

2. Project Description

2.1 Dredging and Earthworks

2.1.1 Maintenance Dredging of Boat Ramp

Maintenance dredging of the proposed boat ramp access channel will be included in maintenance dredging of the marina access channel. This is discussed in more detail in Section 2.7.1 of the Supplementary Environmental Impact Statement and **Section 2.18** of this Addendum.

2.1.2 Management of Tailwater

Tail water from the dredging operation will be transferred from the marina maintenance area through a channel constructed along the property boundary with Shute Harbour Road into the maintenance dredging disposal area, which will be used as a retention and clarification pond for the tail water before it is released through a pipeline back into the marina basin. Tail water will be continuously monitored for pH at the entrance to and treated in accordance with the draft EMP for ASS described in the Supplementary Environmental Impact Statement

Section 2.7.1.6 of the Supplementary EIS notes that:

“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” (page 2-30)

The final length of tailwater channels and appropriate residence times will depend on three factors:

- ❑ Quantities of tailwater likely to be generated from the excavation and dredging activities and associated pumping rate
- ❑ Settlement rates for material being excavated/dredged
- ❑ Intensity and duration of rainfall events.

These three factors will be investigated during the detailed design phase. Settlement rates will be identified as part of a geotechnical investigation. Where different materials being excavated exhibit different settlement rates, the worst case scenario will be adopted. Geotechnical studies will also allow identification of the quantities of tailwater likely to be generated and likely pumping rates within the marina excavation area. Rainfall intensity/duration and associated runoff will be identified through a study of hydrology.

It is intended to design and construct the spoil disposal area and tailwater channels such that they will not overflow in the 1:100 year rainfall event. If sufficient capacity for this cannot be achieved within the spoil disposal area, flows from this area will be directed to the marina excavation area where there will be more than sufficient capacity within the sheet piled area to contain stormwater flows in extreme rainfall events. This area is entirely enclosed by sheet pile walls.

Monitoring of treated tailwater releases to Boathaven Bay will be undertaken. Where levels of suspended solids or other parameters in tailwater exceed agreed standards for

discharges to Boathaven Bay, corrective action will be undertaken. This may include a combination of:

- ❑ Diversion of tailwater to the fully enclosed marina excavation area
- ❑ Increased residence time for tailwater in the spoil disposal area (future development area)
- ❑ Additional treatment such as flocculation with inert polymers to remove sediment.

Standards for discharge will be finalised based on baseline monitoring of Boathaven Bay water quality, additional plume modelling and reference to standards such as ANZECC 2000.

Dewatering of the land reclamation area may need to be controlled to minimise drawdown of groundwater in the coastal zone. However, given that in these areas material is being placed rather than removed, the effects of dewatering on groundwater are likely to be minimal.

2.1.3 Construction Timing

Figure 10.2 in the Supplementary EIS shows that the highest rainfall months are January, February and March with average monthly rainfalls of 389 mm, 384 mm and 318 mm respectively. December and April have average monthly rainfalls of 174mm and 153 mm respectively.

It is accepted that cyclones are likely to occur between December and April.

Given that the majority of works to create the marina basin and adjoining land areas will take place within sheet pile coffer dams, heavy rainfall and cyclonic conditions is not likely to result in any releases from the construction site to the environment. It is likely to result in construction delays due to wet conditions and also the need to collect and treat a larger volume of water. Hence, a decision regarding when construction should take place will be based on commercial considerations rather than environmental.

2.2 Stormwater Management

2.2.1 Management of flows from existing land areas

Permanent management of stormwater flows from existing land areas that currently discharge in the vicinity of the proposed marina site are discussed in Section 2.6.1 of the Supplementary EIS.

In summary, this section notes that existing stormwater culverts under Shute Harbour Road will be diverted to a tidal drainage channel running parallel to Shute Harbour Road and between Shute Harbour Road and the proposed marina development.

Existing stormwater drains from the Coconut Grove area will be extended through the development to discharge into the marina basin. Runoff from this section of the development will also be directed into these drains.

All drains discharging from the marina development area will include trash racks and catch pits to remove gross solids and sediment. Drains discharging from the boat repair and hardstand areas will be directed through an oil and sediment removal

system. First flush capability will allow stormwater generated at the beginning of a rainfall event in the boat repair facility to be diverted to sewer.

First flush capability from car parks will not be provided. The only car park areas open to rainfall are the transport terminal and the boat/trailer car parking at the boat ramp.

2.2.2 Capacity of Stormwater Systems

The performance of oil/sediment separation facilities, catch pits and trash racks will be considered during detailed design. These facilities will be designed in accordance with appropriate standards and requirements of the Queensland EPA and Whitsunday Shire Council. Whitsunday Shire Council requires new developments to comply with the Queensland Urban Drainage Manual. Standards established in this manual include the retention capacity of the stormwater system and first flush system.

A full hydrological analysis will be undertaken as part of the detailed design. This will include examination of intensity and frequency of rainfall events in the region. Following determination of likely stormwater flows during storm events, pipes, drains, sumps and other features of the stormwater management system will be sized to ensure containment of the design flows.

2.3 Public Access and Open Space

Public access is provided to all foreshore areas except:

- ❑ The marine academy, where direct and private foreshore access is required
- ❑ The Marina Facilities and boat ramp area where public access to the foreshore would be dangerous
- ❑ The hotel, where public access would reduce guest amenity.

Public access to all other foreshore areas of the marina is unlimited. Public access to the breakwater beach is provided along a promenade behind the beach that is accessed by three walkways, one at each end and one through the middle of the strip of private land along the breakwater. From these three access points, public access along the beach in either direction is unrestricted.

Public access to all other foreshore areas of the marina is unlimited. Public access to the breakwater beach is provided via three walkways, one at each end and one through the middle of the strip of private land along the breakwater. From these three access points, public access along the beach in either direction is unrestricted.

This is shown in Figure 13-7 of the Supplementary EIS. Reference can also be made to Figure 2-5 of the Supplementary EIS, where all areas depicted as “Crown Land with Council as Trustee” allow unrestricted public access.

Pedestrian routes shown in Figure 13-7 of the Supplementary EIS are intended to link with and extend other pedestrian routes in the area, especially coastal walking paths and links which will culminate in a park at the end of the breakwater. Appropriate signage may be used to supplement walking links and encourage walkers (both visitors and residents) to continue along the breakwater to the park. The route is likely to be visually stimulating with views over the marina and associated boating activity as well as across Boathaven Bay and out to sea. A small car parking area will be

provided at the breakwater park, however it is expected that many users will access the area on foot, as they do much of the foreshore of Airlie Beach.

Landscaping between the bus terminal and Shute Harbour Road is intended to create a visual barrier between the bus terminal, road and properties inland of Shute Harbour Road which overlook the bus terminal. This area is not intended to be utilised for recreational purposes and in fact, public access will probably be restricted for safety reasons.

2.4 Off-site Rock and Fill Sources

Where rock is required to be transported from off-site, this rock will be obtained from appropriately licensed quarries. Any reworking of rock to meet size/grade requirements for the development will be undertaken off-site. It is anticipated that rock will be obtained from the Whitsunday Shire Council's Foxdale Quarry in the Cannon Valley. Final quantities of rock required from off-site sources have not been calculated at this time but are not expected to be significant.

In the event that off-site fill is sourced from a location where acid sulphate soils may occur (nominally below 5m AHD), the acid sulphate content of these soils will be investigated. Should such material be demonstrated to have acid sulphate content likely to be acid generating/potentially acid generating, these materials will not be used.

Material sourced from sites listed on the EPA Contaminated Sites Register or otherwise shown by testing to be contaminated will only be used where EPA has agreed to the proposed methods of using and managing this soil. Fill from locations where contamination may have occurred will be tested prior to excavation.

No suitable quarry sites east of the proposed Port of Airlie have been identified. The Crown owns most land likely to yield material in this area. Several large freehold parcels exist, however all are adjacent to, or within close proximity of existing residential areas. The previous EIS for this development submitted by Burchill and Partners (in 1998) proposed a quarry in Jubilee Pocket. This application met with strong opposition from residents and most Authorities

The Proponent's present preference is to obtain the limited quantities of material needed from Councils Foxdale Quarry. This preference is supported by Council. The Proponent anticipated requirement is for about 35,000m³ of select fill and 20,000m³ of armour rock (total 55,000m³) which equates to about 7 trucks per hour, for a max of 10 / 12 weeks.

There is also a possibility that sources of materials will become available from adjacent developments. The Proponent will continue to work to identify any nearby developments where rock and/or fill is likely to be generated and require off-site disposal and investigate the possibility of utilising this material at the proposed Port of Airlie. This is likely to reduce traffic impacts.

2.5 Marina Facilities Area

The site Master Plan has been revised to move the Marina Facilities Area further away from properties along Shute Harbour Road. The area is now 100m seaward of Shute

Harbour Road whereas previously it was immediately adjacent to Shute Harbour Road. The closest property to the boat maintenance area is now 130m (to the property boundary along Shute Harbour Road). Most boat maintenance activities will take place closer to the seaward boundary of the boat maintenance area which is 230m from the nearest property boundary.

Between Shute Harbour Road and the Marina Facilities Area will be a landscaped buffer and car parks. Landscaping will focus on screening both the car park and Marina Facilities Area from viewers on Shute Harbour Road and adjacent properties.

The size of the buildings provided at the Marina Facilities Area will be single storey and be able to accommodate repair and maintenance facilities for small craft. Yachts and large motor cruisers will be repaired on the seaward side of the buildings and screened from Shute Harbour Road providing shielding from noise emissions. Noise emissions from the boat maintenance area are discussed in more detail in **Section 11.1** of this Addendum.

There are no maintenance and refuelling areas proposed adjacent to the Whitsunday Sailing Club: these will be located according to **Figure 1-1** (which has been revised from that presented in the Supplementary EIS to move these facilities further away from noise sensitive locations).

2.6 Loading and Servicing Facilities

Loading and servicing facilities will be associated with each building/component of the proposed Port of Airlie.

Activities undertaken at loading and servicing facilities are likely to include waste removal, delivery of food and commercial goods, delivery and removal of linen and minor maintenance activities. Vehicles involved will be small to medium sized trucks.

The locations of loading and servicing facilities for each building will depend on final building designs, however with most buildings on the site having underground car parking available, location of loading and servicing facilities in underground areas should be possible for most buildings. This will have a number of advantages including reduced noise and disturbance to site users and adjacent land users and reduced impact on building aesthetics (it is important that buildings appear attractive from all sides).

Detailed design of buildings will need to take noise and aesthetic matters into consideration when incorporating loading and servicing facilities.

2.7 Employment

Employment during the construction phase is estimated to be:

- 35 full time workers for the initial earthmoving and land creation activities
- 800 employee years for the construction of buildings and other facilities (equating to approximately 160 full time jobs)

Employment during the operations phase is difficult to estimate without final details of how each component of the development will be operated and the final configuration

of services that will be offered. A conservative figure is 300 full time equivalent positions but this may be higher, possibly up to 400.

2.8 Transport Interchange

The current bus terminal/transport interchange has an area of 3687 m² and the capacity to accommodate 6 large tourist buses, 2 local “bendy” buses, 6 taxis and several minibuses. The capacity of the terminal has been determined after consultation with local transport companies, tourist agencies and tour operators.

Detailed design of the transport interchange will include consultation with a range of stakeholders, including:

- ❑ Queensland Transport
- ❑ Department of Main Roads
- ❑ Whitsunday Shire Council
- ❑ Taxi and minibus operators
- ❑ Long distance bus operators
- ❑ Local bus operators.

Detailed design will include disabled access in accordance with the requirements of Accessible Public Transport 2002 guidelines.

The area and design of the transport interchange is somewhat flexible and it should be possible to readily accommodate the requirements of stakeholders.

2.9 Land Tenure

Following discussions with Whitsunday Shire Council, the following land tenure requirements will apply to the proposed Port of Airlie (see **Table 2-1** and **Figure 2-1**).

■ **Table 2-1 Proposed Land Tenure**

| Precinct | Site | Tenure |
|----------|---|---------------------------|
| A | Hotel | Freehold |
| B1 | Harbour Apartments | Freehold |
| B2 | Harbour Apartments | Freehold |
| C | Sea Terminal | Freehold |
| D1 | Access Roadways and bus parks | Crown - Council Trustee |
| D2 | Transport Interchange and carpark | Freehold - Council Lessee |
| E | Harbourfront Residential | Freehold |
| F | Harbourfront Retail Residential | Freehold |
| G | Harbourfront Retail Residential Public Car Park | Freehold |
| H | Harbourfront Retail Residential Access | Freehold |
| J1 | Marina Facilities | Leasehold |
| J2 | Marina Facilities (Servicing) | Freehold |
| K | Public Boat Ramp | Freehold - Council Lessee |
| L | Seaview Residential | Freehold |
| M | Beachfront Apartments | Freehold |
| N | Seaview Allotments | Freehold |
| O | Maritime Training Academy | Leasehold |

| Precinct | Site | Tenure |
|----------|------------------------------------|-----------------------------|
| P | Marina Harbour and Entry Channel | Leasehold |
| Q | Public Outdoor Car Park | Freehold - Council Lessee |
| R | Maintenance Dredging Area | Leasehold |
| W | Town Square | Crown - Council Trustee |
| | Harbour view Corridor | Freehold |
| T | Public Beach & Park adjacent | Crown - Council Trustee |
| U | Lookout & Park | Crown - Council Trustee |
| U | Public Park | Crown - Council Trustee |
| | Boardwalk & Service Road | Freehold - Council Lessee |
| | Road to Hermitage Roundabout | Crown - Council Trustee |
| | Road to Lookout | Crown - Council Trustee |
| | Internal Roads to Hotel | Freehold part of Precinct A |
| | Landscaped Buffers to Shute Hbr Rd | Freehold |

Public Boat Ramp

It is proposed that the new ramp and carpark will be freeholded on completion, with a long-term [perpetual] lease granted to Council at no cost for both the ramp and the carpark.

The responsibility for management and maintenance of the total facility however will remain with the developer. As with the transport interchange, this proposal aims to ensure unrestricted public access, while all maintenance and management costs remain with the developer, and not the Local Authority.

Access Channel

Ultimately it is intended that the access channel will remain Crown Land with the Marina Lessee responsible for all maintenance during the term of the final (operational) lease. It may be that DNR&M will issue a development lease to cover the area of channel works as an interim step; however the long term responsibility of maintaining the channel will be in-built in the Harbour Lease.

Marine Academy

This 2,000m² (approx.) waterfront site will be created to provide the Whitsundays with the opportunity to provide a world class maritime training academy. Any future development of the site will conform to the proposed use. The tenure of this site has been discussed and is proposed to be leasehold, with the terms and conditions of the lease to be agreed between Council and DNR&M.

Transport Interchange

The proposed tenure is intended to be a mixture of freehold and dedication to the Crown as follows:

- 1) The building facility itself together with the associated carparking in Precinct Q will be freehold whilst the access roadways, bus and taxi parking will be dedicated to the Crown as public road.
- 2) The Proponent will offer Council a long-term [perpetual] lease over the complete facility **at no cost**. Title would remain with the developer together with all

management and maintenance responsibilities. This proposal ensures Council has control over the interchange and its accessibility to the public, whilst leaving all the maintenance and management to the developer.

Carparking

The tenure proposed for all parking is freehold. Some carparking will be leased to Council (as described above) and some contained within a Body Corporate structure due to the multi level form of construction and the nature of the use (residential). Most will be available for public use.

This is discussed in more detail in **Section 13.1.2** in this Addendum.

Beach

Title to the beach and surrounding parklands will be transferred to the Crown at completion with Council nominated as Trustee.

Town Square

This large fully landscaped area will be dedicated to the Crown with Council as Trustee. Provision will need to be made to allow for footpath dining and the like (with the consent of Council).

Boardwalk

The majority of the projects main services will lie within this corridor, and as such the tenure of the land should be retained and maintained by the developer. However, to ensure that public access is available at all times, the Proponent proposes to offer Council a (perpetual) lease over that area.

Easements

In some circumstances it may be appropriate to nominate other forms of tenure (eg easements) which may be more effective in achieving appropriate land tenure. This will be negotiated with Whitsunday Shire Council at the time of final agreement on land tenure.

Acquisition of Land

On completion of the land reclamation, the proponent will seek to acquire commercial land precincts. A process exists under the auspices of the Land Act 1994 for the valuation and subsequent sale of land in circumstances such as this. It is expected that the price set by the Department of Natural Resources and Mines will reflect the current market conditions. The proponent expects to follow this process.

The manner in which the State Government spends the funds provided by sale of land created in the development is outside the influence of the proponent.

2.10 Building Heights

In response to concerns regarding the compatibility of building heights with the existing planning scheme and following detailed discussions with Whitsunday Shire Council, the maximum height of most buildings has been set at 12 meters with many

at only 1 and 2 floors. The exception to this is the hotel (Area A) and Area L (Harbourfront apartments) which will both be five storeys.

In summary, the following changes have been made to building heights:

- ❑ Site A - Reduced from 6 floors to 5 floors
- ❑ Site B1 - New site included at 4 floors
- ❑ Site B2 - Reduced from 5 floors to 4 floors
- ❑ Site C - Remains at 2 floors
- ❑ Site E - Reduced from 5 floors to 3 floors
- ❑ Site F - Reduced from 5 floors to 4 floors
- ❑ Site G - Reduced from 5&2 floors to 4&2 floors
- ❑ Site H - Reduced from 5&2 floors to 4&2
- ❑ Site L - Reduced from 6 floors to 5 floors
- ❑ Site M - Increased from 2 floors to 3 floors
- ❑ Site N - Remains unchanged at 2 floors

Section 17 of this Addendum provides more information on visual amenity components of the proposed Port of Airlie project.

2.11 Tidal Range for Design of Floating pontoons

The floating pontoons and other marina infrastructure will be structurally designed so as to accommodate the effects of astronomical tidal levels and flows; storm surge effects; appropriate Greenhouse Effects; and any wave action and energy that might propagate into the lee of the protecting breakwater. Such issues will be determined during detailed engineering design of these structural elements.

2.12 Beach Maintenance

The engineering design of the beach will be focussed on ensuring that the beach integrates well into the existing coastal environment. Potential sand losses will be minimised by careful design, however there will likely be the need for some rehabilitation and possible re-nourishment following particularly severe events. Natural re-building of the beach will occur - but this will take time and it may be necessary to reinstate the protection afforded by the beach as soon as possible after a cyclone.

An agreement has been reached with Whitsunday Shire Council whereby the beach will become crown land with Council as trustee.

2.13 Revised Land Uses and Areas

As a result of modifications made to the proposal in response to issues raised in comments on the Supplementary EIS, the areas and numbers of units for various components of the proposal have been amended. These are described in **Table 2-2**. For further discussion on the range of modifications, refer to **Section 1.5** of this Addendum. The revised Master Plan is shown in **Figure 1.1** and revised land use areas are shown in **Figure 2-1**. The footprint of the development has been reduced by 2.4 hectares as a result of these changes.

■ Table 2-2 Revised Land Use Areas

| | Development Site | Revised Area (m ²) | Original Area (m ²) | Proposed GFA (m ²)* | Proposed Bldg Height (storeys) | Res Density (Units) | Description | Plot Ratio |
|-----------|--|--------------------------------|---------------------------------|---------------------------------|--------------------------------|---------------------|--|-------------|
| A | Landmark Hotel | 12,094 | 8,425 | 11,000 | five | 140 | Single level basement car parking, includes hotel access road | 1.11 |
| B1 | Harbour Serviced Apts | 3,490 | 3,545 | 2,800 | four | 28 | Single level basement car parking | 0.80 |
| B2 | Harbour Serviced Apts | 3,635 | N/A | 2,800 | four | 28 | Single level basement car parking | 0.76 |
| C | Sea Terminal | 2,483 | 2,530 | 900 | one-two | NA | Terminal for major tour operator | 0.30 |
| D | Public Bus Transit Facility | 3,687 | 8,370 | | | NA | Terminal for 6 standard buses, 2 articulated buses and taxis | |
| E | Harbourfront Residential | 2,489 | 2,900 | 2,100 | three | 21 | Three storey residential on basement car parking | 0.77 |
| F | Harbourfront Mixed Use | 5,869 | 5,305 | 7,790 | four | 42 | Ground floor commercial on parking basement/residential above | 1.18 |
| G | Harbourfront Mixed Use & Public Carpark | 10,499 | 9,855 | 11,680 | four | 78 | Ground floor mixed use with residential above. Separate basement for public car park | 1.11 |
| H | Harbourfront Residential | 7,378 | 6,685 | 7,000 | three | 58 | Ground floor mixed use on parking basement with residential above | 1.17 |
| J1 | Marina Facilities | 11,481 | 14,315 | 3,600 | one-two | NA | Workshop buildings with capacity for internal mezzanine | 0.39 |
| J2 | Marina Facilities | 8,157 | NA | 3,600 | one-two | NA | Workshop buildings with capacity for internal mezzanine | |
| K | Public Boat Ramp | 4,941 | 4,390 | | | NA | | |
| L | Seaview Residential | 7,549 | 6,205 | 8,000 | five | 50 | Landmark residential complex | 1.06 |
| M | Beachfront Apartments | 6,553 | 6,450 | 8,000 | three | 60 | Three storey residential on basement car parking | 1.22 |
| N | Seaview Res Lots | 6,849 | 6,850 | 6,850 | two | 7 | 7 prime waterfront lots | 1.00 |
| O | Marine Academy | 2,071 | 2,075 | 2,071 | two | NA | | 1.00 |
| P | Marina Access | | 755 | 755 | two | NA | Marina control, ablutions building and access pier | |
| Q | Public Car Park | 7,257 | 7,257 | NA | NA | NA | Previously below D | |
| R | Maintenance Dredging Area | 8,845 | 15,000 | NA | NA | NA | | |
| S | Future development area (spoil disposal) | 0 | 30,000 | NA | NA | NA | Removed from development (See Section 2.16 of this Addendum) | |
| T | Public Beach | 10,375 | 11,700 | NA | NA | NA | | |
| U | Headland Park | 2,390 | 2,390 | NA | NA | NA | | |
| V | Park at Site H | 3,919 | 4,600 | NA | NA | NA | | |
| W | Village Square | 2,664 | 4,740 | NA | NA | NA | | |
| X | Boardwalk Promenade | 2,182 | 5,150 | NA | NA | NA | | |
| Y | Extension of Airlie Esplanade | 1,784 | 1,310 | NA | NA | NA | | |

| | Development Site | Revised Area (m ²) | Original Area (m ²) | Proposed GFA (m ²)* | Proposed Bldg Height (storeys) | Res Density (Units) | Description | Plot Ratio |
|--------|--|--------------------------------|---------------------------------|---------------------------------|--------------------------------|---------------------|-------------|------------|
| Z | Spit Road to Headland (including waterfront pedestrian/cycle path) | 8,577 | 8,355 | NA | NA | NA | | |
| A A | Road to Hotel and Marina Facilities Area | 8,897 | 9,530 | NA | NA | NA | | |
| A B | Landscape Buffer (between Proserpine Shute Harbour Rd and site) | 4,638 | 2,935 | NA | NA | NA | | |
| A C | Landscape Buffer / Beach access (between sites L and M) | 243 | 590 | NA | NA | NA | | |
| A D | Landscape Buffer /Beach access (between sites M and N) | 210 | 630 | NA | NA | NA | | |
| | TOTAL | 16.1 ha | 18.5 ha | | | 512** | | |

* Not including external residential balconies, roof terraces or basement car parking areas or parking garages above grade

** The total number of residential units, excluding the hotel and waterfront lots is 365

2.14 Car Parking

2.14.1 Number of Spaces

Whilst the total number of carspaces exceeds 1,000 the exact breakup between public and private has not been finalised nor has the division between paid and complementary parking been fixed, as both will exist in differing areas.

This is discussed in more detail in **Section 13.1.2** of this Addendum.

2.14.2 Design of Underground Carparks

The underground car parks form the basements and foundations for the buildings around the marina foreshores. The car parks will be constructed from reinforced concrete (footings, base slab and walls) and will be tanked to ensure they are waterproofed from both ingress of ground water and leakage from the basements into the surrounding soil. The driveway levels at the entrances to all car parks will be above the 1 in 100 year storm surge level. The car park floors will be graded to low points, where sumps will be constructed to collect any rain water entering the car parks at the entrances and any wash water from cleaning or treatment of accidental spills etc. The sumps will be equipped with float operated sump pumps that will pump the waste water through an oil-water separator before being discharged to the sewerage system.

2.15 Earthworks Strategy and Development Layout

2.15.1 Optimisation of Layout

Further examination of the proposal was undertaken to identify means by which the footprint of the development could be minimised to limit impacts on the intertidal

zone. The earthworks strategies and development layout have been modified to eliminate the “future development area” shown on the Master Plan, Land Use Plan and Land Tenure Plan included in the Supplementary EIS. The future development area was to be reclaimed using the dredged material for the entrance channel excavation and the soft surface mud for the marina basin excavation. This material will now be used to reclaim the marina maintenance area, boat ramp and public carparks, shown as areas J and K on the revised concept plan attached.

The earthworks strategies for the excavation of the marina basin and for reclamation of the land areas are as follows:

1) Minimise the volumes of material to be excavated

The volumes of material to be excavated have been minimised through the efficient layout and design of the floating marina system, ferry terminals, boat ramp, marine academy, and marina maintenance area

2) Make use of all excavated material to create useful land areas.

The development concept has been designed to produce a balance between excavation and reclamation earthwork quantities

3) Minimise the use of imported materials for reclamation works.

The Whitsunday Shire Council and the local community have requested that the development limit the importation of fill and armour rock for reclamation and protection for the development, to minimise impacts on local roads and the residential and commercial areas of Airlie Beach. There are no viable quarries on the Shute Harbour side of the town and the developer has therefore proposed to utilise, as much as possible the naturally occurring materials to be found on site for fill material for reclamation and protection works.

All materials excavated from the marina basin and entrance channel will be used a general fill to reclaim land for tourism, commercial and onshore marina facility uses. In addition the surface mud has a significant sand and shell grit content (between 20 and 40%) which can be retrieved through the dredging process, if a cutter suction dredge is used. This sandy material will be collected at the outlet of the dredge pipeline, stockpiled and used for the construction of the beach breakwater in lieu of a conventional rock armoured breakwater that would require the importation of 110,000 m³ of selected core material and armour rock. Further an estimated 5000 m³ of boulders and surface rock around the foreshores of the development site will be stockpiled for use in revetment walls around the marina.

4) Limit the impacts on the adjacent environment during construction.

The amount of open sea dredging has been minimised. All excavation and reclamation, with the exception of the excavation of the entrance channel, will be undertaken behind sheet pile cofferdams or bund walls to minimise the effects of dredging plumes and sedimentation on the adjacent intertidal areas

5) Reduce the time for settlement and consolidation of the reclaimed areas

The earthworks plan has been designed to allow full development of the site to be completed within a 5 year period. Soft surface marine mud can be used for land reclamation (as they have been for such developments as the Able Point Marina. However the mud requires a period of 3 to 5 years to allow consolidation and settlement of the material before any further development can occur. An important earthworks strategy for the proposal is to use this material to reclaim areas that will have limited structural development such as on-ground car parks, marina maintenance areas etc and areas to be developed near the end of the proposed development program. Underlying the surface mud are firmer sandy clays, silty sandy clays, sandy gravelly clays, all of which will be suitable for

reclamation of the other development areas and will allow rapid development of the buildings and structures to meet development timeframes and financial targets.

6) Create sufficient land for viable commercial and tourism development to underwrite the costs of development of the marina and protection works

As correctly pointed out in the WRMDA –2001 marina projects on the north coasts of Queensland require “a mix of commercial, residential and tourism outlets for their viability”. Viable marina locations all required large breakwaters for protection from cyclone generated waves and substantial excavation to provide access to deep water and to create the marina basin in the shallow near shore tidal areas. The costs of providing these engineering works cannot be covered by the financial returns generated from a “marina only” development and the financial feasibility study undertaken for the Port of Airlie proposal confirms this fact. The earthworks strategy is therefore to use the material that must be excavated to construct the marina for reclamation of land to be used for commercial and tourist developments, the income from which will defray the costs of marina development and provide an acceptable financial rate of return to the developer.

The proposed development concept shown in **Figure 1.1** is the result of consideration and optimisation of all of the above parameters.

2.15.2 Earthworks Sequence

Sheet pile walls and earth bunds will be constructed around the marina basin, the breakwater and the marina maintenance areas. The areas to be reclaimed will then be de-watered by submersible pumps. The pumps will discharge through pipelines into the marina basin area. On completion of de-watering, the marina maintenance area and the maintenance dredge area will be excavated. The surface mud (average depth 1m) will be removed and used to reclaim development area B. A further 120,000 cu m of underlying firmer sandy clays, silty sandy clays, sandy gravelly clays will then be excavated to a depth of –5.0AHD and used to reclaim development areas A, C, D, E, F and G. The marina maintenance area will then have a capacity to receive up to 270,000 cu m of dredged mud from the excavation of the marina basin and entrance channel.

On completion of the excavation of the marina maintenance area, the marina basin will be dredged to an average depth of –3.0AHD using a cutter suction dredge. The dredged mud will be pumped into the excavated marina maintenance area where it will be discharged onto a hardstand area to capture the sand and shell grit fractions of the material. The sand and shell grit will be stockpiled for used in construction of the beach breakwater.

On completion of the dredging of the surface mud from the marina basin, the basin will be de-watered and drained to allow further excavation of 230,000 cu m of the underlying sandy clays, silty sandy clays, sandy gravelly clays for reclamation of areas H, L, M, N and O (see **Figure 2-2**). All tail water from de-watering of excavations will be discharged into the marina maintenance reclamation area and tested before being discharged back into the sea.

Finally the marina entrance channel will be dredged using a cutter suction dredge. The excavated material will be used to complete the reclamation of the marina

maintenance area. On completion of the dredging, the surface of the marina maintenance area will be drained and allowed to dry out before placing a capping layer of good quality fill and topsoil. The area will then be left vacant for at least 3 years to allow for settlement and consolidation before construction of the car parks, boat ramp and marina maintenance facilities.

More information on management of acid sulphate soils is provided in **Section 6.3.2**.

2.15.3 Earthworks Quantities

Based on the revised development plan, the total volumes of material to be excavated from the entrance channel and marina basin are as shown in **Table 2-3**.

■ **Table 2-3 Earthworks Quantities**

| | Length/Area | Average Depth of Excavation | Volume (m ³) |
|---------------------------|-------------|-----------------------------|--------------------------|
| 40m wide Entrance Channel | 1250m | 1.5m | 95,000 |
| Marina Basin | 12.3 ha | 3.7m | 455,000 |
| Total | | | 550,000 |

All of the material from the entrance channel and 240,000 cu m of soft surface mud in the marina basin will be excavated by cutter suction dredge. A further 230,000 cu m of the underlying sandy clays, silty sandy clays, sandy gravelly clays, will be excavated in the dry from the marina basin and used for reclamation of development areas around the marina basin. 60,000 cu m of sand will be recovered from the dredged material deposited in the marina maintenance area for use in construction of the beach breakwater.

Total areas of land to be reclaimed and volumes of fill required are as shown in **Table 2-4**.

■ **Table 2-4 Reclamation Areas**

| Location ¹ | Area (m ²) | Reclaimed level (m AHD) | Volume of Fill (m ³) | Source |
|---------------------------|------------------------|-------------------------|----------------------------------|--|
| A | 12,094 | 4.0 | 37,600 | Marina Maintenance Area excavation |
| B | 7,125 | 3.0 | 23,500 | Marina Maintenance Area excavation |
| C | 2,483 | 2.5 | 7500 | Marina Maintenance Area excavation |
| D, E and F | 20,055 | 2.5 | 39,000 | Marina Maintenance Area excavation |
| G | 10,499 | 2.5 | 35000 | Marina Maintenance Area excavation |
| H | 7,378 | 2.5 | 25,500 | Marina Basin excavation |
| J, K and Q | 31,836 | 4.5 | 270,000 | Dredged surface mud from entrance channel and marina basin |
| L | 7,579 | 5.5 | 49,000 | Marina Basin excavation |
| M, N and O | 15,473 | 3.5 | 128,700 | Marina Basin excavation |
| Maintenance Dredging Area | 8,845 | 4.0 | 90,000 | From Maintenance dredging |
| Beach breakwater | 10,375 | 3.5 | 63,000 | Sand recovered from dredging |

¹ See Figure 1.1

2.16 Future Development Area

The Supplementary EIS proposed a future development area to be reclaimed using the dredged material for the entrance channel excavation and the soft surface mud for the marina basin excavation. This material will now be used to reclaim the marina

maintenance area, boat ramp and public carparks, shown as areas J and K on the revised concept plan attached.

Soft surface marine muds can be used for land reclamation, as they have been for such developments as the Able Point Marina. However the mud requires a period of 3 to 5 years to allow consolidation and settlement of the material before any further development can occur. An important earthworks strategy for the proposal is to use this material to reclaim areas that will have limited structural development such as on-ground car parks, marina maintenance areas etc or areas to be developed near the end of the proposed development program. Underlying the surface muds are firmer sandy clays, silty sandy clays, sandy gravelly clays, all of which will be suitable for reclamation of the other development area and will allow rapid development of the buildings and structures.

The development area along Shute Harbour Road now finishes opposite Hermitage Drive. The bunded basin for the maintenance dredge disposal area, located at the southern end of the development, was originally designed to be constructed seaward of the fringing mangroves along Shute Harbour Road.

However, in recent negotiations with the Department of Main Roads, the Department rejected our proposal for entry to the development as shown in the Supplementary EIS and requires an entry point at the Shute Harbour Road/ Hermitage Drive intersection. This entry arrangement will require an internal access road to be constructed within the development boundary parallel to Shute Harbour Road as shown on the revised concept plan and require the removal of the mangroves fringing Shute Harbour Road between Hermitage Drive intersection and the marina maintenance area.

This area was to be reclaimed using material from dredging of the entrance channel and the soft surface mud from excavation of the marina basin. These materials will now be used in reclamation of development areas B, J, K and L, which will be developed in the later stages of the development program. After reclamation, the surfaces of these areas will be allowed to dry out and then covered with topsoil and grassed. The areas will then be allowed to consolidate and settle over a 4 year timeframe before commencing construction of services and structures.

As a result of this change, the overall footprint of the development has been reduced by 2.4 hectares.

2.17 Access Channel Details

The entrance channel details have been revised. The channel will have a clear bottom width of 40m with side slopes of 1:6. The level of the bottom of the channel will be -5.2AHD or 3.5 m below HAT. The channel will be approximately 1250m long and aligned south to north in line with the dominant storm generated wave direction. The depth of excavation in the channel will taper from 3.2m at the entrance to the marina basin (adjacent to the breakwater headland) to zero at the -5.2mAHD contour, 1250m to the north.

2.18 Maintenance Dredge Spoil Area

The siltation rate for the marina basin and entrance channel has been estimated at approximately 3mm or 4kg of fine sediments per sq m per year resulting in a total

sedimentation of 750 tonnes per year or 550 cu m per year for the full dredged area. The design minimum depth in the marina basin and entrance channel is 3m below LAT (-4.7 AHD). The marina basin and entrance channel will be initially dredged to -5.2AHD, providing a buffer of 0.5m for deposition of silt. At the estimated siltation rates, a full maintenance dredging program would only be required every 17 years. If the actual siltation rate was 10 times the rate estimated by CES (ie 30mm per year) then maintenance dredging should still only be required every 17 years.

The siltation rates in the Supplementary EIS were estimated utilising data collected from the actual project site (including during a severe wave and wind event) and are based on the extensive experience of the senior engineers from Coastal Engineering Solutions. During the detailed engineering design phase of project implementation the siltation estimates will be further refined using both mathematical modelling techniques and site specific data. The site specific data will be used to verify a 3-dimensional hydrodynamic model. The 3-dimensional hydrodynamic model will determine the near-bottom currents (which initiate sediment movement). These currents will be more accurately and confidently established throughout the project area (including in the vicinity of the access channel) and siltation rates will then be estimated for different areas of the marina basin and channel. The maintenance dredging program and capacity of the maintenance dredge spoil storage area will then be further refined

The dredge spoil storage area has been conservatively sized to provide a storage capacity of 50,000 m³ to accommodate routine maintenance dredging and emergency dredging that may be required from increased siltation in the entrance channel caused by cyclones. At the estimated siltation rates, and with a buffer depth of 0.5m, a major program of maintenance dredging should not be required during the lifetime of the project. However dredging of high spots where silt has accumulated in the entrance channel and marina basin could be expected to be required every 5 to 10 years and allowance should be made for emergency dredging of depositions caused by cyclones. The dredge spoil storage area, as designed, should have the capacity to accommodate spoil from maintenance dredging for the foreseeable life of the project.

In the event that the dredge spoil area fills at a more rapid rate than predicted and insufficient space is available, dewatered dredge spoil will be excavated and removed for land disposal. It is likely that Whitsunday Shire Council will seek to be able to use this material for landfill rehabilitation and other similar uses, whether the dredge spoil maintenance area is at capacity or not.

A levy will be placed on all marina users to cover the cost of maintenance dredging. The maintenance dredge area will remain leasehold from the Crown, attached to the marina lease.

2.19 Blasting

It is not anticipated that blasting will be required. However if blasting of any rock outcrops is required, the blasting will be carried out behind the sheet pile or banded coffer dams. There will be no blasting in the open sea.

