.1.4**); and
- ❑ Provision of access for emergency vehicles; police, ambulance and firefighting vehicles will be provided around the entire perimeter of the marina adjacent to the boardwalk and to the head of gangways of the marina.

Marina and marine facilities operations will be required to be carried out in accordance with an Environmental Authority from the Environmental Protection Agency. This Environmental Authority will include conditions pertinent to the storage and handling of fuels and other chemicals including spill response.

Operation and maintenance of fire control systems to manufacturer's instructions throughout the development by managers of each facility will ensure that fire safety standards are maintained.

Within the marina itself, staff will be trained in emergency response, including fire fighting and spill response.

Management of risk from severe weather conditions and storm surge is discussed in more detail in **Section 5.4.5**.

A site emergency plan will be developed for the marina and marine facilities areas in accordance with AS/NZS 4360:1999. In developing the site emergency plan, consultation will be undertaken with Whitsunday Shire Council and local and regional emergency services including:

- ❑ Local Controller State Emergency Service;
- ❑ Proserpine Health;
- ❑ Qld Police Service;
- ❑ Ergon Energy;
- ❑ Qld Fire and Rescue Authority;
- ❑ Telstra;
- ❑ Qld Ambulance Service;
- ❑ Qld Transport (Marine Operations); and
- ❑ GBRMPA.

2.7 Construction

2.7.1 Dredging and Excavation

2.7.1.1 Overview

The project will be developed on land entirely reclaimed from the intertidal zone below the high water mark. Construction involves the excavation and dredging of the marina basin and entrance channel and use of the excavated and dredged material for formation of the land.

To minimise the environmental impacts of open sea dredging, the marina basin and reclamation areas will be fully enclosed by sheet pile walls and where ever possible the excavation and placing of fill material will be undertaken in dry conditions after pumping out of the enclosed area. Excavating and filling in dry conditions will also ensure that the reclaimed land will be available for construction of site services and

PORT OF AIRLIE MARINA DEVELOPMENT

building development much sooner than if the reclamation had been undertaken using dredged material, which would require a longer period of settlement and consolidation.

To minimise the volumes of imported material, the silty sandy clays underlying the soft marine surface mud will be utilised for land reclamation.

2.7.1.2 Dredging

The channel will be dredged to minimum of RL-5.25 AHD (3.5m below lowest astronomical tide level). The entrance channel will be approximately 1,000m in length and 50m wide and will be excavated using a cutter suction dredge. Dredge spoil (approximately 120,000m³) will be pumped to the 4.5ha disposal area east of the Marina Facilities area along Shute Harbour Road (see **Figure 2-6**). The deposited muds will gradually dry and consolidate over a period of 5-10 years and the area will then be developed for future residential and commercial purposes. Gated outlet structures will be installed in the bund wall. Any drainage from the future development area will be directed through low velocity channels to allow settlement of sediments.

Tailwater from the disposal area areas will be channelled through the maintenance dredging disposal basin and then through a tailwater channel to allow deposition of sediments before allowing the water to re-enter the marine environment.

Dredging is an Environmentally Relevant Activity under the *Environmental Protection Act 1994* and an Environmental Authority issued by the Environmental Protection Agency is required to carry out this activity. The Environmental Authority will contain a number of conditions in relation to environmental management of the dredging activity which must be complied with.

A dredge management plan will be developed for the dredge process including:

- ❑ Dredge practices to minimise suspension of sediment during dredging and to control the quality of return water from the dredged spoil disposal area.
- ❑ Sediment control measures, including use of bunds and silt curtains.
- ❑ Monitoring of suspended sediment levels and appropriate triggers for corrective action (See **Sections 6.1.4** and **7.3**).
- ❑ Appropriate corrective actions for situations when elevated suspended solids levels are identified.
- ❑ Appropriate actions in the event of adverse weather conditions.
- ❑ Biological monitoring of impacts on adjacent seagrass and other ecosystems.
- ❑ Management of acid sulphate soils (see **Section 6.1.5**).

2.7.1.3 Excavation of the Marina Basin

The marina basin will be excavated to a minimum depth of 3.5m below LAT or -5.2AHD. Steel sheet pile walls will be constructed around the entire marina basin (see **Figure 2-6**). The area within the sheet pile wall will be pumped dry and maintained in a dry condition. An average of 2m of soft marine mud deposits (approximately 180,000m³) will be excavated, in the dry and transported by truck and placed in the Marina Facilities area and Dredge Spoil Disposal area along Shute Harbour Road.

PORT OF AIRLIE MARINA DEVELOPMENT

375,000m³ of underlying suitable material from excavation of the marina basin will be excavated for use in the remaining reclamation areas, which will also be enclosed by sheet pile coffer dams.

The potential for generation of Acid Sulphate Soils and appropriate management of these is discussed in more detail in **Section 6.1.5** and **Appendix E**.

It is expected that excavation of the marina and land reclamation works will be included in the Environmental Authority for dredging.

2.7.1.4 Reclamation of Development Areas

Sheet pile coffer dams will be constructed around the land reclamation areas. The areas will be pumped out and maintained in a dry condition before placing fill material, effectively preventing release of sediments to the marine environment during excavation and filling operations. The excavated material from the marina basin will be spread, dried and compacted by rollers. In areas designated for park and open space, selected suitable topsoil material will be placed on top of the fill.

The sheet pile dams will also form the permanent internal marina walls and the cut off wall behind the breakwater beach. The internal marina walls will be vertical sheet pile walls with a reinforced concrete cap that ties in to the reinforced concrete promenade walkway as shown in **Figure 2-8**.

The Headlands at the end of the outer breakwater will be constructed of armour rock and a 60m long rock groyne will be constructed perpendicular to the outer breakwater to create a compartment for the beach breakwater.

The height of all reclaimed land is designed in accordance with predicted extreme wave and tidal conditions, with an additional allowance for sea level rises due to global warming. Studies undertaken as part of this Supplementary EIS have calculated storm surge levels as shown in **Table 2-3** (see also **Section 5.1**).

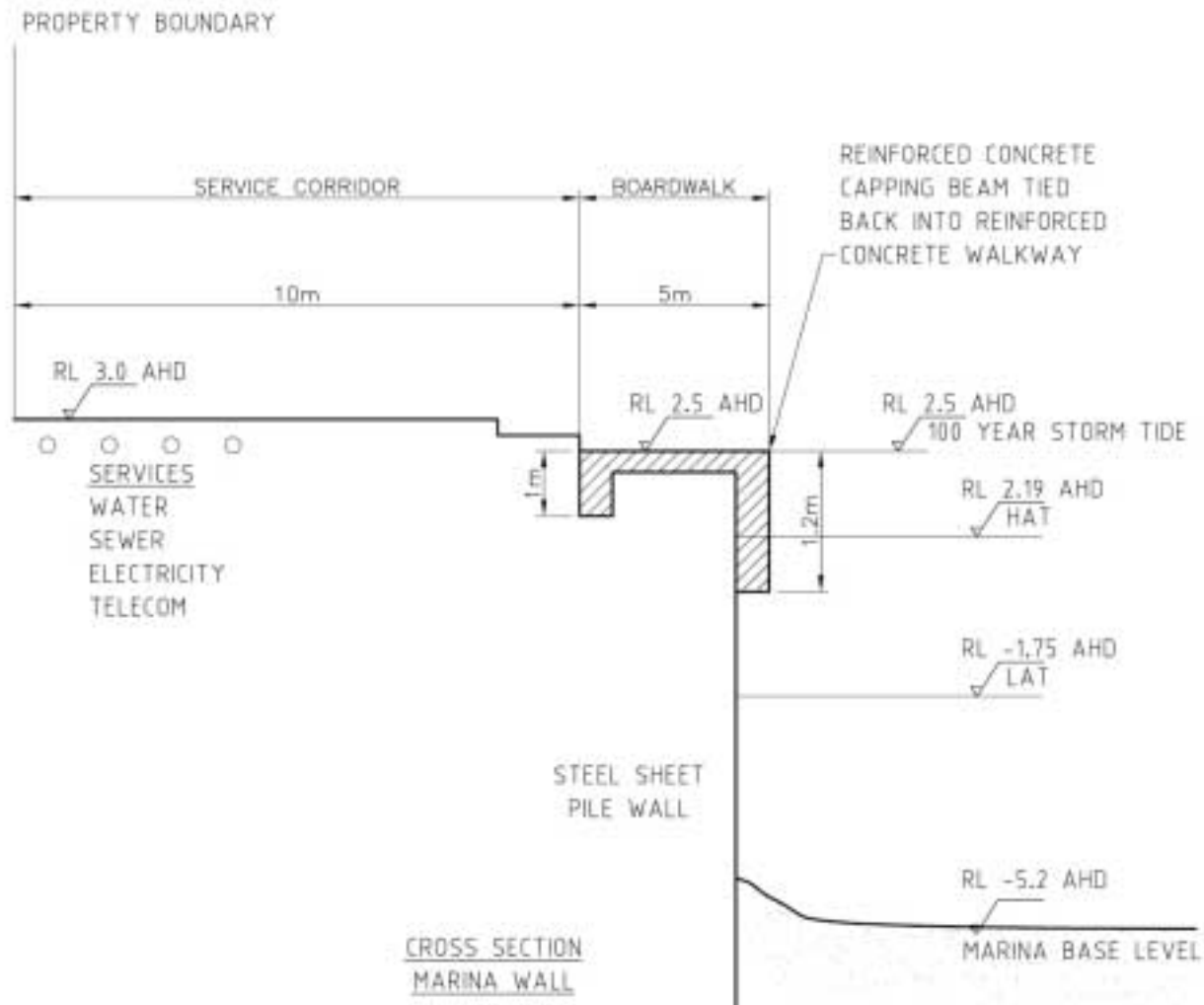
■ **Table 2-3 Storm Surge Levels**

Average Recurrence Interval (years)	Storm Tide Level (to AHD)	Storm Tide Level (to CD)
50 years	2.5	4.2
100 years	2.6	4.3
250 years	2.8	4.5

Based on these levels, the reclamation levels in **Table 2-4** have been adopted.

■ **Table 2-4 Reclamation levels**

Reclamation Area	Minimum Level (m AHD)	Comment
Harbour Boardwalk	2.5	Set at 50 year storm tide level
Roads and Public Areas	3.1	Set at 100 year storm tide level plus allowances of 0.2m for wave set up and 0.3m for climate change
Building Floor Levels	3.3	Set above 250 year storm tide level plus allowances of 0.2m for wave set up and 0.3m for climate change
Top of breakwater rock armour headlands	5.6	See also Section 5.3
Top of breakwater beach	3.5	See also Section 5.3
Top of bunds for dredge spoil disposal area	4.5	Height determined by required capacity for disposal of dredged spoil



NOT TO SCALE

SINCLAIR KNIGHT MERZ

PORT OF AIRLIE MARINA



Marina Wall Cross Section

Figure 2-8

PORT OF AIRLIE MARINA DEVELOPMENT

2.7.1.5 Spoil Disposal Area

An armoured bund wall will be constructed on the seaward side of the fringing mangroves along Shute Harbour Road to create basins for receiving the spoil material from dredging of the entrance channel and the soft muds excavated from the marina basin. The outside slopes of the bunds will be protected from erosion and from wave action by armour rock or sheet piling protection. After completion of the dredging and reclamation, the disposal areas will be capped with a layer of topsoil and sown with grass and other appropriate coastal vegetation, to protect the surface of the reclaimed land from erosion. A cross section of the spoil disposal area is shown in **Figure 2-9**.

2.7.1.6 Construction Sequence

The construction sequence is described below and detailed in **Figure 2-6**.

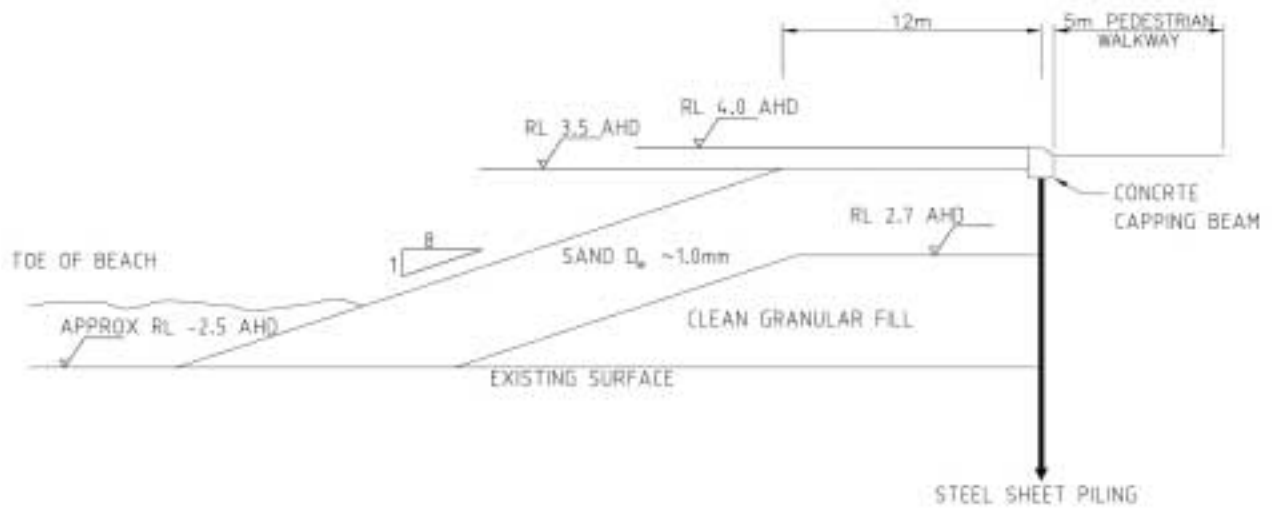
All foreshore vegetation will be cleared from the construction area and transported to landfill. All loose and rippable surface rock will be excavated from the foreshore areas and stockpiled for future use as armour rock for the future development area that will be used for disposal of the dredged spoil.

Selected fill material will be imported from an established quarry/borrow pit to establish a working area of 5000m² adjacent to Coconut Grove for project offices, materials storage, construction equipment hardstand. This area will be provided with security fencing.

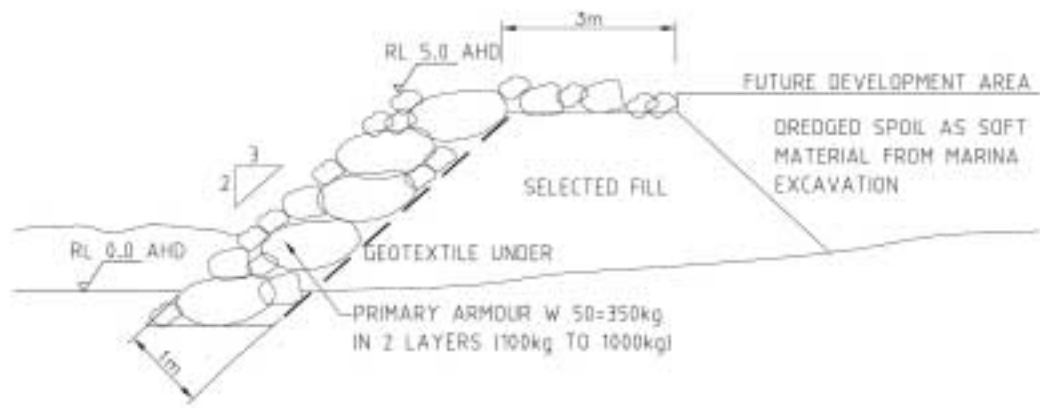
Selected fill material will be imported to construct a haul road parallel to Shute Harbour Road from Coconut Grove to the future development area and to construct bunds for containment of excavated soft material and maintenance dredge spoil basin.

Tail water channels for return water from dredging and dewatering of marina basin will be constructed within the future development area. Dredging water and water from dewatering the marina and reclamation areas water will be discharged into the future development area and discharged back into the bay adjacent to the Whitsunday Shire Council sports park. Pumping rates from the marina basin will be determined during the detailed design phase and this will determine the area size requirements for disposal of dredged spoil. Residence times in the tailwater channels will be determined during detailed design at a length suitable to ensure the quality of the return water meets discharge standards.

The proposed management method allows a great deal of flexibility to respond to changing conditions by increasing residence time for water as required to remove suspended solids with different settlement rates. The tail water will be continuously tested for acidity and turbidity to ensure the water to be discharged meets the agreed water quality standards. During construction the site will be isolated from inflows from stormwater from the adjacent land areas by a tidal drain to be constructed along Coconut Grove and Shute Harbour Road.



CONCEPT DESIGN
BEACH PROFILE



PRELIMINARY CROSS SECTION
RETAINING BUND FOR DREDGED SOIL

NOT TO SCALE

PORT OF AIRLIE MARINA DEVELOPMENT

Sheet pile coffer dams will be constructed around the reclamation areas and marina basin from floating barge. Surface drains will be excavated in the surfaces of the reclamation areas and in the marina basin. All areas within coffer dams will be continuously dewatered by pumping out to future development areas and discharged back into the sea via the tailwater channel. Excavation of drains will be undertaken by drag-lines and excavators with swamp tracks.

Soft surface muds will be excavated from the marina basin, transported by truck and placed in the future development area. Fill material from under the soft muds will be excavated from the marina basin and placed and compacted on layer of geofabric placed on the existing surface. The fill material will be placed in sequential lifts that will be graded to low points within the coffer dams to maintain surface drainage of the material. All leached water from the placed material and rainwater collected from the fill areas will be pumped to the tailwater channels via the future development area to allow sediments to settle out before the water is discharged into the sea. Excavation of the material from the marine basin will be undertaken by an excavator and front end loader and the material transported to the reclamation areas by trucks. Excavation will proceed seawards from the shoreline.

The entrance channel will be dredged with cutter suction dredge that will pump the dredged material to designated dredge spoil disposal area. All tailwater from dredging operations will be held in the bunded disposal area until the water meets discharge water quality standards and then discharged to the sea through the tailwater channel.

The sheet piling around the marina will be used as the permanent wall for the marina basin. A reinforced concrete capping beam will be constructed at the top of the sheet pile walls (see **Figure 2-8**) and tied back into the reinforced concrete walkway running behind the marina wall. The faces of the sheet pile marina wall exposed to tidal action will be coated with an epoxy tar paint to protect against corrosion.

The headlands at either end of the beach breakwater will be protected by armour rock as described in **Section 5.3**. A rock groin or spur breakwater will be constructed at the end of the main breakwater to prevent sand from moving eastward off the beach. The armour rock will be sourced from an existing quarry in the Cannonvale Valley, transported to site in dump trucks and placed by excavators and dozers.

The beach breakwater will be constructed with 25,000 m³ of selected fill from the excavation of the marina basin, overlain by a one metre of clean sand (35,000 m³). Sufficient sand may be available from materials to be excavated from the site. Any additional sand will be sourced from licenced sand extraction areas in the Don River at Bowen. All material will be placed by dozer, pushing the material out from the back of the beach during the bottom half of the tide. A silt curtain will be placed along the line of the toe of the beach during construction to minimise silt plumes from expanding into Pioneer Bay.

The reclaimed land will be topsoiled and grassed to protect the surface from erosion until construction of the buildings is commenced. Until the area is topsoiled and grassed, runoff from the area will be collected and discharged through the tailwater channel.

PORT OF AIRLIE MARINA DEVELOPMENT

2.7.2 Infrastructure and Facilities

On completion of the reclamation works the permanent roads, pedestrian areas and public parklands will be constructed and landscaped. Site services including water supply, sewage pipelines and pumping stations, electricity mains and telecommunications cabling will be installed in the service corridors running behind the marina board walk (see **Figure 2-8**) and in the footpaths in the dedicated road reservations.

The public boat ramp and carparking and the marina facilities hardstand areas will be completed after all earthworks have been completed.

Finally, all external works will be constructed to connect the development to council and main roads, water supply and sewage systems, electricity and telecommunications to connect the site to existing systems.

More details on site infrastructure and services are provided in **Section 2.6**.

2.7.3 Building and Structures

Piles for the floating marina pontoons will be driven in the dry after the marina excavation has been completed. The sheet pile wall across the entrance to the marina will then be removed and the marina basin flooded. The marina pontoons will then be transported to site from the manufacturers, unloaded at the marina facilities area, floated into position and secured to the piles.

The transportation interchange and public carpark, the ferry terminal and the adjacent harbourfront mixed retail/commercial/residential complex will be constructed once the reclamation works have been completed.

The remaining retail and residential buildings will be constructed to meet market demands. A temporary marina administration and amenities building will be erected at the entrance to the marina until the building containing the Harbourfront Mixed Use & Public Carpark (Component G) has been constructed. Temporary on grade carparking for the marina (140 cars) will also be provided at this site.

To minimise the areas and volumes required for reclamation all permanent carparking will be constructed under the buildings. Basement carparks will form the basis for the reinforced foundation of buildings and will require excavation of reclaimed land. General reclamation will be to 2.5 AHD and the underslab of the carparks will be excavated to 0.5 AHD. If required, excavation will be within sheet piled coffer dams that will be dewatered and will be addressed during detailed design. Excavated material from the carpark will be used for site contouring or the future development area. Basement carparks will be reinforced concrete construction, fully waterproofed to prevent seepage into the carpark areas. Drainage and emergency pumps within the carparks will be provided in the event of extreme storm events leading to inundation of the carparks.

2.7.4 Construction Schedule

Construction of the project will be undertaken over a 7 year timeframe (18 months reclamation and civil works and 5 years building and other facilities development),

PORT OF AIRLIE MARINA DEVELOPMENT

commencing in May 2003. A preliminary construction program as been developed as shown in **Appendix C**, with consideration given to the following:

- ❑ All excavation and dredging will be undertaken in the dry season (between April to December);
- ❑ Priority has been given to the construction of the key infrastructure elements; the ferry terminal, transport interchange adjacent commercial facilities; and
- ❑ Commercial, residential and tourist accommodation components will be developed as determined by market demands.

The primary critical activity periods can be summarised as follows:

■ **Table 2-5 Proposed Construction Schedule**

Activity	Start Date	Duration (months)
Contractor Mobilisation and establishment	May 2003	1
Sheet pile coffer dams around the site	July 2003	4
Reclamation of breakwater spur and construction of beach and protection works	August 2003	6
General Excavation and Reclamation	June 2003	9
Installation of site services	Feb 2004	7
Construction of Transport interchange and Ferry Terminal	March 2004	7
Construction of Marina Berths	March 2004	6
Construction of pedestrian walkways and public parks	March 2004	3
Construction of Marina Facilities and Public Boat Ramp	November 2004	6
Construction of Commercial and Residential components	November 2004	5 years

Construction activities will be undertaken 6 days per week and hours will be restricted to daylight hours, typically from 7 am to 6 pm.

2.7.5 Quantities

Quantities of materials required for construction of the proposed marina and reclamation and servicing of the land components are provided in **Table 2-6**.

■ **Table 2-6 Estimated Quantities of Materials for Land Reclamation and Marina Construction**

Material	Quantity	Source
Dredge spoil from entrance channel to disposal	120,000m ³	From site
Soft surface mud from marina basin to disposal	170,000m ³	From site
Suitable material from marina basin to development areas	375,000m ³	From site
Selected fill for bunds, haul roads and working platforms	35,000m ³	Imported from quarry
Revetment rock for future development area	8,000m ³	From site
Breakwater armour rock	20,000m ³	Imported from quarry
Beach sand	60,000 m ³	Likely that most sand will be available on site. Any additional sand is likely to come from the Don River (Bowen)
Steel sheetpiling	24,000 lin m	From Brisbane by rail & road
Floating pontoons, walkways, bridges	3000 lin m	Manufactured in Cannonvale
Piling for marina	2000 lin m	Transported from Brisbane
Concrete for structures	4,000 m ³	From local Batching plants
Road base and sub base	2,500 m ³	From licenced quarries in the area
Pavers	12,000 m ²	Unknown source, sourced from within region if possible
Asphalt	5,000 m ²	From local batching plants
Topsoil	3,000 m ³	From Cannonvale Valley
Landscaping supplies (trees, shrubs, turf etc)		From local suppliers

PORT OF AIRLIE MARINA DEVELOPMENT

2.7.6 Construction By Products and Waste

The planning of the new proposal has given careful consideration to maximising the use of material found on the site and minimising the amounts of imported material that will need to be transported through the main commercial areas of Cannonvale and Airlie Beach. As described above all excavated material (including dredged material) from the site will be used for reclamation works. Areas where the dredged spoil, and weak surface muds will be deposited will be allowed to consolidate over a period of years and then be used for appropriate urban development. There are significant quantities of surface rock around the existing foreshore within the site. This rock will be retrieved, stored and used as armour rock protection for bund walls and marina walls as required. The dredged material from the entrance channel has a significant proportion of sand and shell (up to 20%). Dredge spoil disposal operations will be undertaken to retrieve this sand and shell for use in construction of the beach breakwater.

The proposed management of other construction generated wastes is described in **Table 2-7** below

■ **Table 2-7 Waste Generation During Dredging and Land Reclamation**

By Products and Waste	Estimated Quantity	Management Method
Vegetation	Up to 6,000m ³	<input type="checkbox"/> Shred and place in Kelsey Creek landfill
Waste oil (from equipment maintenance)	400L/month	<input type="checkbox"/> Store in bunded area
Packaging	Unknown	<input type="checkbox"/> Dispose of to oil recyclers (NQRR)
Sewage	Up to 20 EP	<input type="checkbox"/> Sort into wood, cardboard, paper, plastic, metal
Food wastes	Unknown	<input type="checkbox"/> Recycle where possible, otherwise dispose of to licenced landfill
Steel sheet piling	9000 linear metres	<input type="checkbox"/> Chemical toilets
		<input type="checkbox"/> Store in sealed container
		<input type="checkbox"/> Dispose to licenced landfill
		<input type="checkbox"/> Reused by contractor in another project

2.7.7 Safety and Emergency Management

A construction emergency management plan will be developed for the marina excavation, channel dredging and land reclamation activities. This plan will be prepared in accordance with requirements of AS/NZS 4360:1999 and will incorporate:

- ☐ Workplace health and safety requirements;
- ☐ Management of hazardous materials (see also **Section 2.7.8**);
- ☐ Monitoring of weather and sea conditions and weather warning arrangements;
- ☐ Securing of construction works and evacuation procedures in the event of extreme weather conditions; and
- ☐ Induction and training of employees and contractors.

2.7.8 Hazardous Materials

Hazardous materials stored and handled on site during marina construction and land reclamation will be limited to:

- ☐ Diesel for refuelling of equipment;
- ☐ Oil for minor equipment repairs and servicing of earthmoving and piling equipment (major repairs will take place off-site);
- ☐ Oxygen and acetylene for welding of sheet piles and other structures;

PORT OF AIRLIE MARINA DEVELOPMENT

- ❑ Bitumen/epoxy based paints for painting of sheet piles;
- ❑ Lime for neutralisation of acid sulphate soils (if necessary); and
- ❑ Fertilisers and pesticides for revegetation and landscaping.

All hazardous materials will be stored and handled such as to minimise the risk of spill or leak to the environment. This will include:

- ❑ Dedicated storage areas with containment adequate to contain the volume of liquids stored;
- ❑ Appropriate warning signs and information on safe handling;
- ❑ Material Safety Data Sheets on all hazardous materials stored on site;
- ❑ A spill response plan and appropriate spill response equipment and
- ❑ Training of construction workers in safe storage and handling and emergency response procedures.

Storage areas for petroleum products and other flammable and combustible liquids will comply with AS 1940: *Storage and Handling of Flammable and Combustible Liquids*.

No explosives will be required during the construction process.

2.7.9 Employment during Construction

The developer of the project has a commitment to maximise employment opportunities for local people and local contractors.

The dredging and reclamation works, site services and marina construction will be contracted to a national contractor with the required experience in these types of construction. The contract for this work will be competitively bid by prequalified contractors who will be encouraged to employ local skilled and unskilled labour and utilise local contractors, plant and equipment. While it is not possible at this stage to specify an actual proportion of local labour that might be used, the Proponent will seek to maximise these opportunities.

The Proponent is also aware of the Queensland Government's internal policies regarding 10% training positions in government projects and will seek to mirror this requirement as closely as possible.

There will be no construction camp established for the project. The lead contractor will make arrangements for accommodation of construction workers and other in rental housing/units or similar accommodation in Cannonvale, Airlie Beach, Proserpine, and other locations within Whitsunday Shire.

The total number of people employed on the site during construction of the marina and reclamation and servicing of the land is estimated as follows:

- | | |
|---|----|
| ❑ Professional and Administrative Staff | 10 |
| ❑ Plant and equipment operators | 15 |
| ❑ Skilled tradesmen | 15 |
| ❑ Semiskilled and Unskilled labour | 15 |

PORT OF AIRLIE MARINA DEVELOPMENT

The maximum number of staff and labour on site at any time during excavation and reclamation works and construction of site services is estimated to be 35 people.

During construction of various components of the development, employment numbers will vary significantly. It is expected that the overall project will generate 800 person years of employment over a seven year period. Local participation may be higher during this period because of the range of skills needed for building construction works compared to land reclamation works.

2.7.10 Traffic and Access

Heavy vehicles trip generation during the construction stages of the proposed development as shown in **Table 2-7** has been estimated based on the quantities of main construction materials outlined in **Section 2.7.5**

■ **Table 2-8 Construction Stage Heavy Vehicle Generation**

Material	Estimated Quantity	Total Truck Loads	Average Vehicles per Day [round trips]	Source
Dredging and Land Reclamation				
Construction Equipment	10 plant	10	3	Brisbane
Steel sheet piling	24,000 m	200	5	Brisbane
Sand	35,000 m ³	3,500	70	Proserpine and O'Connell Rivers
Rock	20,000 m ³	2,000	70	Quarries west of Cannonvale
General Fill	35,000 m ³	3,500	70	Quarries west of Cannonvale
Total		9,200	Max 70	Average 6 loads per hour
Site Services, Infrastructure and Marina				
Construction Equipment	10 plant	10	3	Brisbane
Topsoil	3,000 m ³	300	10	Landscape suppliers west of Cannonvale
Pavers and Concrete	6,000 m ³	600	10	Concrete plant in Cannonvale
Asphalt	10,000 m ²	50	5	Proserpine or other licenced quarry in the region
Road Base and Subbase	2,500 m ³	250	10	Quarries west of Cannonvale
Piles for floating pontoons	3,200 ln m	24	5	Brisbane
Floating Pontoons	3,000 m	125	2	Cannonvale
Landscaping supplies		50	2	Cannonvale
Total		1 350	Max 10	Average 1 load per hour

The total quantity of imported fill material, rock and sand is up to 100,000 m³, similar to the quantity of earth and rock material required for the construction of the Vision Airlie Project. The residents of Airlie Beach and Cannonvale may expect similar impact from construction traffic over a similar period of time.

Trucks transporting fill material for the construction of haul roads and spoil bunds will enter the site from Shute Harbour Road and Coconut Grove. After the internal haul roads have been constructed, all further imported construction materials will be transported via the bypass loop in Airlie Beach and will enter the site via the proposed major access point from Shute Harbour Road. A temporary intersection will be constructed at this point to DMR requirements.

PORT OF AIRLIE MARINA DEVELOPMENT

Temporary parking spaces for 15 cars for construction staff will be provided within the site adjacent to Coconut Grove. It is expected that the contractor will provide buses for transfer of workers from remote locations such as Proserpine and Cannonvale.

Movement of all materials within the site will be on an internal construction road network and heavily trafficked routes will be gravelled. Dust generation from vehicle using unsealed surfaces will be managed with water sprays (utilising water from dewatering of coffer dams).

A plant and equipment maintenance and refuelling area will be established on site adjacent to Airlie Headland and the Whitsunday Sailing Club. The area will be sealed with a graded bitumen surface. Drainage from the area will be controlled and runoff directed to a grease trap before being discharged into the marina basin for pumping to the spoil disposal area

2.8 Operation and Maintenance

The holder of the marina lease will be responsible for the maintenance of marine structures and for maintenance dredging of the marina basin and entrance channel.

The marina walls, rock armour protection works and the marina basin and entrance channel will be inspected and surveyed by qualified engineers appointed by the marina lessee biannually and after major storm events. The results of the surveys will be provided to the Whitsunday Shire Council and DNRM. Any necessary repairs will be designed and constructed to meet the requirements of both authorities. The 5m wide public boardwalk that runs around the entire marina perimeter will be held under the marina lease to allow unrestricted access for repairs and maintenance. Access to the 5m wide public walkway will be maintained along the back of the breakwater beach, via an easement, to allow access for operation and maintenance and any necessary repairs and replenishment of the beach after major storm events

The marina and access channels will require maintenance dredging every 10 to 15 years. Maintenance dredging will require an Environmental Authority to be obtained from the Environmental Protection Agency (Environmentally Relevant Activity 19) and all dredging activities will have to be carried out in accordance with the conditions of the Environmental Authority. A dredge management plan as outlined in **Section 7** will be developed for maintenance dredging programs. It is conservatively estimated that approximately 3-4mm of fine sediments will be deposited on the seabed within the confined waterways of the proposed marina and entrance channel each year. A very severe cyclone may cause an additional 1mm to be deposited during only a few days. With initial over-dredging of 0.5 metres, the buffer created will offset the need for maintenance dredging for a very considerable period. The rate of sedimentation of the entrance channel and marina basin will be closely monitored over the first 5 years after completion to establish the rates of sedimentation and to plan the regular program of maintenance dredging. During the periods between maintenance dredging operations, the spoil from maintenance dredging will be well drained and the surface sealed by rolling to limit ingress of water into the material. The material may be used by the Whitsunday Shire Council as capping material on the Council's landfill sites.

PORT OF AIRLIE MARINA DEVELOPMENT

2.9 Project Costs

Total development costs of the project are estimated at \$100 million. The costs of constructing the marina and reclaiming and servicing the land are estimated at \$25million. A full breakdown of project costs are included in the Project Financial Feasibility Study which has been submitted commercial-in-confidence to the Coordinator-General of the Department of State Development

2.10 Economic and Employment Opportunities

The project will produce annual revenues of \$50 million and employment of 300 full-time equivalent positions (to be made up of full time, part time and casual) when the development is fully operational.

At the State level, the project will contribute \$230 million to the economy during the construction phase and \$125 million per annum during the operational phase. Employment in the State would be boosted by 1,800 person years during the construction phase and 1,100 full-time, part-time and casual employees operationally.

At the regional level, the project will contribute \$170 million to the economy during the construction phase and \$100 million per annum during the operational phase. Employment in the region would be boosted by 1350 person years during the construction phase and 900 full-time, part-time and casual employees during the operational phase. Once operational the project represents approximately 1.5% of the region's economy.

At the local level, the project will contribute \$140 million to the economy during the construction phase and \$90 million per annum during the operational phase. Indirect employment in the Whitsunday Shire would be boosted by 1,100 person years during construction and by 800 full-time, part-time and casual employees operationally. This project represents a significant addition to the local economy, particularly upon Airlie Beach's economy.

At this stage it is not possible to provide a detailed break down of full time, part time and casual positions during operation of the development. These positions will be driven by commercial decisions to be made by operators of various components of the facility. Ongoing liaison with the TAFE college and local high schools will be encouraged to assist in curricula planning by training providers. Operators will also be encouraged to work with Centrelink to match currently unemployed people in the area with suitable employment.

The project will act as a catalyst for further tourism development in Airlie Beach and these projects will provide further employment opportunities.

This page intentionally left blank.