The Spit Master Plan
Concept development phase

Consideration of CoGC ocean-side
cruise ship terminal proposal
December 2018

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Contents

1.0 Introduction

1.1 Background

In March 2018, the Department of State Development, Manufacturing, Infrastructure and Planning (the department), appointed the consultant team led by John Gaskell Planning Consultants and Deicke Richards to prepare a master plan for The Spit over an eighteen month period.

The agreed project scope and budget excluded detailed consideration of the City of Gold Coast (CoGC) ocean-side cruise ship terminal (OCST).

On 21 June 2018, the Minister for State Development, Manufacturing, Infrastructure and Planning, the Hon. Cameron Dick, and the Mayor of CoGC, Cr. Tom Tate, entered into a Memorandum of Understanding (MOU) that sets out that the master plan will consider the potential effects of the ocean-side cruise ship terminal at Philip Park in relation to its built form, access arrangements, servicing layout and infrastructure requirements. The MOU also notes that:

- the consideration of the cruise ship terminal during the master planning process does not imply State Government support for, or opposition to, the proposal
- if the CoGC wishes to apply for approval for a cruise ship terminal the parties acknowledge that an appropriate time to do that would be subsequent to the release of the master plan at the completion of Stage Three of The Spit master plan program.

The master plan consultant team has been considering the OCST in more detail as part of phase two of The Spit master planning process.

1.2 Purpose of report

The purpose of this report is to inform the department, CoGC and other key stakeholders, about how the consideration of the CoGC ocean-side cruise ship terminal has been undertaken during the first stages of phase two of The Spit master planning process, specifically the development of draft master plan concept options prior to the public consultation process.

This report documents the consideration of the OCST in the preparation of the options for The Spit master plan.

Preliminary	Stage 1	Stage 2	Stage 3	Stage 4
Inception & mobilisation	**Context, opportunities & visioning**	**Master plan concepts**	**Final master plan**	**Statutory provisions**
Sep 2017 – Mar 2018	Apr 2018 – Jun 2018	Jul 2018 – Dec 2018	Jan 2019 – Apr 2019	May 2019 – Aug 2019
Stakeholder meetings held Communications & master planning consultants appointed Pop-up consultation sessions held	Workshop 1 Stakeholder groups and meetings Site context analysis, opportunities and visioning	Workshops 2 & 3 Concept options prepared Public consultation Identification of preferred concept option Identification of priority implementation initiatives	Workshop 4 Public consultation Master plan finalised & released Confirmation of priority implementation initiatives	Identification and drafting of provisions to give effect to the master plan as appropriate

Figure 1.1. The Spit master planning process and current stage

1.3 Scope

The scope of work undertaken to date by the master plan consultant team during phase two of the master planning process to support the development of draft master plan concept options for stakeholder and public consultation, has included developing a thorough understanding of the:

- OCST investigation including the functional layout and operational assumptions
- Council's preferred site location in Philip Park
- potential landside implications of the current reference design in terms of built form, transport and traffic, recreation, environment and infrastructure.

Considering this understanding and the feedback received on the OCST at workshop two (see Section 4.2), the consultant team has tested how the current OCST reference design would fit with other concepts to support the development of The Spit considering the agreed vision for the future of The Spit.

Alternative concept layouts for landside buildings and infrastructure have particularly considered how the OCST could be connected to and support other economic development initiatives, particularly to the west on vacant state land and the Sea World car park.

This report summarises the consideration of the OCST in the preparation of the options for The Spit Master Plan.

1.4 Overview of contents

This report includes the following:

- a summary of the master plan consultant team's understanding of the CoGC ocean-side cruise ship terminal
- site analysis of Philip Park
- a summary of feedback on the OCST and concept options developed at workshop two
- overview of scenarios
- evaluation of the scenarios considering the reference project criteria
- an evaluation of the common landside (onshore) components of the ocean-side cruise ship terminal (e.g. jetty over the beach) in each scenario
- a summary of key principles for consideration in the development of the master plan and refinement of the reference design.

1.5 Inputs and assumptions

Two key source documents have been used for the consideration of the OCST terminal during the concept development phase of The Spit master planning project. These reports are:

- Ocean-side Cruise Ship Terminal (OCST) User Brief and Background Information Report, Final V1 August 2018
- Ocean-side Cruise Ship Terminal Business Case, Final Draft, May 2017.

Assumptions regarding passenger numbers, building space requirements, transport and traffic movements and generation, logistics and operational requirements have been drawn from these documents and reviewed by the master plan consultant team technical specialists where required to support the development of concept options.

Additional detailed studies where available have been drawn upon also, for example the user surveys conducted by AECOM on behalf of CoGC.

1.6 Exclusions

Consideration of the OCST as part of phase two of the master planning process has not involved a review of the:

- strategic rationale or case for a cruise ship terminal on the Gold Coast
- investment logic map for the project
- alignment of the project with local, state or commonwealth government policies.

The following items are outside the scope of this consideration:

- new studies such as flora and fauna surveys, traffic, pedestrian or parking surveys, soil or geological investigations
- user surveys
- demand forecasting
- the impact, requirements or possible outcomes related to:
  - any infrastructure on the eastern side of the ocean high water mark, including the visual impact on the ocean-side beach, maritime safety matters or environmental impacts
  - indigenous cultural heritage
  - security issues
  - air or noise emissions from the proposed infrastructure
  - visual assessment or reporting of views from the ocean beach, seaway groin, sand pumping jetty, private property or water craft
- health or psychological loss from the loss of greenspace, or surf on the open beach
- transport modelling or the carrying out of a Traffic Impact Assessment (TIA)
- the viability of the project, financially or otherwise
- benefits or disadvantages in relation to financial, economic or job creation impacts
- consideration of the loss of the surf on the ocean beach or its impacts on the visitors to The Spit
- environmental impacts of the investigation is limited to a peer review of the existing environmental reports prepared for the OCST terminal at Philip Park
- detailed infrastructure capacity modelling or infrastructure design.

1.7 Common terms

The following common terms are used in this report and are noted as distinctly different.

Reference project – The functional requirements and size of key use areas.

Reference design – The site layout concept.

Scenario – High level option with particular passenger capacity or site location.

Functional site layout or concept – Conceptual site layout considering key use areas for landside (onshore) components.

Development footprint – The location and extent of all development proposed on a site. This includes all buildings and structures, open space, all associated facilities, landscaping, on-site stormwater discharge, on-site parking, access and manoeuvring areas.

2.0 Background

2.1 Background

There has been various public and private sector investigations into developing a dedicated cruise ship terminal (CST) on the Gold Coast. A summary of the investigations since 2000 are outlined in Table 2.1 for reference.

A detailed summary of government and unsolicited market proposals is contained in the CoGC OCST Business Case (May 2017).

Table 2.1 Cruise ship terminal investigations and projects since 2000

Date	Project name	Proponent	Options considered
2002 – 2003	Project Princess	Department of State Development	5 options Located within the Gold Coast Seaway and The Broadwater.
2006	Notional Seaway Project Also referred to as the Gold Coast Marine Development Project	Gold Coast Development Board	1 option Located in the Gold Coast Seaway and access from Doug Jennings Park.
2012	Cruise ship terminal investigations	CoGC	6 options Located within the Gold Coast Seaway, The Broadwater and ocean-side.
2013	Broadwater Marine Project	Joint CoGC and Department of State Development	Area for consideration within The Broadwater.
2016 – current	Cruise ship terminal investigation	CoGC	3 options All locations ocean-side.

It is understood that the CoGC has selected the current ocean-side site over a seaway or Broadwater location due to the hydraulic and navigational complexity associated with entering the seaway or The Broadwater (CoGC, 2018).

The CoGC business case states that the development of the facility would represent a net cost to the CoGC over the 30 year analysis term, and that the OCST would generate a significant economic return and worthwhile investment for the City.

The business case also concluded that a positive cost benefit ratio would only be achieved through a home port option, not a transit port facility.

2.2 Overview of current investigations and decisions by CoGC

On 7 June 2016 the CoGC resolved to investigate options for an OCST. The three locations investigated were:

- Location 1: Offshore of Philip Park
- Location 2: Extension of the existing sand bypass jetty
- Location 3: Extension to the existing southern training wall of the Gold Coast Seaway

The feasibility study phase involved the development of the following documents:

- Strategic Assessment of Service Requirement
- Preliminary Update Report
- Preliminary Evaluation Report
- Business Case.

On 18 October 2016 the Council resolved to reduce the locations for investigation from three to one, with the focus being an ocean-side location at Philip Park.

Referral of the project to the Australian Government under the Environmental Protection and Biodiversity Conservation Act 1999 (EPBC) was also undertaken. On 15 May 2017 a decision was made that the OCST was not a controlled action if undertaken in a particular manner. Measures to avoid significant impacts on listed threatened species and communities and listed migratory species during construction were detailed.

On 30 May 2017 the CoGC considered the business case and:

- noted that the business case identified a positive benefit cost ratio range of 3.0 to 3.9 associated with a home port
- endorsed further investigations including an Initial Advice Statement for submission to the State Government (Office of the Coordinator General)
- endorsed additional steps including seasonal (winter/spring) flora and fauna studies, further design and geotechnical investigations, continuing market soundings.

Following this decision, investigations and the development of the reference design focused on the concept of a home port cruise ship terminal and project planning activities to move through the project development phase.

As of February 2018, a range of preliminary project development activities had been completed including:

- market engagement
- legislative and regulatory requirements
- geotechnical investigations
- fuel supply strategy
- transport logistics considerations
- services assessment
- implementation and procurement planning.

The Ocean-side Cruise Ship Terminal (OCST) User Brief and Background Information Report (Final V1 August 2018) prepared by CoGC incorporates the findings of these examinations and presents an updated reference design that has been used in this consideration of the OCST.

2.3 Preferred site location

As identified by CoGC, the current preferred location for the cruise ship terminal is ocean-side with landside building and infrastructure located in part of Philip Park being Lot 3 on SP104014 with an area of 5.98 hectares. This lot is shown in Figure 2.1.

It should be noted that the cadastral boundary extends east below high water mark. The land area to the toe of the foredune is approximately 4.51 hectares.

Figure 2.1. CoGC preferred location for the OCST

2.4 Key components of the OCST

The preferred OCST option includes landside (onshore) and offshore components. A summary of each component as relevant to the consideration of the landside (onshore) of the OCST as part of the concept development phase of The Spit master planning process follows.

Landside components

As noted in the OCST User Brief and Background Information Report (Final V1, August 2018), for a home port option there are a greater number of passenger and logistical support functions required than for a transit port. Facilities include passenger check-in and luggage handling, passport and immigration control, back of house services and logistical facilities for ship provisioning and servicing. As indicated in the business case and user brief, ship refuelling is assumed to be via a barge.

The reference project includes landside infrastructure suitable for a home port option and the design is based on the following general criteria as detailed in the business case (May, 2017). Each of the scenarios developed and tested have considered these criteria.

Table 2.2. Criteria for landside components

Destination experience	Provide ultimate arrival and departure experience and amplify the experience of the Gold Coast and its surrounds showcasing the cruise ship terminal and coast setting.
Site legibility	Provide clarity of experience and legibility for the user that calms and adds to experience for passengers.
Functional efficiency	Minimise clashes between logistics and passenger services during ship days by providing a separated and flexible site layout.
	Provide operator efficiency and dependability.
Passenger flow	Provide appropriate ground transport facilities and drop off areas for passengers arriving or departing the terminal with minimal on-site parking for passengers.
	Undertake all passenger check-in, baggage handling, customs, quarantine and security checks prior to departure.
Security, quarantine and safety	Provide appropriate border control, quarantine and security services for safety for all users and operators.
	Manage and control access of persons to the terminal whilst vessels are at the port.
Passenger comfort	Allow passengers waiting to board the vessel to do so in comfort and a style consistent with the cruise ship brand.
	Receive VIPs and clients in an appropriate style and enhanced facilities.
Public access	Provide facilities that are accessible to the general public during non-ship days including the jetty, dining and retail outlet(s).
Admin and operational support	Provide back of house (BOH) facilities for staff.
	Provide office accommodation and rest room/s required for the operation.
	Allow the establishment of a command centre for site management, security control, quarantine and emergency response.
	Provide supporting facilities, including toilets and tea facilities, for vehicle management officer (Vehicle Management shelter/gatehouse elsewhere on site).

The CoGC reference design general layout has also been designed considering the functional site layout and building requirements and relationships diagram developed as part of the feasibility stage of the OCST project as shown in Figure 2.2.

This layout considers the movement and flows for passengers from arrival through to boarding the vessel. In addition, the flow of goods and services that are delivered to a cruise ship has been considered, assuming that as a home port, cruise ships will need to be 'turned over', cleaned, restocked and refuelled between cruises. It is assumed that these activities would take place prior to boarding and that there would be minimal overlap between embarking passengers and logistics.

The scenario options developed and tested by the master plan consultant team have adopted this functional brief.

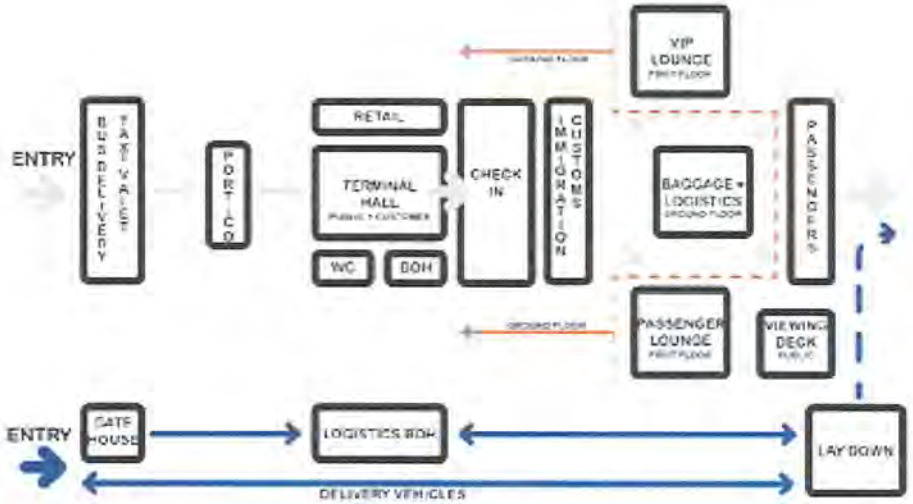


Figure 2.2 Functional site layout and building requirements adopted for the OCST project

The CoGC business case for the OCST also included a detailed brief for the functional building areas required for key passenger and operational use areas (based on a maximum 2500 passenger ship capacity). Table 2.3 outlines the estimated floor space required for each key use area. The master planning consultant team has adopted this base requirement as part of the testing and development of alternative scenarios and functional site layouts.

Table 2.3: Terminal building key use areas

Building Function	GFA (m²)
Entry Hall, Reception and Check In	1000
Immigration & Customs	500
Passenger Waiting Lounge(s)	550
Retail (café, shop or similar)	300
Baggage Handling Facility	1000
Back of House (Offices, Meeting Rooms, Training Room, Logistics Building, WC & amenities	400
Total Gross Floor Area	*3750m²*

Figure 2.3 illustrates the current reference design for landside (onshore) components of the CoGC's OCST.

Figure 2.3. Landside (onshore) reference design, August 2018

1:2,000

Offshore components (not part of The Spit master plan consultant team consideration)

The key offshore components of the OCST terminal include:

- a jetty
- wharf and dolphins
- the breakwater.

These elements are described in this section so that the landside (onshore) consideration of the OCST are understood.

While the scope for the consideration of the OCST as part of the master planning process does not include offshore components, it has been determined during the testing that requirements and impacts onshore are sensitive to changes with the offshore configuration.

As previously noted, the business case reference design has been further refined in response to market engagement and technical investigations between May 2017 and February 2018. Reference design drawings provided to the master plan consultant team for consideration are included in Appendix A.

Jetty

The jetty consists of a 900 metre long structure extending perpendicular from the shore. The jetty is a skeletal framed structure comprising raking piles and headstocks (bents) and a vehicle running surface. The jetty elevation rises above the significant wave height for approximately 800 metres of its length before sloping down to the wharf deck level. This option includes a 7 metre wide roadway along the length of the jetty that allows for OCST vehicle access during ship days and pedestrian access on non-ship days.

The key change to the jetty (and wharf) to include prime movers and semi trailers has implications for landside infrastructure and the concept options. Generally, the extent of the landside infrastructure footprint has increased with:

- additional ramping to enable large vehicles to access the jetty and wharf
- four travel lanes over the coastal dune rather than two lanes to allow for passenger and logistics movement and transitioning onto the jetty.

Changes in the configuration of the jetty between the May 2017 and August 2018 reference designs, and the implications of these changes, will be further discussed in the analysis section.

Wharf and dolphins

A concrete wharf structure (in line with the jetty) is included for cruise ship access. Further to feedback from the market soundings process, it appears that the reference design for the wharf has now changed to accommodate logistics support and movements by semi-trailers. This has had follow on impacts on the width of the jetty over land and also requires additional ramping.

This change will have implications for the indicative construction cost and business case that are outside the scope of this consideration.

An independent system of berthing and mooring dolphins is also included at the wharf deck level on the southern side.

Breakwater

The breakwater is required to provide cruise ships with protection from waves while berthing and at dock. This is necessary to allow passengers to board and disembark the ship safely and provide certainty to the market of availability during adverse conditions.

Plans indicate a structure 780 metres long and extending up to 6 metres above the lowest astronomical tide.

2.5 CoGC impact assessment and mitigation

The CoGC OCST business case (May, 2017) assessed the likely impacts of the OCST on the community, environment and transport. The following items were noted for ongoing consideration as part of the project development phase.

Community and social impacts

A number of positive social impacts were identified. Ongoing community consultation was noted as required in subsequent project phases.

Environmental impacts

It was determined that the proposed project was not considered likely to have a significant impact on availability or quality of habitat. Environmental management and risk mitigation were noted as key considerations in the construction and operation of the OCST.

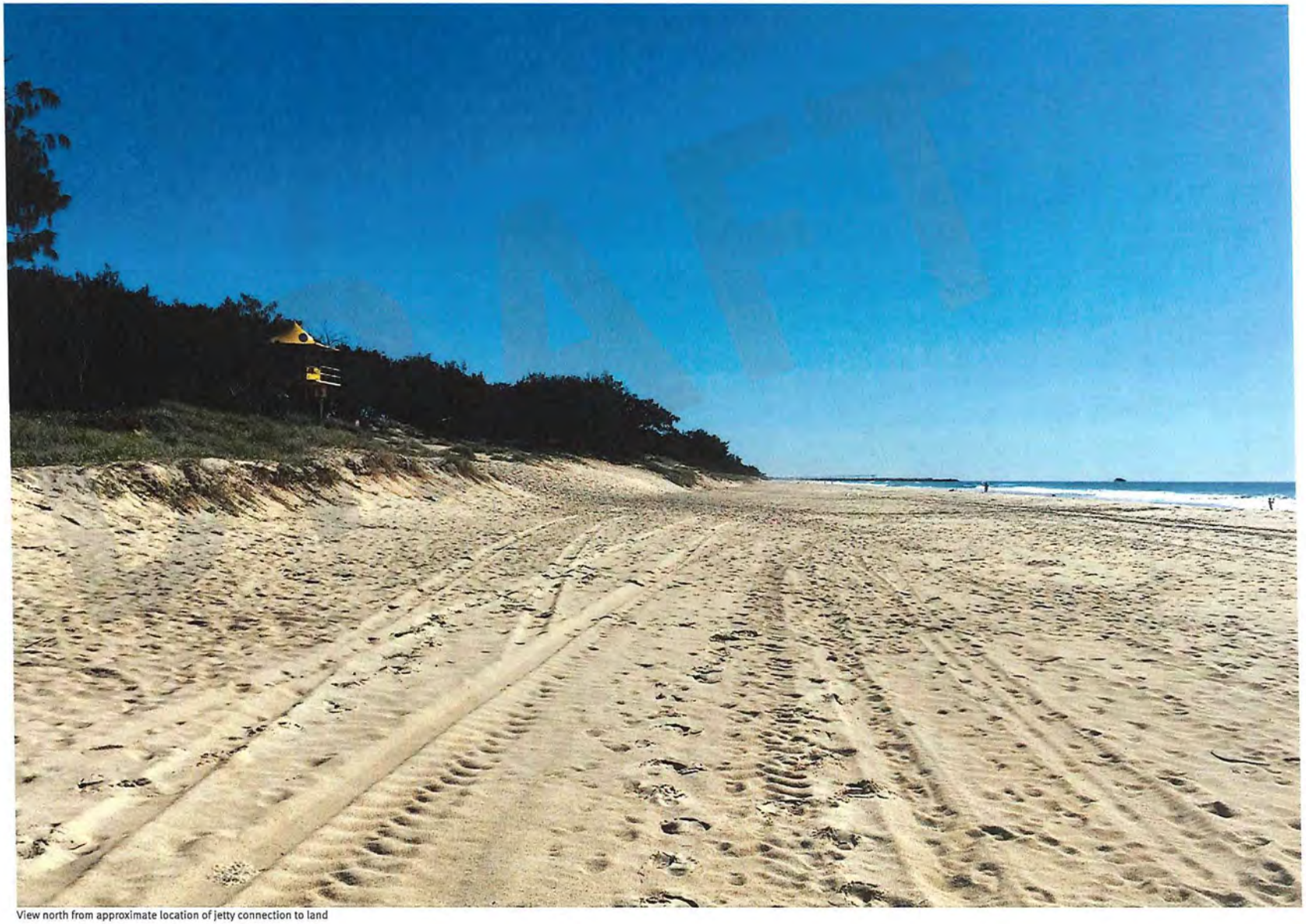
Approval process requirements and an Environmental Impact Statement (EIS) were identified as being required in subsequent project phases.

Traffic impacts

The business case notes that traffic mitigation strategies will be required as part of the OCST project. Potential strategies identified included:

- scheduling the movement of passengers outside existing traffic peaks
- provision of additional car parking at the CST to reduce the amount of (taxi and ride share) trips to and from the area
- provision of coach transport integrated with the existing public transport network to reduce number of lower occupancy vehicle trips
- upgrading key intersections in the area to accommodate increased traffic volumes.

The provision of additional car parking over and above the business case would alter the traffic modelling assumptions.



View north from approximate location of jetty connection to land

3.0 PHILIP PARK SITE OVERVIEW AND ANALYSIS

This section provides an overview and analysis of the existing situation in that part of Philip Park identified as the preferred location for the OCST by CoGC.

This analysis is based on a number of site visits by the master plan consultant team between March 2018 and August 2018, existing technical reports prepared as part of the CoGC project feasibility and development phases, and mapping relevant to the OCST landside (onshore) consideration.

3.1 Site location and context

Philip Park is located to the east of Seaworld Drive and comprises of Lot 3 on SP104014 and Lot 318 on WD800475. Lot 3 on SP104014 is the CoCG preferred location for the OCST. Refer to Figure 3.

The subject site is approximately 1.3 kilometres north of the entry to The Spit at the intersection of MacArthur Parade and Seaworld Drive.

The Federation Walk coastal reserve is located immediately to the north, and the Sheraton Grand Mirage Resort is approximately 300 metres from the southern boundary of the subject site.

To the west of the subject site and Seaworld Drive is the southern portion of the Sea World at-grade asphalt car parking area and a large vacant area of unallocated state land in multiple parcels.

3.2 Site area

While cadastre plans indicate that this lot has an area of 5.98 hectares the area above 2.0m AHD effectively to the west of the toe of the foredune is approximately 4.51 hectares. Refer to Figure 3.1.

3.3 Land tenure and zoning

Philip Park is reserved for park and recreation purposes with the CoGC nominated as trustee.

The park is included in the Open space zone under the Gold Coast City Plan (Version 6).

Figure 3.1. Site area and area west of coastal dune

3.4 Topography

The landform in the subject area of Philip Park includes a coastal foredune rising to approximately 6 metres AHD with higher localised areas to 7 and 8 metres AHD. A secondary dune is evident in some locations.

The dune system varies in width from 60 metres at the south end of the subject site to nearly 100 metres at the northern end.

The profile and features of the beach east of the coastal dune are likely to vary according to season and weather but, for reference, when inspected in August 2018 the beach profile included a scarp to the foredune of between 1.5 and 2 metres high with a wide flat section of beach approximately 50 metres extending to a berm crest. Refer to Figure 3.3, which shows the beach scarp profile in the approximate position of the jetty connection (to south of existing life guard tower).

The majority of the subject site to the west of the dune system to Seaworld Drive is undulating with areas between 2 and 4 metres AHD. As shown in Figure 3.2 a swale, potentially below 2 metres AHD is located in the south-west corner of the site and extends south-east. There appear to be other localised low points on the site below 2 metres AHD. No survey information is available at this time.

The highest astronomical tide (HAT) at the Gold Coast Seaway is 1.91m.

3.5 Site features and improvements

Key features of the site as shown in Figure 3.2 include:

- the coastal dune system
- buildings, structures and car parking between Seaworld Drive and the coastal dune system
- pedestrian and cyclist pathways including the coastal walk on/through the dunes that is part of the Oceanway coastal walk
- a range of vegetation areas with different species, varying quality and coverage.

Figure 3.2. Overview of site features

Coastal dune system

The eastern portion of the subject site, approximately 130 and 170 metres east of Seaworld Drive, comprises of a coastal dune system rising from 4 to 7 and 8 metres above AHD.

Buildings, structures and car parking

Between Seaworld Drive and the dune system, the following features are evident:

- approximately 317 car spaces
- one amenities block
- one demountable building used by the Friends of Federation Walk volunteers (refer Figure 3.4)
- one shipping container (refer Figure 3.4)
- a barbecue area
- beach showers.

A lifesaving tower on the beachfront is located adjacent to the main pathway from the carpark.

An area with exercise equipment is located on the southern boundary and to the south of the subject area directly adjoining the barbecue area.

The total area of carparking or substantially cleared area is 1.4 hectares. This represents 48% of the site area west of the coastal dune above 4 metres AHD.

Figure 3.3. Beach scarp profile north - approximate position of jetty connection to south of existing life guard tower

Figure 3.4. Existing structures in Philip Park

Pedestrian and cyclist pathways

Primary pedestrian and cyclist pathways are shown on Figure 3.2. These pathways are of varying quality in terms of width and surface.

The Oceanway pathway is a shared use pathway that provides access north-south and is located behind and on the foredune within the subject site. This pathway is approximately 2.2 metres wide and concrete from the south of the site to the point within the site where it intersects with the main east-west connection to the beach from the Philip Park carparking area.

Another north-south pathway extends from the south to the carpark. This is a gravel informal pathway varying in width and condition. The exercise equipment area is located off this pathway.

There is no pedestrian pathway along the site frontage to Seaworld Drive and the verge is grassed.

Beach access east-west is provided by a link from the car parking area that is wide, clearly signed and fenced with a concrete/asphalt surface to the intersection with the Oceanway pathway. A secondary link near the southern boundary is made of gravel and has a steep section.

There are also a number of informal single width beach tracks (sand only) from the Oceanway pathway to the beach.

Dedicated bicycle lanes are located on both sides of Seaworld Drive adjacent to the site.

Figure 3.5. View south along Oceanway pathway (sealed)

Figure 3.6. View north along Oceanway pathway (unformed)

Figure 3.7. Main/ primary beach access from Philip Park

Figure 3.8. Secondary beach access – steep gravel pathway

Figure 3.9. View south from exercise area

Vegetation and landscape character units

Figure 3.2 illustrates the diverse range of vegetation and landscape units evident on the subject site. This section includes information on the species, height and coverage of vegetation - not necessarily the environmental value of the vegetation which is considered in the next section.

Currently there are a number of distinct vegetation types and areas within the subject site ranging from grassland to 10 metre high coastal woodland species. Generally vegetation on the dune system ranges from grassland to 6 metres high.

As shown in Figures 3.10 and 3.11 the density and integrity of vegetation on the foredune is greater to the north of the beach access from the Philip Park carpark area.

Minimal vegetation is provided within car parking areas.

A significant cleared area is also evident immediately to the south of the subject site.

Figure 3.10. View from the Oceanway south of proposed OCST connection point

Figure 3.11. View of coastal vegetation illustrating the transition in vegetation quality to the north of the proposed OCST connection point

3.6 Current uses and activities

The current range of uses and activities in this part of Philip Park, as observed by the master plan consultant team during a number of site visits at different times between March 2018 and August 2018 include:

- walking, running or cycling on the Oceanway and other key pathways through the subject site
- users parking in the carpark and accessing the beach for walking, running, walking a dog (on-leash area), swimming, surfing, fishing and other passive recreation activities
- the Friends of Federation meeting and then conducting activities in the Federation Walk coastal reserve to the north (7 to 10am on the last Sunday of the month between February and November)
- picnickers using park facilities
- use of the exercise equipment
- illegal overnight camping.

The CoGC's user survey conducted in January/February 2018 by AECOM included two locations within the subject site or vicinity.

Vantage point 4 was located near the lifesaving tower on the beach. As the beach was closed due to hazardous surf conditions during the majority of the user survey observation period, the number and nature of observations is unlikely to reflect typical peak usage. Kite surfers were observed to be using this stretch of beach and ocean at multiple times during the observation periods.

Vantage point 5 was located to the south of the exercise equipment area. From this point the following activities were observed:

- active recreation involving walking, running or cycling
- use of exercise equipment during most times of the day, peaking in the early morning and mid-morning periods with users walking, running or cycling not generally driving to use to the equipment
- some anti-social behaviour during the off-peak period
- use of the barbecue facility and associated power outlet
- illegal camping in the carpark and use of park facilities including toilet, beach showers, barbecue and associated power outlet.

Meetings with the Queensland Police representatives during phase one and two of the master planning project have indicated that some anti-social and illegal behaviour has occurred in the park at different times of the day.

Figure 3.12. Barbecue and exercise area at the southern end of the subject site

3.7 Environment and ecological features

Analysis of the environmental values and ecological features of the OCST preferred location in Philip Park has been informed by both a desktop review of existing reports (AECOM, 2016), field investigations (BAAM, 2017) and observations by the master plan consultant team.

This summary considers both existing site features and environmental statutory considerations for any development on the site. Further detail is contained in the source reports of which the BAAM report (2017) is the most recent and relevant.

Flora species and values

In terms of vegetation cover and quality of the subject site (as also reported by BAAM, 2017) includes:

- foredune vegetation of varying quality
- areas of grassland to the southern portion and to the south
- littoral woodland
- scattered trees within cleared car parking area.

Littoral forest is located to the north-west of the subject site in the Federation Walk coastal reserve and an area of Acacia sophorae is located to the south adjacent to the Oceanway pathway.

The areas of each vegetation type reported by BAAM correspond with that shown on Figure 3.2.

Field surveys by BAAM (2017) on the subject site did not identify any flora species listed as threatened or near threatened flora species under either the EPBC Act or Queensland Nature Conservation Act 1992 (NC Act).

The impact of the current reference design and concept options on vegetation are considered in the next section of this report.

Fauna species and values

Existing vegetation provides opportunities for fauna but field surveys undertaken by BAAM in early 2017 indicated that no fauna species listed as threatened or near threatened species under either the EPBC Act or NC Act were recorded in the subject site.

One threatened species has potential to occur, namely Grey-headed Flying-fox (Pteropus poliocephalus; EPBC Act: vulnerable). As there is no flying-fox camp present on The Spit the Grey-headed Flying-fox only has potential to occur as a rare seasonal visitor to flowering trees in littoral forest and woodland habitats that contain suitable food trees for the Grey-headed Flying-fox.

During an October 2018 site visit, evidence of avifauna were observed immediately adjacent to the car park area:

- large birds nest located approximately 4 metres high in a tree (near amenities block)
- Curlew (species unknown) (7 individuals in a group on the western edge of the site).

BAAM concluded that there was no suitable habitat for migratory shorebirds on the eastern side of The Spit including in the OCST project area.

The CoGC has provided records of turtle nesting sites on the ocean-side beach to the master planning consultant team. The BAAM report did not note turtle nesting and noted the project area is unlikely to support nesting habitat for marine turtle. Further investigations regarding the presence of turtle nesting may be required.

Statutory considerations

Environmental values that are protected under Australian Government or Queensland legislation are identified as:

- Matters of National Environmental Significance (MNES)
- Matters of State Environmental Significance (MSES)
- Matters of Local Environmental Significance (MLES)

As previously noted the CoGC has addressed MNES through the referral of the OCST project to the Australian Government. No significant impacts on landside MNES were identified for consideration.

At the state level, the subject site is included in Category X on the regulated vegetation management map. This reflects the history of The Spit as a sand bank. Revegetation work has substantially contributed to vegetation cover and flora diversity. Current State Planning Policy (SPP) mapping does not identify any protected areas, regulated vegetation or wildlife habitat.

The Gold Coast City Plan does include areas mapped as MSES and MLES on the subject site.

The MSES mapped area as shown on Figure 3.13 is related to Priority species – State significant species.

The MLES mapped is general priority vegetation. The relevant City Plan overlay code requires that for assessable development, the development avoids impacts and damage is minimised to the greatest extent possible.

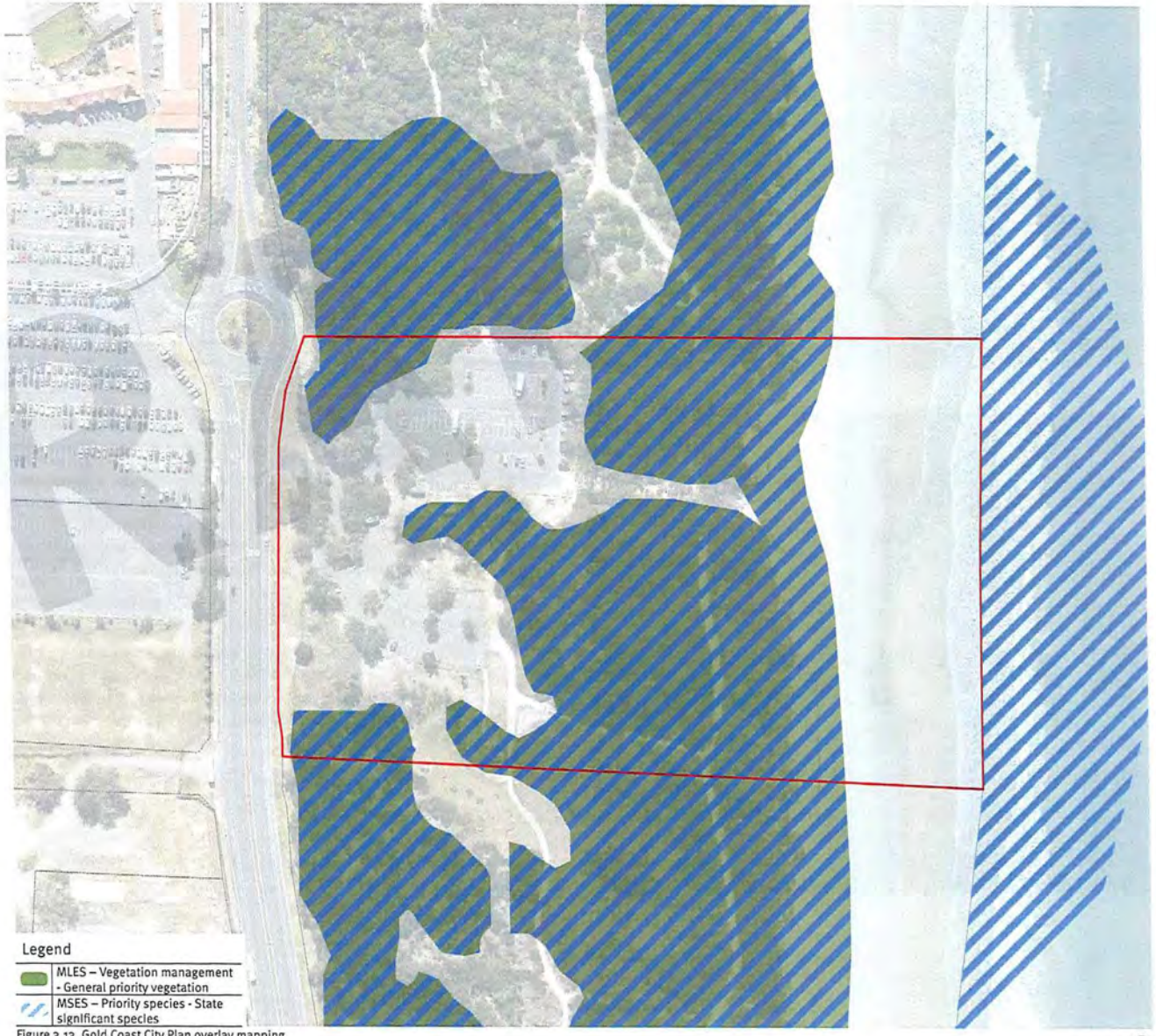


Figure 3.13. Gold Coast City Plan overlay mapping

3.8 Access, traffic and parking

Existing site access

Vehicle access to the subject site is located approximately 50 metres to the south of the roundabout on Seaworld Drive that provides access to Sea World. This is a left-in and left-out facility only.

The cross-section of Seaworld Drive adjacent to the site includes two travel lanes in each direction, bicycle lanes and a kerbside lane.

The kerbside lane adjacent to the subject site is not allocated for a particular purpose however buses and coaches have been observed parking in this area.

The main bus stop for Sea World is located directly opposite on the western side of Seaworld Drive.

Road network capacity

The traffic capacity of the road network at peak times on weekends has been raised as an issue by some stakeholders during the master planning consultation process.

The master plan consultant team received information on the CoGC's investigations into the potential upgrading of the Gold Coast Highway/ Waterways Drive intersection and possible provision of a third lane northbound on the Sundale Bridge (Gold Coast Highway across the Nerang River) as part of phase one of the master planning process.

The supporting traffic volume analysis of the Gold Coast Highway/Waterways Drive intersection indicates that the current capacity of the intersection towards The Spit is approximately 1400 vehicles per hour. The intersection is nearly at capacity during the typical weekend peak (1373 vehicles per hour) and exceeds capacity during the late afternoon on busy weekend days, particularly during the warmer months. The CoGC modelling indicates that with upgrading of the intersection and additional lane capacity on the Sundale Bridge, a total capacity in the order of 2300 vehicles per hour could be achieved.

This intersection and road network servicing The Spit generally operates with significant spare capacity during weekdays. Hence the benefits of any upgrade are likely to be limited to peak weekend traffic conditions.

The CoGC has advised that traffic modelling indicates that with upgrading, the intersection would have capacity to accommodate development expected under the current City Plan to 2041, including the proposed 2500 passenger cruise ship terminal.

Future light rail

The current City Plan (Version 6) identifies a corridor for light rail investigation on The Spit. As part of the preparation of draft concepts, The Spit master plan consultant team has reviewed the general arrangement drawings provided by the CoGC for the possible extension of light rail onto The Spit.

The implications of the light rail general arrangement plan have been considered during the preparation of the master plan options.

The Spit master plan consultant team has proposed an alternative light rail arrangement that could reduce the impact on the subject site as shown in Figure 3.15. It is proposed that a single track only be provided on The Spit except at stations and at the southern end of The Spit. This will require further detailed analysis during the next stages of the master planning process.

It is noted that Seaworld Drive is identified as an active transport corridor in SPP Transport infrastructure mapping.

Parking

As previously noted the subject site within Philip Park currently includes approximately 317 carpark spaces in two key areas.

User surveys of key locations on The Spit, including two locations in the vicinity of the subject site, found that the majority of the large asphalt car parking areas on The Spit are generally underutilised outside peak weekend use times.

Figure 3.14. View of Seaworld Drive north

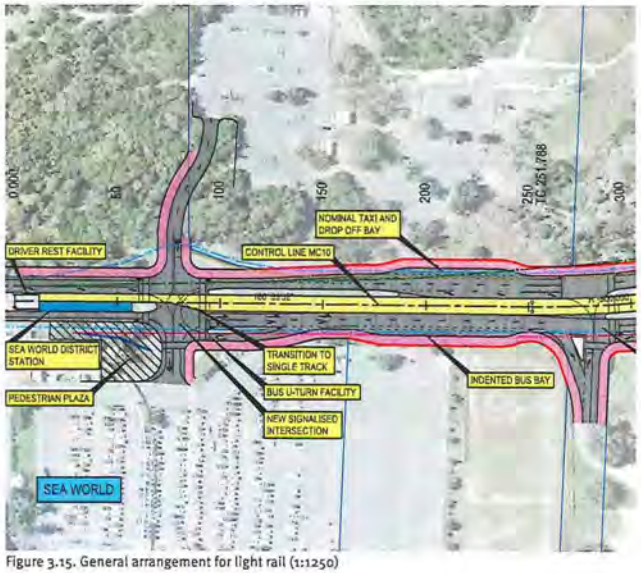


Figure 3.15. General arrangement for light rail (1:1250)

3.9 Infrastructure and servicing

The following table summarises the location of infrastructure and services relative to the subject site.

Table 3.1. Summary of infrastructure and service locations

Sewer	A gravity trunk sewer line is located on the eastern side of the Seaworld Drive road reserve within the road verge. Two sewer manholes are located in the grassed footpath adjacent to the subject site. A third manhole is located in the verge immediately to the south of the subject site.
Potable water	A trunk water line is located on the western side of Seaworld Drive road reserve within the road verge.
Stormwater	Stormwater pipes have been identified in the roadway adjacent to the subject site. Investigations undertaken for the CoGC to support the development of the business case identified that existing stormwater lines that collect road surface drainage in this area may discharge to a soak-away pit in an unknown location in Philip Park.
Electricity	Underground electrical services are located on both sides of Seaworld Drive within the road reserve.
Gas	A 90mm existing high pressure gas main is located on the eastern side of Seaworld Drive within the road reserve.
Recycled water release trunk main	A trunk line for the recycled water release system is located on the eastern side of Seaworld Drive within the road reserve.
Telecommunications	Existing telecommunications lines are located on the western side of Seaworld Drive within the road reserve.

Further investigation of the existing stormwater management arrangements is recommended as part of ongoing investigations for the OCST.

3.10 Flooding, coastal management and erosion

Flood hazard

The current nominated flood height for the site is 2.32 metres AHD. The minimum floor level for development needs to provide for a freeboard above this level. The freeboard allowance depends on the nature of the use proposed. The Gold Coast City Plan does not specify a minimum freeboard for commercial uses.

Current flood mapping (Version 4) on the CoGC website (refer Figure 3.16) indicates that there are minor areas within the subject site of Philip Park that may be subject to flooding in a 100 year ARI flood up to a depth up to 0.6m. These areas are primarily located on the southern boundary and in the north-west corner of the subject site. These areas correspond with low lying areas observed on the subject site during field investigations.

While low, the isolated area to the south of the subject site may not be flood affected in a river or storm surge event as Seaworld Drive is higher and may act as a barrier. However, the location of road drainage stormwater pipes to The Broadwater, south of the subject site may create backflow flooding that needs to be considered. Detailed levels for this infrastructure has not been reviewed at this time.

Draft flood mapping prepared to ensure state government policies regarding allowances for climate change are appropriately considered have been reviewed and show no areas of 100 year ARI flooding on the site or a nominated flood height.

Coastal management and erosion prone areas

The subject site is located in a coastal management district and the eastern half of the site is included in an erosion prone area under state legislation.

Small areas of the site on the southern and north-western edge are included in the medium storm inundation area in the SPP mapping.

It is noted that the A-line seawall does not extend past the subject site.

Further consideration of coastal management and erosion processes will be required as part of the further investigation of the OCST.

While it is argued that the breakwater component of the OCST may ameliorate erosion and result in accretion, the implications for landside uses to the north and south of the subject site should be considered.

Figure 3.16. Designated flood levels

NTS

4.0 OVERVIEW OF SCENARIOS

4.1 Overview

In addition to the current CoGC reference design, three scenarios and associated functional site layouts have been developed and tested as part of the first stages of phase two of The Spit master planning process.

The ocean-side cruise ship terminal (OCST) scenarios to be tested during phase two of the master planning process were identified following workshop two.

Following is an overview of feedback received at workshop two that influenced the development of alternative scenarios and site layouts.

A summary of each of the ocean-side cruise ship terminal scenarios is also outlined in this section.

4.2 Workshop input on OCST

The Spit master planning process involves workshops with selected participants at key stages.

Workshop two on the weekend of Saturday 21 and Sunday 22 July 2018 involved 50 participants representing diverse groups including residents, businesses, environment groups, recreation users, commerce groups, design experts and government agencies.

Over the two days, participants were engaged in the development of overall concepts for the future of The Spit and key parts of The Spit.

The OCST was one of eight topics explored on each day of the workshop. Most of the OCST workshop groups identified their opposition to the OCST.

On the first day the group considering the OCST identified the following priorities if the OCST was to proceed:

- the cruise ship terminal be integrated within The Spit landscape
- a strong connection be made east to west from the ocean to The Broadwater
- provide an opportunity to demonstrate exemplary model of sustainable design.

On day two of the workshop one group was tasked with looking at the OCST in more detail to test the terminal and identify opportunities for integration of the terminal within The Spit master plan.

The key question posed to the group was how an innovative cruise ship terminal on The Spit at Philip Park could be delivered. The group considered both a 2500 and a larger 4000 passenger design vessel size. The following issues and opportunities were considered:

- terminal access for passengers and employees
- traffic and transport access
- employment opportunities
- tourism and accommodation connections
- the architectural character of the terminal building.

It is acknowledged that many members of this group found this task challenging, and many of the group did not support the OCST. Key concepts developed by this group included:

- moving the terminal building closer to Seaworld Drive or to the west of Seaworld Drive, to preserve the frontal dune and Federation Walk access
- options for moving or consolidating the OCST car parking and servicing areas west of Seaworld Drive to reduce impacts on Philip Park
- a land bridge across Seaworld Drive between the OCST and Sea World.

Testing of an option for the location of landside infrastructure to the west of Seaworld Drive was identified and considered in the concept development phase.

4.3 Additional technical inputs

In addition to undertaking a thorough site analysis and review of the available CoGC documents on the cruise ship terminal, the master plan consultant team has also undertaken the following activities to support the development of the scenarios and alternative layouts:

Deicke Richards

- Review of CoGC documents to identify key information gaps and ascertain known outputs for the development of a design brief
- Review of existing modern cruise ship terminals of similar capacities, including gaining an understanding of the new Brisbane terminal
- Creating a preliminary/indicative design brief for the spatial requirements of each component of the terminal for a 2500 passenger and 4000 passenger facility
- Engaging with the community representatives and other design experts during workshop two to develop structure plans for the terminal that reflected community aspirations
- Testing the configuration of the required spaces within the structure plans developed during the community engagement session
- Identifying opportunities to better connect the OCST to significant economic development opportunities to the west.

Cambray Consulting

- Consideration of transport and traffic arrangements at comparable existing cruise ship terminals in Brisbane, Sydney and Singapore
- Review of mode share assumptions in the OSCT Business Case, May 2017
- Preparation of indicative setdown and parking requirements for a 2500 passenger and 4000 passenger facility. This includes linear dimensions and approximate bay numbers
- Assisting Deicke Richards with estimates of vehicular servicing areas, dimensions and ramping.

4.4 Overview of scenarios

In addition to the current CoGC reference design (August 2018) three scenarios and functional site layout options have been developed and evaluated.

The consideration of a larger capacity home port facility and terminal building was deemed as necessary given the CoGC investigation and references in the user brief and background information report provided that the ocean-side facility be designed to permit use by a range of cruise ships typically operating around Australia as well as larger vessels being considered for operation around Australia (August, 2018).

Table 4.1 summarises the key dimensions of the different scenarios texted.

Table 4.1. OCST scenarios

Scenario 1	OCST as a home port with 2500 passenger located in Philip Park as per the reference design in the CST user brief
Scenario 2A	OCST as a home port with 2500 passenger located in Philip Park with an alternative functional site layout
Scenario 2B	OCST as a home port with 4000 passenger located in Philip Park with an alternative functional site layout
Scenario 3	OCST as a home port with up to 2500 passenger with land-side building and infrastructure in an alternative location to the west of Seaworld Drive as proposed in one of the concepts developed at workshop two

The following table summarises each of the scenarios and the key elements that have been considered during the concept development phase to test options for the configuration of landside buildings and infrastructure.

A number of the elements are common across all scenarios. The key differences relate to:

- an increase in the terminal building footprint, set-down, parking and servicing areas if a larger passenger volume is to be accommodated
- additional parking areas if one of the adopted mitigation strategies involves providing long-term on site parking (refer to Business Case, May 2017, p117)
- assumptions regarding the number of bus bays, kerb space for set-down and short-term parking provisions for the purpose of testing alternative scenarios.

Table 4.2. Summary of OCST landside components and scenario assumptions

	Scenario 1 *(Reference design August 2018)*	Scenario 2A	Scenario 2B	Scenario 3
Passenger assumption	2500	2500	4000	2500
Terminal *(exc. logistics and BOH)*	3750m²	3750m²	5000m²	3750m²
Total car parking	81 *(as shown counted on plan)*	145	221	145
– Staff car parking	41	15	25	15
– Short term car parking		120	180	120
Taxi set down		10 bays	16 bays	10 bays
Ride share & private vehicle set down		10 bays	16 bays	10 bays
Bus bays	10 *Up to 20 may be required to support large vessels (Source: Royal Caribbean)*	10	16	10
Design vehicle for logistics	12.5m long rigid truck 19m long prime mover with semi-trailer			
Passenger transport	Minimum four dual control low floor buses accommodating up to 5000 passenger movements over 3-5 hours. Staged implementation.			
Jetty width over dune and beach	4 lanes Redirection of the Oceanway pathway.		Further testing of landside impacts and options to reduce the impact of the jetty width over the dune system and beach is ongoing.	
Spacing of piers	Skeletal framed structure. Standard pile bents spaced approximately 18m comprising of a pair of transverse racking piles (i.e. angled not vertical). Additional longitudinal raking piles located approximately every 200m.			
Potable water supply	Demand for potable water supply varies depending on operator but is required to be available. Pipeline to be provided.			
Black and grey water	Generally stored and treated on ship with discharge at sea in accordance with regulations. No landside implication.			
Bilge water	Stored and treated on ship for discharge at sea. Waste oil sludge removed at the wharf for disposal. Landside logistics and traffic implication.			
Other sludge	Collected and stored on ship with removal using dedicated liquid waste collection road tankers at the wharf. Landside logistics and traffic implication.			
Power	Generated on ship and no specific requirement. No specific requirement landside.			
Jetty load capacity	25 tonnes but may be varied considered loading requirements. Further information required as this may affect the jetty design in terms of pile spacing or the depth of the structure.			

Connection point

The same connection point from the ocean to land has been used for all scenarios at this stage to ensure that scenarios can be directly compared.

For reference the top of the dune where the jetty would connect is between 5 and 6 metres AHD. The reference design (May, 2017) indicated that the top of the jetty deck at the connection point would be 5.8 metres AHD.

4.5 Scenario 1 - CoGC reference project and design

This scenario and functional site layout reflects the CoGC reference project parameters and reference design.

It is noted that the current CoGC OSCT reference design has been modified from that included in the Business Case (May 2017).

The key changes relate to offshore infrastructure, but the landside impact is that access and ramping is required to enable a prime mover and semi-trailer with shipping container to be able to access the jetty. The width of the jetty over the coastal dune and beach has also increased from 2 to 4 lanes.

In summary, the key components of the reference design site layout are:

- passengers entering the terminal at ground level for processing and then transitioning to first floor lounges
- left in/left out access arrangement from Seaworld Drive in approximately the same location as the existing entry
- a one-way internal loop with a private vehicle and taxi drop off zone and porte-cochere
- bus set down and waiting area
- two storey terminal building with a GFA of 3350m² setback 85 metres from Seaworld Drive
- 400m² logistics and back of house building with gatehouse
- a covered walkway from the terminal building to Seaworld Drive.

As outlined in the business case the layout of the subject site has been developed to take into account:

- limiting the new building footprint to the cleared areas within Philip Park
- preserving the foreshore and dune vegetation
- limiting impact (noise and visibility) from operational areas upon the beach area
- maintaining public thoroughfares such as Federation Walk
- providing upper levels views of the Pacific Ocean and cruise ship for passengers and public.

Note that the following items were not included in the reference design or costing:

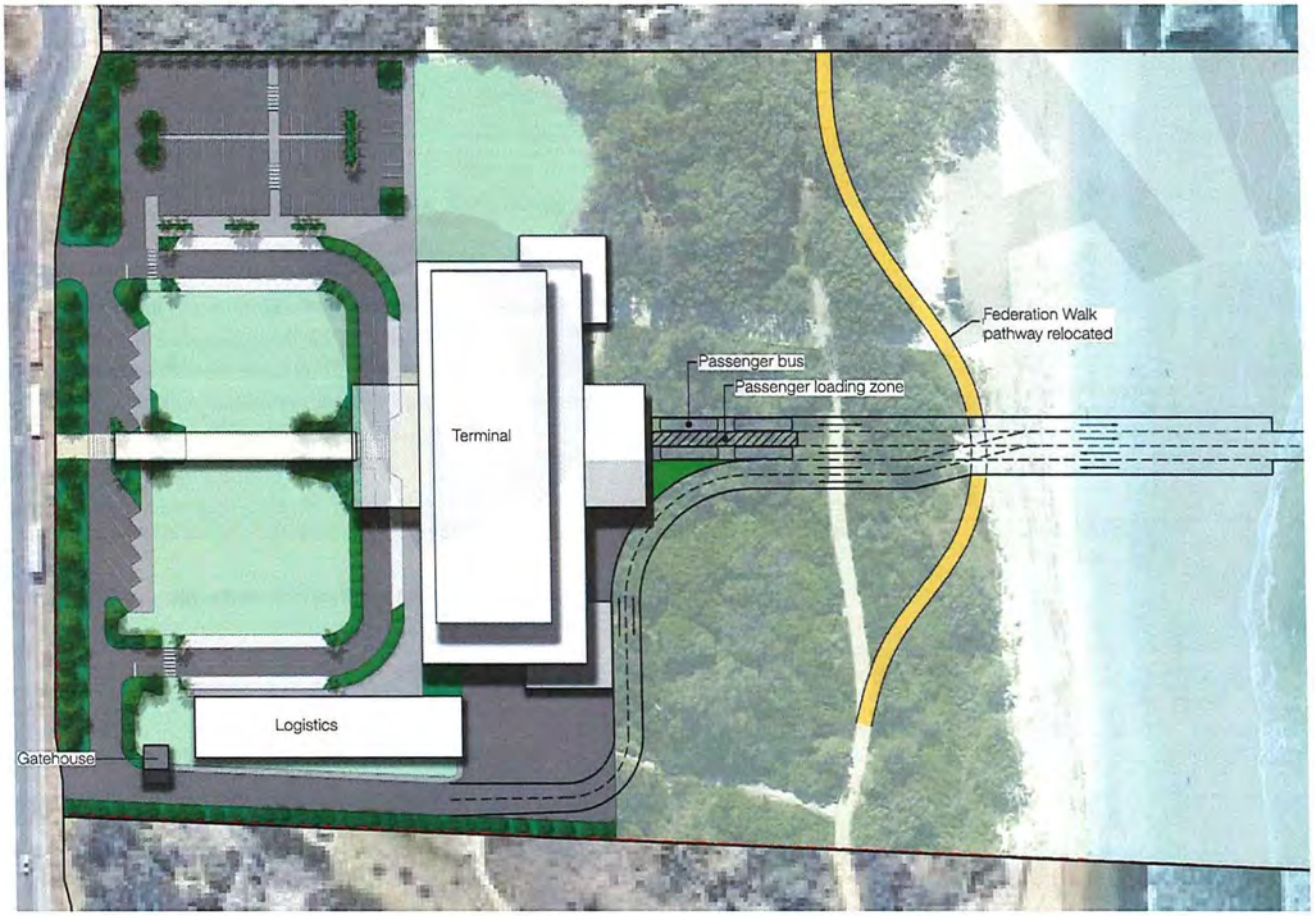
- diving platform
- viewing platform (300m along)
- pedestrian walkway (to viewing platform).

Snapshot

Capacity	2500 passenger
Development footprint[1]	25,400m²
Terminal size (inc BOH)	3750m²
Car parks	81
Bus bays	10
Set down	Not identified on site layout
Taxi rank	Not identified on site layout

1 The development footprint has been calculated considering the relevant Gold Coast City Plan administration definition, the highest astronomical tide of 1.91m assumed at the 2m contour and excluding work associated with the Oceanway pathway.

Scenario 1 - CoGC reference project and design



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4.6 Scenario 2A – Alternative functional site layout for 2500 passenger facility

Scenario 2A presents and alternative functional site layout for a 2500 passenger ocean-side cruise ship terminal facility.

Key features of this layout include:

- re-orientation of the terminal building east-west, facing south
- connection of the terminal building and ground floor uses to Seaworld Drive
- the location of logistics and back of house areas within the same building footprint but to the rear of and out of sight of public areas
- provision of staff parking clearly separated from public short-term parking
- provision for passenger loading within or parallel to the main terminal building
- relocation of site access to fit with signalised intersections to service the western development area.

Snapshot

Capacity	2500 passenger
Development footprint[1]	21,200m² (approx.)
Terminal size (inc BOH)	3750m²
Car parks	128
Bus bays	8
Set down	7
Taxi rank	Approximately 90 metres

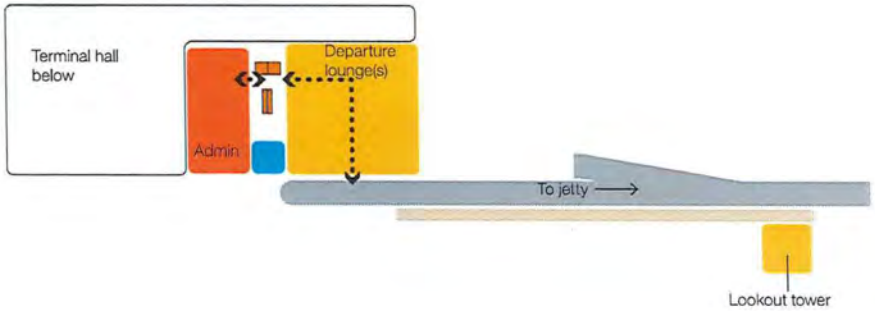
1 The development footprint has been calculated considering the relevant Gold Coast City Plan administration definition, the highest astronomical tide of 1.91m assumed at the 2m contour and excluding work associated with the Oceanway pathway.

Scenario 2A – Alternative functional site layout for 2500 passenger facility

Section

Lower Level

Upper Level



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4.7 Scenario 2B – Alternative functional site layout for 4000 passenger facility

Scenario 2B presents an alternative functional site layout for a 4000 passenger ocean-side cruise ship terminal facility.

Key features of this layout include:

- re-orientation of the terminal building east-west
- connection of the terminal building and ground floor uses to Seaworld Drive
- the location of logistics and back of house areas within the same building footprint but to the rear of and out of sight of public areas
- provision of staff parking clearly separately from public short-term parking
- provision for passenger loading within or parallel to the main terminal building
- relocation of site access to fit with signalised intersections to service the western development area.

Snapshot

Capacity	4000 passenger
Development footprint[1]	26,900m² (approx.)
Terminal size (inc BOH)	5000m²
Car parks	128
Bus bays	10 bays
Set down	16 bays
Taxi rank	16 bays

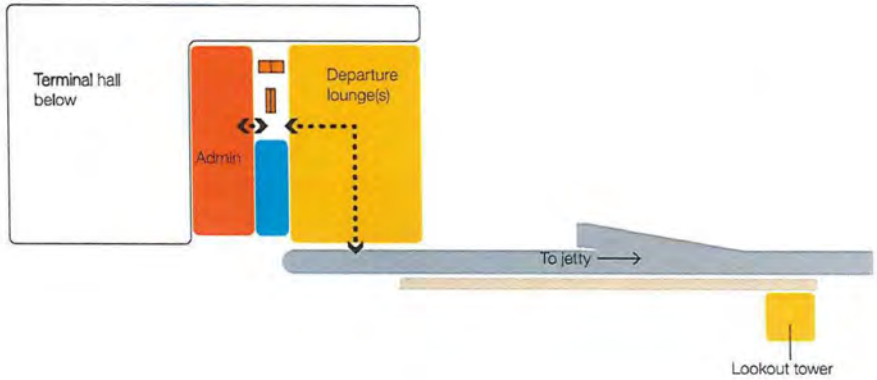
1 The development footprint has been calculated considering the relevant Gold Coast City Plan administration definition, the highest astronomical tide of 1.91m assumed at the 2m contour and excluding work associated with the Oceanway pathway.

Scenario 2B – Alternative functional site layout for 4000 passenger facility

Section

Lower Level

Upper Level



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4.8 Scenario 3 – Alternative site location to the west of Seaworld Drive

Scenario 3 was generated in response to ideas and concepts that were developed at workshop two.

The opportunity to locate the terminal building to the west of Seaworld Drive was considered to reduce the impact on the coastal dune and Philip Park. The potential to integrate the terminal into a larger low rise mixed use development was seen as having some merit.

Unless located further south this option would require negotiation with Sea World as the concept sits over part of the existing at-grade car park.

Key features of this layout include:

- location of the terminal to the west of Seaworld Drive
- a three storey building with car parking on the ground level
- plaza entry from the south
- an additional 180 metres of jetty structure within a two level bridge over Seaworld Drive
- the logistics area is over multiple levels with access not separated from other vehicles.

Snapshot

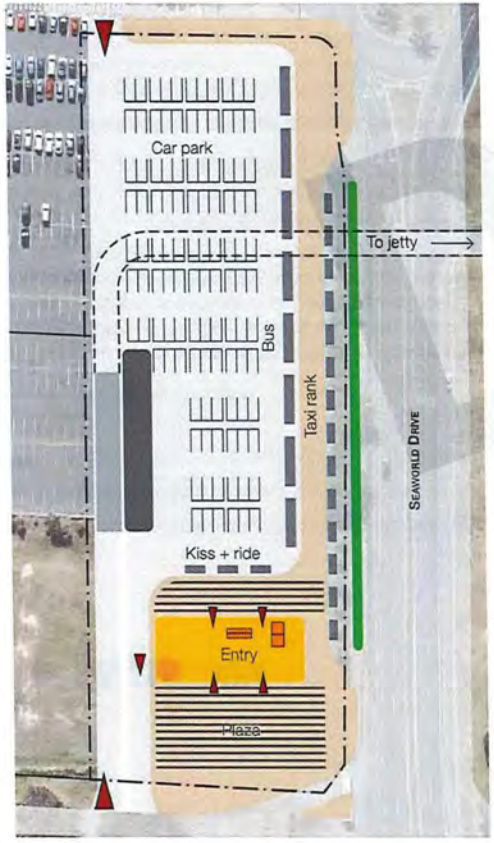
Capacity	2500 passenger
Development footprint[1]	13,500m² (approx.)
Terminal size (inc BOH)	3750m²
Car parks	115
Bus bays	8
Set down	4
Taxi rank	Approximately 110 metres

1 The development footprint has been calculated considering the relevant Gold Coast City Plan administration definition, the highest astronomical tide of 1.91m assumed at the 2m contour and excluding work associated with the Oceanway pathway.

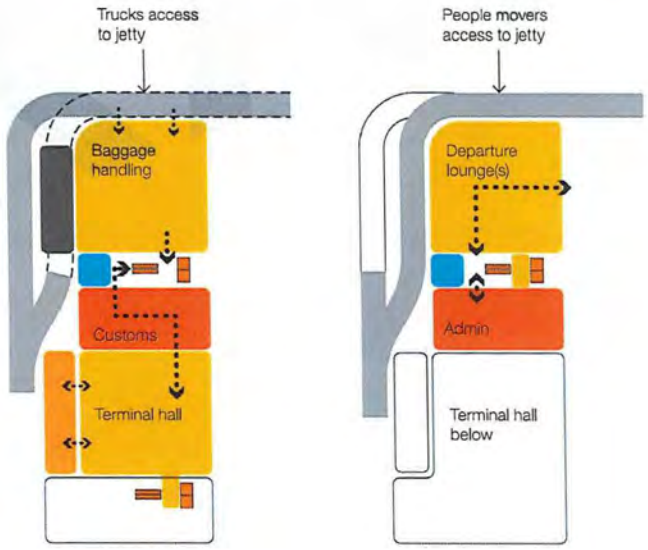
Scenario 3 – Alternative site location to the west of Seaworld Drive

Section

Lower Level



Upper Levels



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5.0 EVALUATION

This section includes the evaluation and consideration of:

- scenarios for landside infrastructure west of the coastal dune
- the location of the jetty structure relative to and east of the coastal dune and beach
- particular technical matters.

Different jetty scenarios east of the terminal over the dunes and beach have not been considered at this time. A preliminary assessment based on the current reference design and a structural case example has been undertaken. This assessment has been supported by indicative sections through Philip park and a photomontage.

Further consideration of the impacts and potential benefits of different site layouts on the coastal dune system and beach is required once additional information is available on the jetty structure.

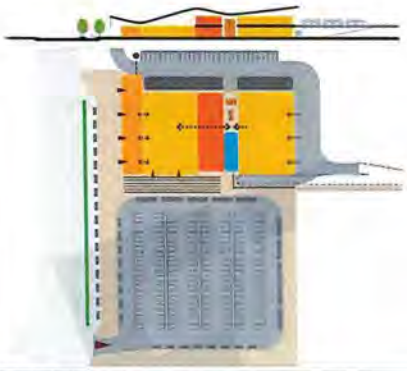
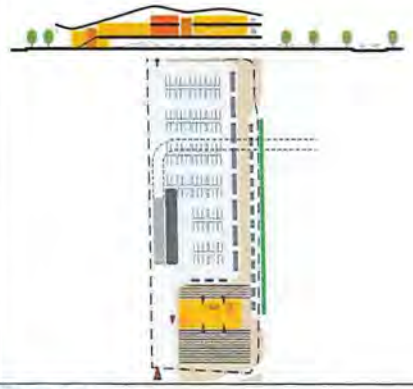
5.1 Evaluation of OCST landside elements west of the coastal dune

The following matrix outlines the key differences of the scenarios west of the coastal dune in terms of:

- built form outcomes
- transport and traffic
- environment
- recreation
- infrastructure.

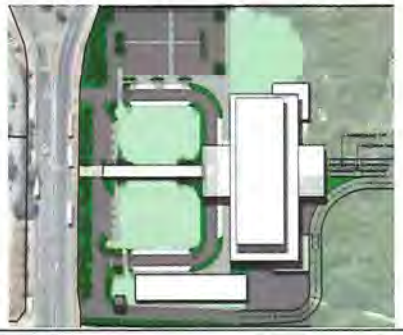
The matrix also presents the pros and cons of each option in terms of potential connections and synergies with other master plan priorities on immediately adjacent land to the north, west and south.

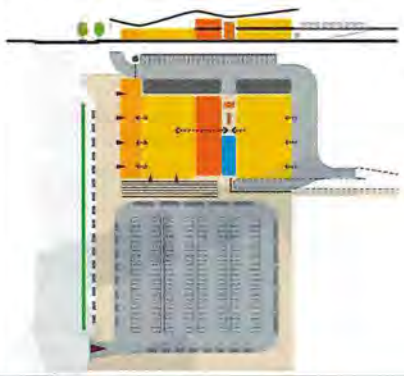
Table 5.1. Scenario evaluation matrix – landside west of coastal dune

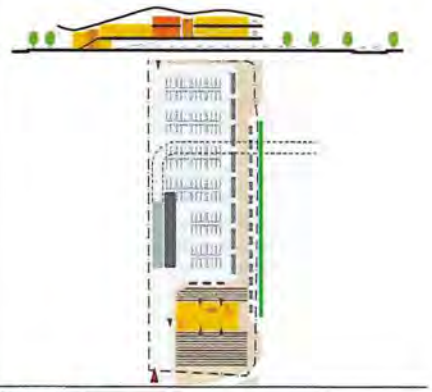
		Scenario 1 CoGC reference design	Scenario 2A 2500 passenger facility in Philip Park *Alternative functional site layout*	Scenario 2B 4000 passenger facility in Philip Park *Alternative functional site layout*	Scenario 3 2500 passenger facility *Alternative site location west of Seaworld Drive and functional site layout*
	Section (1:2,500) *Floor plan (1:2,500)*				
Built form	*Building configuration and footprint*	2 storey building parallel to Seaworld Drive and the coastline with a building floorspace of 3750m². Ground floor: Entrance/arrivals, retail, customs and baggage hall, back of house, logistics and servicing. Upper level: Departure lounges and option of a public viewing deck. The building sits well back from the street, close to the dunes, in isolation from urban context and takes up considerable area within Philip Park. This results in the building being placed only 85m from the top of the beach (approximate line of dune grass). Entry is on the western side of the building. It is uncertain how the jetty access fits with the building footprint for servicing and people movers from the plans provided. It is noted that the August 2018 reference design includes a passenger loading zone over the coastal dune system. It is assumed this would require shade and shelter. Further consideration of the impact of landside elements on the coastal dune system and beach are required.	2 storey building perpendicular to Seaworld Drive and the coastline with an approximate building floorspace of 3750m². Ground floor: Entrance/arrivals, restaurants, retail, customs and baggage hall, logistics and servicing. Upper level: administration, departure lounges, café. The building is positioned at a 90-degree angle to Seaworld Drive with the main entrance facing south towards the primary entry route to the CST. The footprint location enables a better urban relationship with Seaworld Drive. Entrance/arrivals hall is visible and accessible from the street for pedestrians without traversing the carpark. Restaurants at ground level can address the street and open in to the entrance and entrance/arrivals hall. This building placement enables a 105m setback from beach edge and enables good views and access from Seaworld Drive to dune vegetation and beach.	2 storey building perpendicular to Seaworld Drive and the coastline with an approximate building floorspace of 5000 m². Ground floor: Entrance/arrivals, customs and baggage hall, logistics and servicing. Upper level: administration, departure lounges, café. The building is positioned at 90-degree angle to Seaworld Drive with the main entrance facing south towards the primary entry route to the CST. The footprint location enables a better urban relationship with Seaworld Drive. Entrance/arrivals hall is visible and accessible from the street for pedestrians without traversing the carpark. Restaurants at ground level can address the street and open in to the entrance and entrance/arrivals hall. This building placement enables a 105m setback from beach edge and enables good views and access from Seaworld Drive to dune vegetation and beach.	3 storey building located to the west of Seaworld Drive with an approximate building floorspace of 3750 m². Ground floor: entry, drop-off areas, car parking. Level 1: Entrance, arrival halls, customs, logistics. Level 2: Administration, departure halls. An entrance hall with some retail is located on level 1, but the actual departure area is a level higher. This results in baggage drop-off and baggage halls on different levels. The southern side of the building overlooks a plaza that can integrate into development adjacent.
	Service access	Service access is located to the south of the main terminal building and is supported by a free standing logistics and back of house building with a gatehouse.	Clear separation between vehicle drop-off and pick-up/servicing on opposite sides of the building, with servicing on north and east. Logistics and services areas are accessed via existing roundabout or a new signalised intersection and located on northern side of the building in a walled enclosure. The jetty location is close to the current proposal. The entry ramp access up to the jetty is on eastern side of the CST building.	Clear separation between vehicle drop-off and pick-up/servicing on opposite sides of the building, with servicing on north and east. Logistic and services areas are accessed via existing roundabout or a new signalised intersection and located on northern side of the building in a walled enclosure. The jetty location is close to the current proposal. The entry ramp access up to the jetty is on eastern side of the CST building.	Vehicle and service access is likely to be from the same side of the building. Access to services will require ramping from street level to mid-level for trucks and to uppermost level for people movers. A two-level bridge access across Seaworld Drive to the jetty would be required with upper level for people mover vehicles and lower level for service vehicles.
	Other businesses				Results in the loss of car parks that service Sea World.

Section (1:2,500)

Floor plan (1:2,500)







	Scenario 1 CoGC reference design	Scenario 2A 2500 passenger facility in Philip Park *Alternative functional site layout*	Scenario 2B 4000 passenger facility in Philip Park *Alternative functional site layout*	Scenario 3 2500 passenger facility *Alternative site location west of Seaworld Drive and functional site layout*
Access & parking	An area of approximately 2700m² comprising of 81 car spaces. In addition, the reference design includes 10 bus spaces in front of terminal close to Seaworld Drive and indented kerbside spaces that are assumed to be for pick up and set down by ride share/private vehicles and taxis and ten indented bus stops.	Large area of approximately 9100m² for: – 8 coach bays (min. 6 required) – 10 taxi bays – 7 ride share/private vehicle set-down bays (nom. 10 required) – 128 car parking spaces (nom. 120 required) – 16 staff car parking spaces (nom. 15 required) Service road access for taxis possible. CST to ship shuttles (people movers) to be determined.	Very large area of approximately 11,500 m² for: – 10 coach bays – 16 taxi bays – 16 ride share/private vehicle set-down bays – 192 car parking spaces (nom. 180 required) – 28 staff car parking spaces (nom. 25 required) Service road access for taxis possible. CST to ship shuttles (people movers) to be determined.	Large area of approx. 7300m² for: – 8 coach bays (min. 6 required) – 14 taxi bays (min. 10 required) – 3 ride share/private vehicle set-down bays (likely 10 required) – 110 car parking spaces (min. 120 required) – 0 staff car parking spaces (min. 15 required) Service road access for taxis possible. Drop-off within building footprint along Seaworld Drive compromised in area, will need to extend beyond building footprint to the north and into multideck carpark further west. Potential results in the loss of car parking for Sea World.
Environment	Landside components have been positioned to minimise clearing. An area of the dunal vegetation would be impacted. Based on the current reference design (August 2018) approximately 7760m² of coastal dune vegetation, littoral woodland and littoral forest would be impacted excluding areas that may have minor disturbance due to the location of piles or during constructure.	Reduced impact compared to reference design and a reduction in the impact on dune vegetation.	Similar impact to reference design and a reduction in the impact on dune vegetation at the southern end of the site.	Substantial reduction in impact compared to reference design, with the only impact being piles for the jetty structure.
Recreation	The impact on recreation facilities and activities is comparable across all scenarios. In summary impacts would include: – requirement for relocation of the Oceanway – loss or relocation of public parking that supports beach access – loss or relocation of the barbecue area – loss or relocation of public amenities associated with beach access and use including toilets and beach showers – relocation or adjustment of the exercise equipment area. For further detail on recreation considerations refer to Section 5.3.2			
Infrastructure	The proposed scenarios would all have relatively comparable impacts on existing infrastructure and services including, potable water, sewer, stormwater, gas and communications, except for: – a greater demand on sewer capacity in scenario 2B (4000 passenger compared to 2500 passenger) – greater roof and impervious surface area in scenario 2B (4000 passenger terminal) with a greater stormwater management requirement.			
Other community impacts	In all scenarios the Friends of Federation volunteer base and storage would be impacted and would need to be relocated.			
Variation from reference project and design as costed in the business case (landside only)	Additional jetty width where the jetty connects to the terminal to accommodate passenger loading onto transport and prime mover and semi-trailer access. Ramp to enable access to the jetty by very large vehicles.	Additional 70 metres of jetty structure to enable passenger loading beside the terminal building. Additional car parking to service expected pick up and drop off needs (approximately 37 spaces).	Additional terminal building floor space of approximately 1,250m2 to accommodate a 4000 passenger facility. Additional 70 metres of jetty structure to enable passenger loading beside the terminal building. Additional car parking to service expected pick up and drop off needs (approximately 101 spaces).	Increase in building height from 2 storeys to 3 storeys. Additional 180 metres of jetty structure to enable passenger loading beside the terminal building. Additional car parking to service expected pick up and drop off needs (approximately 24 spaces).

5.2 Evaluation of OCST landside elements east of coastal dune

Alternative scenarios for landside infrastructure or the jetty location and design east of the coastal dune system to the high water mark has not been undertaken at this time, but a range of items for further consideration have been identified through the analysis of indicative sections and preparation of a photomontage based on the current reference design.

Given that the same connection point to shore and jetty configuration have been assumed in all scenarios, consideration of this area is not a defining factor in the development of concept options for the master plan at this time. Options and opportunities can be explored during phase three of the master planning process as preferred options for Philip Park are developed.

The master plan consultant team would welcome the opportunity to explore options to reduce the impact of the jetty structure on the coastal foredune area as part of the reference design refinement process. The team believe that there are opportunities to reduce and mitigate impacts.

For example, rotation of the cruise ship terminal in scenario 2A and 2B enables the passenger shore to ship transport loading zone to be move further to the west off the dune system. Further testing and refinement of this option with CoGC would be beneficial.

Preliminary work to support the further consideration of landside impacts over the coastal dune and beach have commenced and include review of the current reference design, a site visit to understand the existing site conditions at the proposed point of connection and the beach profile and the review of similar structures to identify an appropriate case reference.

Reference design – Jetty and landside connection

It is understood that the reference design for the jetty and landside connections has been refined in response to feedback from cruise ship operators.

Figure 5.1 highlights a key change in the reference design that will impact on the consideration of landside elements of the OCST.

In summary, the section of jetty that extends over the coastal dune system and beach above high water mark is now proposed as four lanes rather than two lanes wide. The drawings provided do not indicate what the width of the structure would be, however it is expected to be in the order of 15-16 metres.

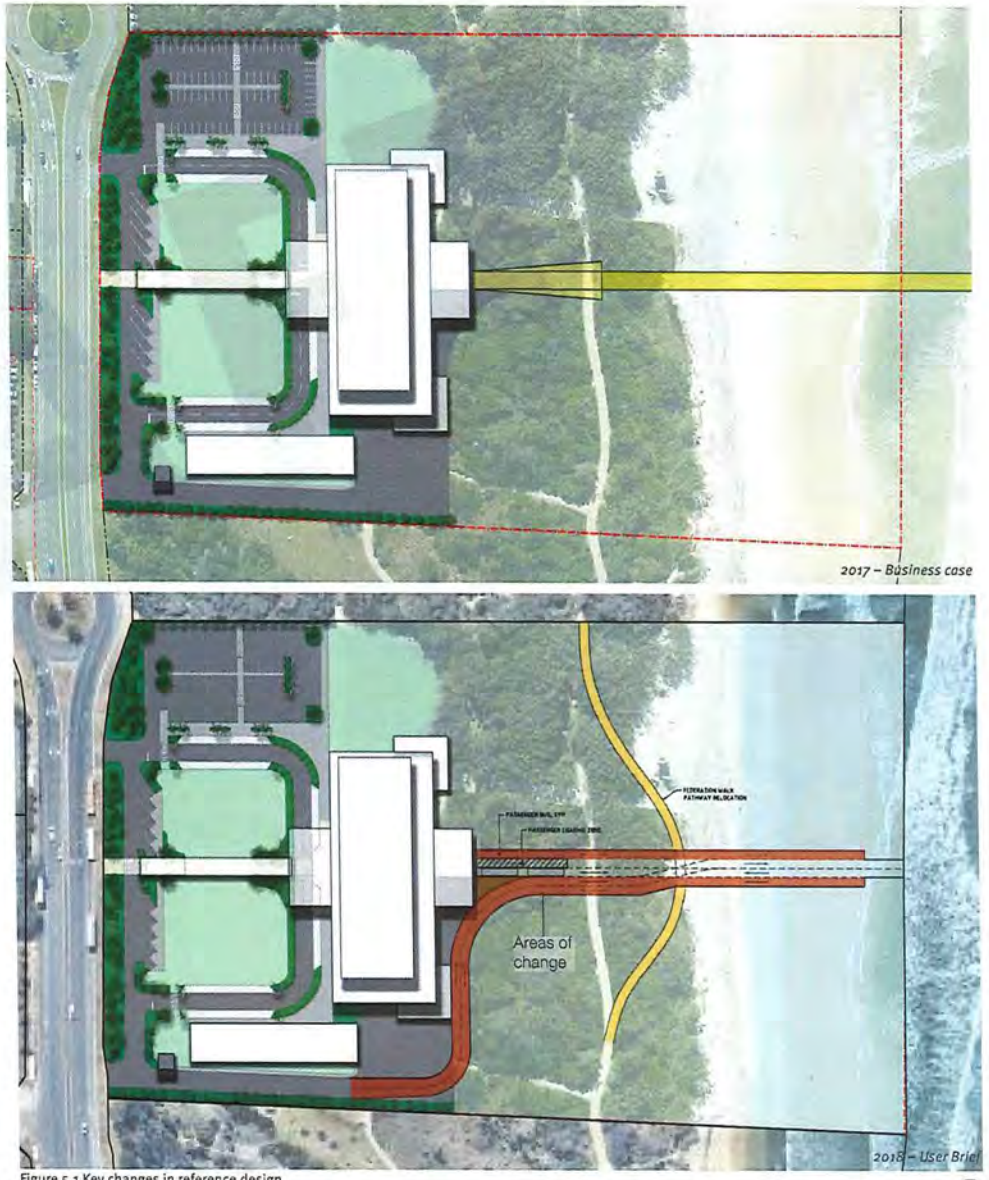


Figure 5.1 Key changes in reference design

1:2,000

The May 2017 reference design had an overall structure width of 8.5 metres comprising of a 7 metre wide roadway, balustrades (0.5m) and a service/ pipes area (1.0m). Drawings indicated that if the long term recycled water release system was added, an additional 2.6 metres would be added to the width.

In addition, an area of ramping from the logistics area up the dune to the jetty has been added. In physical terms this will mean additional disturbance to the dune system and more piles.

Visually the impact within Philip Park is difficult to fully analyse given there is limited information available on the depth of the structure and detailing.

Drawing 60517891-SK-0314 indicates that the piles and headstock would be steel.

The reference design (May 2017 and August 2018) refers to the need for additional longitudinal raking piles approximately every 200 metres. An example of this configuration is shown in Figure 5.3. It is unknown whether a pile grouping of transverse and longitudinal piles would occur within the beach zone above high water mark.

In all scenarios, where the design of the jetty is assumed to be in the same general location, the Oceanway pathway would need to be redirected to ensure appropriate head height clearance can be maintained for all users as shown in the sections compiled from available information (refer Figures 5.4 and 5.5).

Figures 5.6, 5.7 and 5.8 provide an indicative illustration of how a jetty structure might sit in the landscape in the proposed locality.

The potential impact and considerations for recreation use of the beach and Oceanway pathway are discussed in more detail in section 5.3.2.

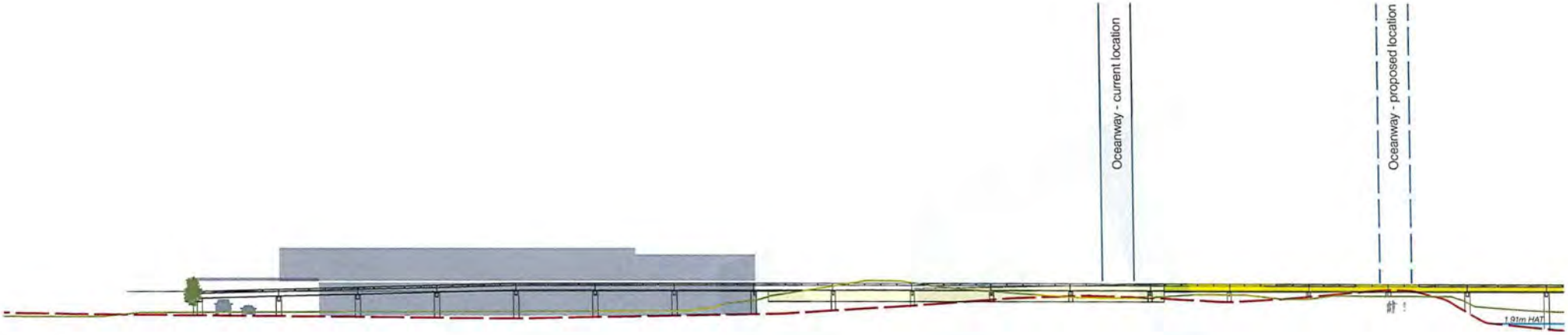
Structural case example - Sand bypass system jetty

For scale and structure comparison, a structural case example has been identified. Based on the description in the business case, the sand bypass pumping jetty is the most relevant structural example for reference (Figure 5.3). The pumping jetty:

- has a skeletal framed structure approximately 490 metres long (380 metres west from the toe of the vegetated foredune)
- is approximately 3 metres wide
- the deck is approximately 5.8 metres AHD
- comprises of both sets of vertical piles and sets with one vertical pile and one raking pile set
- includes longitudinal piles at intervals
- the piles and headstock are coated/painted steel.

Figure 5.2. Approximate location south of jetty structure south of lifesaving tower

Figure 5.3 Sand pumping jetty



Legend

	Approximate terminal building envelope
	Approximate passenger loading area
	'Survey profile' as per 60517891-SK-0312 (ETA beach profile at 06.05.16)
	'1m Contour 2009' as per TASK0143097 / Map 8 (produced by CoGC 16.03.18)
	HAT (1.91m)
	Jetty elevation as per 60517891-SK-0312

Figure 5.4. Section of CoGC proposed cruise-ship terminal through Philip Park - East-west, facing north

1:500

Figure 5.5. Section of CoGC proposed cruise-ship terminal through Philip Park, illustrating impacts on dune environment - East-west, facing north

1:250

Figure 5.6. Perspective of potential OCST jetty configuration as viewed from north

DISCLAIMER: This photomontage depicts an indicative configuration of the OCST jetty in the Philip Park location shown within the CoGC reference design. It has been compiled utilising images of the existing sand pumping jetty, reconfigured to match the approximate dimensions (such as height, length and layout) of the reference design. The image is for illustrative purposes only and has been based on available information, the exact structural specifications of the jetty, such as deck thickness, pile spacing, guardrails and lighting have not been resolved.

Figure 5.7. Perspective of potential OCST jetty configuration over foredunes

Figure 5.8. Section of potential OCST jetty configuration, looking west towards terminal building, indicating approximate jetty connection point

5.3 Specific technical analysis and considerations

This section summarises and extends some of the observations and issues raised in the previous sections in relation to particular technical matters.

Some technical matters are not able to be fully considered at this time given the level of information available. Where relevant this is noted and items for further consideration during the design development phase of the OCST are identified.

5.3.1 Traffic and transport

Traffic and transport will be a key factor in the efficient operation of the OCST in terms of both passenger (arrival and departure) and servicing logistics.

The proposed traffic management approaches outlined in the Business Case (2017) and User Brief and Background Information Report (2018) have been reviewed as part of this consideration.

Assumptions regarding the number of buses, set down space for taxis, ride share and drop off in the User Brief and Background Information Report (page 27-29) have been refined considering a desktop review of:

- the proposed new Brisbane cruise ship terminal
- Overseas Passenger Terminal and Whites Bay Terminal in Sydney
- Hong Kong Terminal
- both the old and new terminals in Singapore (Singapore Cruise Centre and Marina Bay Cruise Centre Singapore).

Reference images of these terminals are shown in Figure 5.9

Traffic and transport assumptions developed by Cambray Consulting have been integrated into the alternative scenarios (2A, 2B and 3) tested in section 4.0.

The following site access and traffic management options have been raised in this report and the alternative scenarios for further testing and consideration:

- access via a signalised intersection servicing the OCST and development to the south of Sea World with provision for pedestrian crossing of Seaworld Drive at grade
- additional bus bays and set down
- additional space for taxi, ride share and drop off
- servicing and logistics access to the north and screened from view
- passenger loading adjacent and integrated into the terminal building.

During the design development phase the following items are raised for further consideration during the design development phase of the OCST project:

- Comprehensive benchmarking against other exemplar Overseas Cruise Ship Terminals with comparable capacity, in terms of the their facilities and operations, adjusted to account for each terminals' unique context. It is noted that some benchmarking has already been undertaken
- OSCT embarkation and disembarkation timetables with respect to the peak (in particular weekend peak) traffic periods on The Spit (including sensitivity of coincident peaks and offset or staggered peaks)
- Minimisation of on-site parking for OSC passengers and identification of potential off-site car parking supported by bus shuttles
- Minimisation of dwell times on site for coaches, bus shuttles, taxis and ride-share vehicles. This will reduce the required hardstand footprint associated with the set-down and pick-up functions. For example remote coach parking and taxi feeder rank and call-up facilities are likely to need to be investigated
- Optimisation of on-site re-supply storage, including refrigerated storage, and potential remote warehousing of foodstuffs, consumables and other materials
- Confirmation of the grading of ramps and swept paths of service vehicles, including connecting to and turning around on the jetty
- Refinement and further capacity assessment of the terminal to ship passenger shuttles and other vehicular traffic using the jetty
- Pedestrian connectivity to nearby tourist attractions such as Sea World, and other attractors like the surf beach, The Broadwater, and retail activities
- Replacement of the general public parking lost at Philip Park elsewhere on the Spit if required
- Possible requirements to limit or charge for parking in the vicinity of the OSCT, if overspill parking issues are anticipated
- Confirmation that the external traffic arrangements will operate appropriately under opening conditions, full master plan conditions and with and without the light rail
- Remodelling of the combination of the OSCT and The Spit Master Plan at full development should be undertaken to assess the cumulative, combined traffic impacts, and to confirm if proposed upgrades to Waterways Drive and the Sundale Bridge are likely to prove adequate or whether additional traffic capacity works are required, if feasible.


White Bay Cruise Ship Terminal, Sydney, Australia


Overseas Passenger Terminal, Sydney, Australia


Brisbane International Cruise Ship Terminal, Brisbane, Australia


Singapore Cruise Centre, Singapore, Singapore


Marina Bay Cruise Centre, Singapore, Singapore


Kai Tak Cruise Terminal, Hong Kong, China

Figure 5.9. Aerial images of cruise ship terminals (source: Google)

1:2000

5.3.2 Landscape and recreation considerations

Overview of Philip Park landscape character and recreation uses

The subject area of Philip Park west of the coastal dune is predominantly parkland comprising an open asphalt car park of approximately 317 spaces and open grassed areas used for picnicking, informal play and other outdoor activities such as 'boot camp' style personal training. An amenities building (refer to Figure 5.10), temporary office and shipping container used by the Friends of Federation Walk community group are also located on the subject area.

The broader park includes a small barbecue area and fixed outdoor exercise equipment. The area immediately to the south of the subject area is vegetated with open grassed areas and pathways. Portions of this section are low-lying forming ephemeral wetlands and overland flow paths in the form of swales.

The landscape character of the park is similar to that of Hollindale Park to the south, and to some extent, Doug Jennings Park to the north, being relatively informal parkland with associated facilities. Generally, level grassed areas occur under the dappled shade of Coastal Sheoaks, Cottonwoods and Tuckeroos providing picnic areas and shaded respite. In the eastern portion of the park, the open parkland character gives way to the heavily vegetated sand dunes which rise up to the coastal walk known as Oceanway before falling again onto the beach.

The southern entry to the Federation Walk coastal reserve occurs at the northern boundary of Philip Park. It is here that the open parkland character of Philip Park gives way to the more natural character of Federation Walk reserve.

Philip Park is primarily used for parking and beach access (refer to Figure 5.11). A patrolled beach is located immediately adjacent to the park supported by an open-air wash down facility (taps and showers) and the amenities block.

The combination of these different uses, including car parking, beach access, shaded picnic areas and other amenities, create a valuable recreation asset for The Spit. Like other beach access areas within the CoGC, they provide valuable access to parkland and beach and ocean access for residents and visitors from a wider catchment area.

Landscape character considerations

Construction of the OCST would result in the northern expansion of development east of Seaworld Drive beyond the Sheraton Grand Mirage Resort. This will result in a change in character in this area of The Spit from predominantly an open green space to an urban space characterised by built form, parking and vehicle movement.

The detailed assessment of the visual impact of the OCST terminal building in the landscape is beyond the scope of this consideration and will depend on the final configuration of the terminal building, other structures, and associated vehicle circulation and parking arrangements. In the current reference design the terminal building is set back from Seaworld Drive with an entry structure, parking and potentially grassed or landscaped area forward of the building. These elements would be prominent in views from Seaworld Drive.

Sectional analysis (combining the reference design site plan, jetty elevation, contours drawn from CoGC base mapping for The Spit and existing ground truthed vegetation), show that given the position of the jetty and height of the dunes it is unlikely that the terminal would be visible from the beach immediately adjacent to the site (refer to Figures 5.4 and 5.5). The passenger loading area is likely to be visible from the immediate beach area but would be less visible or not at all visible in long views along the beach from the north (e.g. from the seaway training wall) or south.

It is noted that the terminal is intended to have upper level views of the Pacific Ocean. Combined with minimum ground floor heights to establish an appropriate level of flood immunity (yet to be confirmed), this requirement may result in a higher building or changes to the ground level in the vicinity of the terminal building and jetty access ramps.

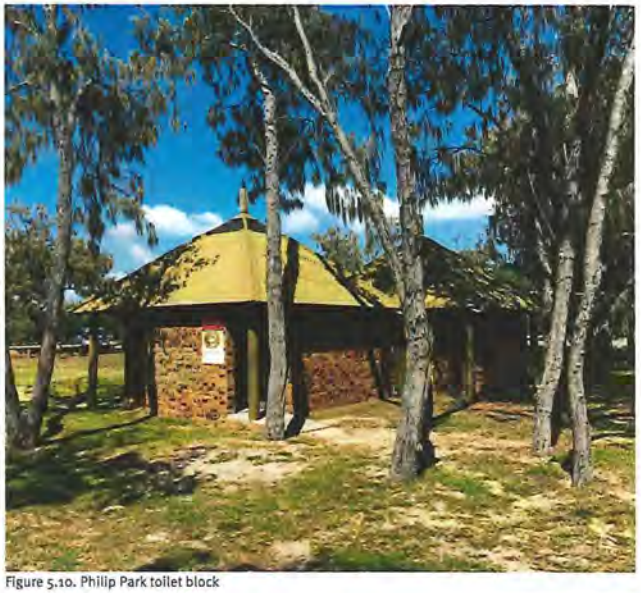


Figure 5.10. Philip Park toilet block

Figure 5.11. Beach access from Philip Park car park

In the immediate landscape, impacts on landscape character and visual amenity could occur from:

- back of house logistics and servicing areas
- the access road that ramps up to the jetty to provide access for service vehicles
- the terminal building and structures associated with the passenger loading area
- jetty piles and structure
- the realignment of the Oceanway pathway
- security fencing.

Section 5.2 has considered the impact of OCST infrastructure east of the dune system.

Coastal dunes make up a significant part of the eastern portion of Philip Park. It is within this dunal system that the sealed pedestrian and cycle pathway known as the Oceanway is located. The Oceanway provides pedestrians and cyclists with glimpses of the beach and into the hind-dunes. Oceanway is, for the most part, constructed at the highest elevations of the dunal system and in this location presents the opportunity for users to experience a more "natural" landscape with fringing vegetation either side.

The proposed location and level of the OCST jetty would necessitate the re-location of the Oceanway pathway in this section of Philip Park. The reference design shows the Oceanway moving to the east. In this location the new path would need to be lowered in elevation to provide clearance for pedestrians and cyclists under the jetty structure as illustrated in the sections (refer to Figures 5.4 and 5.5).

As currently proposed, the realignment and releveling of the Oceanway pathway would require significant earthworks to be undertaken within the sensitive dunal system impacting on existing vegetation. Further consideration of relocation options for the Oceanway pathway is required.

Landscape character and amenity near the OCST would be altered in both the immediate environs and broader landscape, from natural beach and dunes to a commercial, car parking and infrastructure area. The size of the jetty, wharf, breakwater, and cruise ships themselves, will ensure that it is seen from multiple receptors. The jetty will have the effect of visually and physically breaking up a long expanse of uninterrupted coastline and will be visible from a number of public vantage points to the north and south.

The jetty design over the dunes and beach will have as strong physical presence and could be designed to contribute to the experience of beach users other than just for shade.

Strategies to minimise the impact of infrastructure on the landscape and coastal experience could be considered and may include the following:

- landscape buffering around on-shore components particularly back of house logistics and service areas
- limiting building heights and the incorporation of architectural materials, finishes and treatments that complement the coastal setting
- edge finishes and treatments to the jetty that give it a more aesthetically pleasing 'architectural' appearance rather than an 'engineered' one
- the function and finishes of the underside of the jetty over the dunes and beach (e.g. opportunity for public art or temporary uses)
- adequate and safe access (including disabled access) under, through or around the infrastructure that does not diminish a visitor's experience on The Spit
- adequate consideration given to the personal safety and security of site users in the vicinity of the OCST and its associated infrastructure.

Parkland and open space planning considerations

The OCST reference design (August 2018) would result in a net loss of approximately 25.4 hectares of open space zoned land assuming that areas outside the development footprint to the east along the dunes is retained in the open space zone.

The CoGC Local Government Infrastructure Plan (LGIP) includes the subject site as an existing trunk park and community facility. The subject area is not identified in the public parks and land for community facilities schedule of works.

Further consideration of the implications of the removal of approximately 25.4 hectares of land from the LGIP in terms of district and city park demand and supply is recommended.

Recreation use considerations

As previously noted, the combination of a range of different uses, including car parking, beach access, shaded picnic areas and other amenities, create a valuable recreation asset for The Spit. There is a high level of connection between on-shore and water-based recreation uses.

Following is an overview of potential impacts and considerations for recreation uses in Philip Park and the immediate beach area. Consideration of the impacts of the jetty, wharf and breakwater structures on water-based recreation activities is beyond the scope of this analysis but are noted for further consideration as appropriate by the department.

Park recreation uses (west of dune system)

As previously noted the subject area of Philip Park has the following specific park recreation assets that would be impacted by the development of the OCST:

- barbeque and picnic tables (unshaded)
- toilets
- outdoor showers.

The exercise equipment area is substantially outside the assumed development footprint of the OCST.

Section 3.6 of this report details current uses and activities in Philip Park. The CoGC user surveys in January/ February included one observation vantage point to the south of the exercise equipment. It is not possible to draw conclusions about the intensity of use or value of Philip Park as a recreation asset from the user surveys. The use of existing picnic tables in the area may also be lower than in other comparable locations as there is no built shelter and limited shade from established trees (refer to Figure 5.12).

Parking for beach access

A primary function of the park is to support access to the adjacent patrolled beach.

The OCST proposal would remove approximately 317 public car parking spaces from Philip Park. The loss of this parking may discourage use of the beach by the general public and place greater demand on facilities elsewhere on The Spit. The removal of public car parks could mean the patrolled surf area needs to be relocated.

No offset parking elsewhere is included in the current OCST reference project or design. It is unknown if parking would be available to users outside of times when a cruise ship is berthed. This issue requires further consideration in the design development phase of the OCST project.

This potential impact requires further consideration during the preparation of the final master plan for The Spit and in consultation with COGC to understand strategic park planning implications in terms of city-wide beach access and parking strategies.

Walking / cycling (west of dune and on dune)

The Oceanway pathway currently continues north-south on the eastern edge of Philip Park within the dune area in the subject area and is a formed concrete pathway (refer to Figure 5.13). An unformed gravel and natural surface pathway extends from Philip Park to the south connecting with the Oceanway pathway just north of the Sheraton Grand Mirage Resort. The Federation Walk pathway commences from the Philip Park car park and extends north. These two pathways are not directly connected.

The proposed location of the OCST in Philip Park disrupts several existing pedestrian and cycle pathways and will necessitate the construction of new path connections. Earthworks and the removal of vegetation in sensitive dune areas are likely to be required.

The reference design for the OCST seeks to maintain public thoroughfares and preserve foredune and dune vegetation. Issues with the realignment of the Oceanway pathway are highlighted by the sections of the jetty and beach (refer Figures 5.4 and 5.5).

Informal walking on the beach will not be significantly impeded by the OCST jetty although the user experience in the immediate vicinity of the jetty will be altered. As noted elsewhere (refer to section 5.2) the width, pile locations and treatment of the edge and underside of the jetty will influence the visual impact and potential safety of users. These issues should be considered and addressed during the design development phase.

Figure 5.12. Philip Park barbecue facilities

Figure 5.13. Oceanway path

Beach use (west of HAT)

Piers for the OCST jetty structure will occur across the beach which may limit recreational uses in the immediate vicinity of the jetty. The jetty structure of the OCST will cast shade onto the beach which may be utilised by some beach users.

As noted, walking and other informal uses will not be substantially limited by the OCST jetty over the beach assuming that adequate clearance is maintained below the structure.

If sand does accrete on the beach behind the breakwater the removal of sand to maintain safe head clearance along a section of the beach above the highest astronomical tide (HAT) may be required. The profile of the beach is also subject to other seasonal and weather events.

It is unclear how the OCST proposal would affect public access to the existing patrolled beach at Philip Park. It is assumed that cruise ship passengers would be encouraged to use a patrolled beach immediately adjacent to (or as near as practicable to) the cruise ship terminal as part of their Gold Coast experience. While it is recognised that there are economic advantages to cruise ship passengers dispersing across the Gold Coast, providing beach access and a safe swimming zone in the immediate vicinity of the OCST may retain some passengers on The Spit and reduce demands on traffic and transport infrastructure.

There is a risk that large numbers of cruise ship passengers may displace local beach users and other tourists from the Philip Park section of the beach. Conversely, the OCST may provide superior facilities to those that currently exist in Philip Park and attract a larger number of local beach users and non OCST tourists. The greatest impediment to continued use of the beach and ocean by persons other than cruise ship passengers would be the loss of public parking and public amenities such as showers and toilets if not replaced or provided for in the proposal.

Water-based recreation activities (east of HAT)

While not within the scope of this consideration Table 5.2 outlines the range of water-based uses that may be impacted.

Table 5.2 Water-based recreation activity considerations

Water-based recreation activity	Comment
Swimming	Structural elements of the OCST such as the breakwater and piers may affect the open beach surf break of The Spit. It has been argued that swimmers may benefit from a calmer ocean swimming environment.
Surfing	It is expected that surfers will be restricted from entering operational areas of the OCST when a cruise ship is berthed. The Ocean-side Cruise Ship Terminal Business Case (2017) suggests that the proposed OCST breakwater will create a 'benign wave environment inside the breakwater' (p 86) and provide 'shelter from harsh waves' (p 105). It also states that 'the physical development of the OCST may change the nature of coastal processes, impacting the sand budgets and surf breaks. Surfers may be negatively impacted and forced to find another location with desired surfing conditions.' (p 106).
Diving	Structural elements of the jetty, wharf and breakwater may provide fish habitat attractive to dive tourism. The OCST reference project design incorporates a 'potential additional scope item' being a diving platform approximately 750m from shore providing dive access to the Scottish Prince wreck dive site. It should be noted that the Ocean-side Cruise Ship Terminal Business Case (2017) states that the dive platform would only be available for use when there is no cruise ship docked at the wharf. Given that the business case cites 212 cruise ship calls per annum as the facility's maximum capacity, public access to the proposed diving facility may be limited.
Fishing	The OCST over water facilities may provide recreational fishing opportunities similar to those provided by the existing sand pumping jetty. Structural elements of the OCST including the jetty, wharf and breakwater may provide fish habitat. Public access to the OCST jetty may be restricted to 'non-ship' days making access by the public irregular and uncertain.
Boating	The Ocean-side Cruise Ship Terminal Business Case (2017) states that the OCST development may create potential navigational issues for smaller vessels. This will likely effect diving and fishing vessels.

5.3.3 Environmental considerations

Environmental matters have been considered by the CoGC as part of the development of the reference design project for the OCST. This consideration of environmental matters as part of phase two the master planning process, focuses on terrestrial (land) flora and fauna. Coastal protection and management matters have not been reviewed as part of this consideration.

A survey and assessment of the terrestrial ecology values within Philip Park on Lot 3 on SP104014 (see Figure 2.1) and assessment of surrounding habitats with potential to be indirectly impacted by the CoGC ocean-side cruise ship terminal was completed by BAAM Pty Ltd in 2017.

As part of the master planning process S5 Environmental has also undertaken field observations within the proposed OCST site to identify potential environmental opportunities and constraints.

Figure 5.14. Coastal dune in subject location

Flora

The primary vegetation communities on the subject site as documented by BAAM (2017) include:

- a coastal foredune complex to the east of the Oceanway pathway dominated by Casuarina equisetifolia (Coastal She-oak) with a ground layer of Spinifex sericeus (Beach Spinifex), Carpobrotus glaucescens (Coastal Pigface) and other common coastal ground creepers and grasses with a sparse shrub layer dominated by Acacia sophorae (Coastal Wattle) and Macaranga tanarius
- littoral woodland to the west of the Oceanway pathway generally dominated by Casuarina equisetifolia (Coastal She-oak) with Banksia integrifolia, Melaleuca quinquenervia (Paperbark) with a sparse shrub layer (Acacia sp) and sparse ground layer with an overall minimal species diversity
- grassland with scattered shrubs and trees close to parking areas, picnic facilities, the exercise equipment area and to the southeast of the subject area.

Littoral forest extends from the north west corner of the site (north of the vehicle entry) into the Federation Walk coastal reserve.

Both the BAAM (2017) and S5 Environmental (2018) investigations have concluded that:

- the site does not contain remnant vegetation
- no flora species listed as threatened or near threatened flora species either under the Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act) or Queensland Nature Conservation Act 1992 (NC Act) are evident
- exotic weed species are evident.

Considering the current reference design, areas of coastal foredune, littoral woodland and littoral forest would be directly impacted as shown in Figure 5.14. Figure 5.15 includes those areas that could be considered assessable vegetation under the City Plan based on the vegetation management overlay map and the definition of assessable vegetation. The estimated area of vegetation clearing that would be required is approximately 7760m².

Fauna

To supplement desktop reviews of available fauna databases and migratory shorebirds survey data, BAAM Pty Ltd undertook a 2-day general terrestrial ecology field survey in April 2017. During this survey a total of 47 terrestrial vertebrate fauna species (including 44 bird and 3 reptile species) were recorded. No threatened or near threatened species fauna species were recorded.

One threatened species, the Grey-headed Flying-fox has potential to occur but there is no flying-fox camp on The Spit. This species therefore has potential to occur only as a rare seasonal visitor to flowering trees in the littoral forest (BAAM, 2017).

No migratory shorebird species listed as threatened species were identified in the subject area.

Based on available information at the time of the BAAM report, it was noted that while endangered and vulnerable species of turtles were known to nest on South Stradebroke Island, no marine turtles were known to have nested on Main Beach.

However, the CoGC has provided the master planning consultant team with reports of turtle nesting sites on Main Beach.

S5 Environmental (2018) has therefore concluded that the beach adjacent to the subject site may provide for turtle nesting.

In summary, while existing vegetation and the dune system may provide some habitat value for threatened or migratory species, no critically endangered, endangered or vulnerable fauna species were recorded and are likely to be directly impacted by the landside infrastructure of the proposed OCST.

Measures to mitigate impacts on nesting turtles during the construction and operational phases of the OCST should be considered.

Environmental matters of significance and approvals

The ocean-side cruise ship terminal project will require a number of approvals under Queensland and Australian Government legislation.

Matters of national environmental significance

An assessment of the likelihood and potential significant impact of the OCST proposal on matters of national environmental significance protect under the Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act) was undertaken by AECOM Australia Pty Ltd in 2016. Both a desktop assessment and field work were undertaken to support this consideration.

The CoCG received a referral decision on 15 May 2017 from the Australian Government that the proposed action to develop an ocean-side cruise ship terminal at Philip Park is not a controlled action if undertaken in a particular manner.

Particular measures must be undertaken to avoid significant impacts on listed threatened species and communities and listed migratory species. These measures relate to mitigating potential impacts from noise from piling activities during construction and mitigation and management measures regarding vessel strike during construction and operation.

No on-shore or land specific measures were included in the EPBC referral decision.

Matters of state and local environmental significance

City Plan overlay mapping, as shown in Figure 3.13 includes areas mapped as follows:

- matters of state environmental significance (MSES) – Priority species – State significant species
- matters of local environmental significance (MLES) – Vegetation management – General priority vegetation.

Existing ecological reports will support the consideration of these values during the design development and approvals phase but further environmental assessments and a vegetation management plan are likely to be required as part of a state assessment process for project approval.

It is expected that measures to minimise impacts on flora and fauna during both the operational and construction stages will be required, including rehabilitation strategies.

Figure 5.15 Potential areas of vegetation clearing

5.3.4 Infrastructure considerations

This analysis has focused on confirming infrastructure and services currently available in proximity to the subject site and the likely demands of the OCST considering information provided by CoGC for the master planning process and as part of the OCST documentation.

It is noted that the OCST project has not progressed through the design development phase at this time and that infrastructure and servicing would be further refined and capacity investigated in detail as part of this process.

Existing infrastructure and services

As shown in Figure 5.16 a number of trunk services are located within the Seaworld Drive road reserve adjacent to the subject site including:

- water (trunk – western side)
- sewer (trunk – Coombabah catchment – eastern side)
- gas (eastern side)
- electrical (western – extent of eastern line requires confirmation)
- communications (western side – Optus and Telstra).

Additionally, an existing 1200mm diameter trunk recycled water release pipeline is located on the eastern side of Seaworld Drive. This line continues to the southern discharge point in the Gold Coast Seaway and forms and important part of the CoGC's sewer network.

Stormwater lines associated with road drainage are located within Seaworld Drive to the north (discharge point unknown and unclear) and to the south discharging to The Broadwater.

OCST infrastructure and servicing requirements

Table 5.3 summarises the expected infrastructure and servicing requirements of the landside terminal and services that are likely to be required on the jetty and wharf for the servicing of cruise ships based on the current reference design provided by CoGC.

These requirements have been determined from the latest information available in the User Brief and Background Information Report (August 2018). This report includes feedback from interviews with cruise ship and terminal operators.

While this consideration is predominantly limited to landside infrastructure, cruise ship requirements that need to be provided for in the jetty and wharf structure will have landside connection and possibly implications on the design of the jetty structure and land connection.

Table 5.3 OCST infrastructure and servicing requirements

Service	Terminal	Jetty/ wharf	Comment
Potable water	Required	Provision for supply required.	
Sewer	Required	Not required	Business case and User Brief and Background Information Report indicates no-shore treatment or disposal required.
Electrical	Required	Not required for ship servicing but likely to be required for lighting and equipment on the jetty and wharf.	
Gas	Unknown	Unknown	
Communications	Required	Unknown	
Stormwater	Required	Unknown but stormwater and spill management planning required.	
Waste disposal	Required	Required – jetty to accommodate tankers for sludge waste.	The current reference design includes two way access for vehicles to the jetty. The reference design vehicle size is unknown.
Fuel supply	Fuelling of passenger transport likely to be offsite but confirmation required.	The business case assumes that fuel supply will be by barge.	

Infrastructure considerations

As noted, detailed analysis of infrastructure and servicing requirements can only be undertaken once the reference design is progressed through design development. Following are preliminary comments on service connection and capacity.

Connection

Connection to water, sewer, electricity and communications services from the site is expected to be possible.

Capacity

Information has not been received from CoGC on the existing water and sewer capacity or issues for consideration as part of the master planning process.

Robert Bird Group calculated demand from the current planned land use under the Gold Coast City Plan for water and sewer infrastructure in phase one of the master planning process. It is noted that the CoGC Local Government Infrastructure Plan (LGIP) 2018 assumes minimal population growth in the Main Beach statistical area to 2031 with an increase of 540 persons. Non-residential floor space is estimated to increase by nearly 30 percent to 2031.

The requirement for augmentation of service capacity is unknown at this time.

Further information from CoGC on the current capacity of infrastructure, along with estimates of the cruise ship terminal demand and the demand from the proposed development potential of The Spit under the master plan should be considered in phase three of the master plan process prior to finalisation of the preferred master plan to determine if augmentation of service capacity is required.

Stormwater management

During the detailed design phase, particular attention should be given to stormwater management planning and design given the current lack of stormwater infrastructure in the vicinity of the subject site.

With an approximate roof and impervious area of 1.8 hectares, additional areas may be required to be included in the development footprint to adequately manage the quantity and quality of stormwater. The application of best practice water cycle and stormwater management design principles should be considered in the design development process for the OCST including opportunities for the collection and reuse of stormwater.

Trunk recycled water main

The exact location and depth of the trunk recycled water main adjacent to the subject site is not know at this time.

It is expected that vertical and/or horizontal clearance may be required to this important piece of city infrastructure and that this would be considered as part of the design development phase.

Figure 5.16 Existing infrastructure and services

5.3.5 Other considerations

There are a range of other considerations that may influence further development of the OCST reference project and design that relate to opportunities that the OCST may present to users outside of operational times. Opportunities (such as those identified below) could be further explored in the next stage.

Shopping / retail

Retail facilities provided to cruise ship passengers may be made available to the general public during non-ship days. It remains unclear as to how the general public would be informed about ship arrivals and departures and whether uncertainty around access to OCST facilities would discourage use of this area.

Sightseeing / tourism

The OCST pier will potentially provide off-shore vantage points valuable for sightseeing similar to those provided by the existing sand pumping jetty.

The Ocean-side Cruise Ship Terminal Business Case (2017) refers to the proposed jetty and wharf as a 'new public amenity' (p 105) and the reference project design incorporates, as a potential additional scope item, a viewing platform on the jetty approximately 300 metres from shore. A pedestrian walkway, separate to the jetty, may provide access to the viewing platform.

The business case suggests that the jetty will only be accessible to the general public during 'non-ship' days. Given that the business case cites 212 cruise ship calls per annum as the facility's maximum capacity, public access to this facility may be limited.

6.0 RECOMMENDATIONS

Consideration of the proposed ocean-side cruise ship terminal as part of phase two of the master planning process has involved the evaluation of the current CoGC reference design and three other scenarios as developed through the consultation and technical evaluation process.

This section outlines the master plan consultation team's recommendation in terms of the concept options that should be considered in the next phase of the project and identifies key principles that aim to ensure the proposed OCST is integrated with and contributes positively to The Spit.

6.1 Concept option recommendations

This analysis and evaluation has determined that a cruise ship terminal location west of Seaworld Drive has a number of challenges resulting from the smaller site area, location across Seaworld Drive and distance from the offshore cruise ship jetty. This creates a number of issues:

- a taller, three-storey building is needed
- there is poor separation of services and passenger access
- baggage drop-off and the baggage hall are likely to be on different levels, requiring additional service lifts and travelators
- large jetty with potentially a two-level bridge or high-level bridge across Seaworld Drive
- required parking and drop-off is compromised in use and too small.

In this option there is need to extend parking into an adjacent (temporary at-grade or multi-deck) carpark. This would require the multi-deck carpark to be built at the same time to attain the required level of parking from the onset of services.

On the basis of the significant challenges associated with the site on the western side of Seaworld Drive, it is recommended that only the two options to the east of Seaworld Drive be developed for inclusion in the public consultation Process. Further consultation with CoGC is recommended to identify strategic connections and refinements that may be considered during both the master planning process and the CoGC cruise ship terminal project development phase should the project proceed.

The investigations contained in this report show that a cruise ship terminal location east of Seaworld Drive contains the best opportunity to minimise land based impacts and maximise planning opportunities associated with The Spit. Reviewing different sizes for the cruise ship terminal has allowed a realistic evaluation of the likely land side planning and urban design requirements for integration and further consideration as part of the master planning process.

6.2 Principles for consideration as part of phase three of the master planning process and the OCST design development phase

Consideration of the OCST and the development of concept options for The Spit Master Plan during phase two of the master planning process has occurred in parallel.

A set of simple design principles are proposed for consideration by the department and CoGC to guide the next phase of work on concepts for the OCST as part of the master plan process.

Key principles for consideration of the OCST during the refinement of the master plan reference design are as follows:

- strong urban address and built form to Seaworld Drive to encourage a similar response on the western side of the street
- building placement close to Seaworld Drive allowing a maximum setback from the beach and foredunes
- building placement to maximise views from Seaworld Drive to foreshore and beach
- building frontage close to, visible and readily accessible from Seaworld Drive, preferably on the approach side (southern side) of the building
- provision for an at-grade pedestrian crossing point across Seaworld Drive
- building and infrastructure (i.e. jetty) placement and configuration to minimise and mitigate impacts on the dune system and beach.

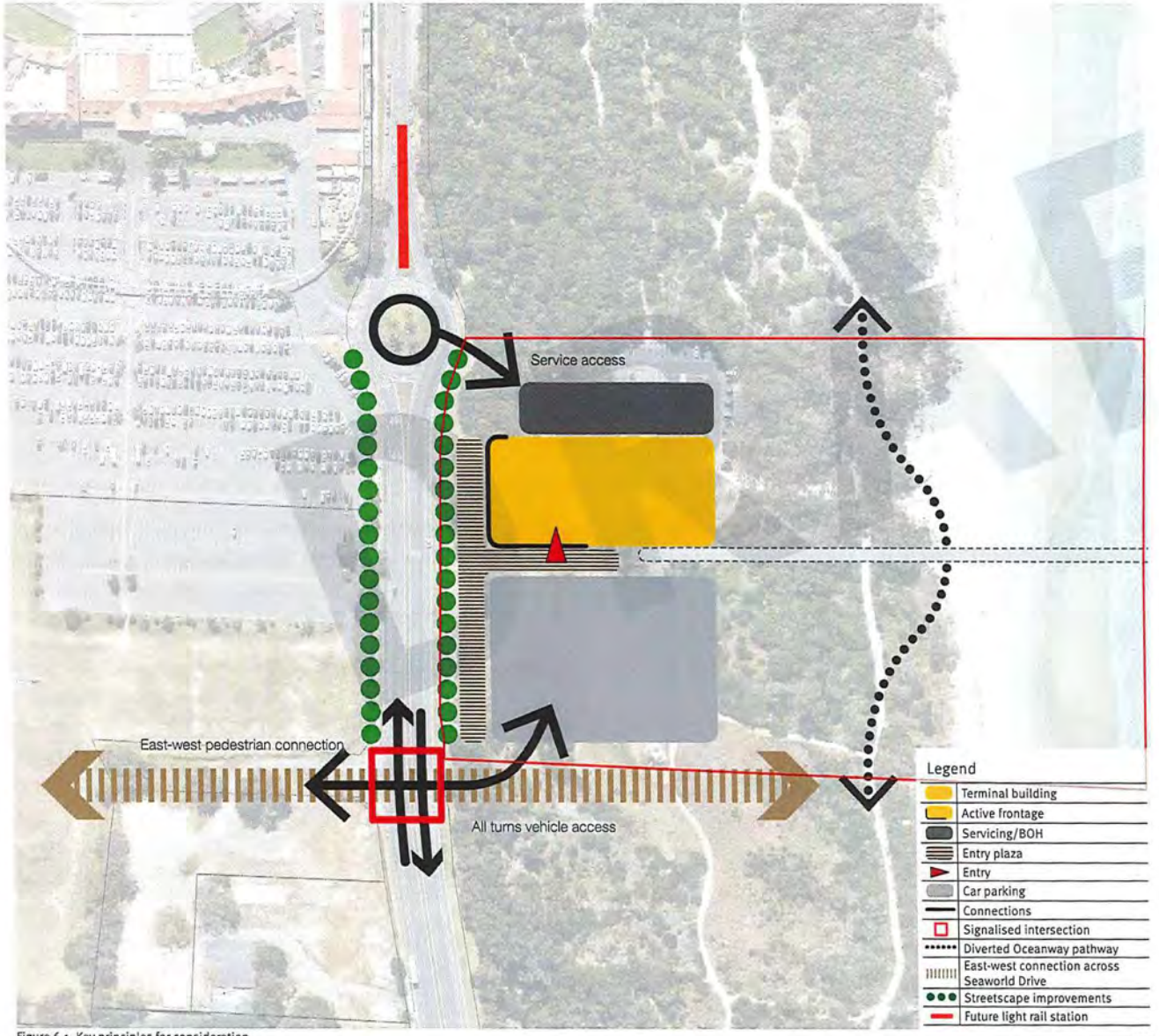


Figure 6.1. Key principles for consideration

6.3 Other considerations

The following items are raised for consideration during phase three of the master planning process as these may have material affect on the preferred master plan.

- Potential site access and movement (vehicles and pedestrians).
- Potential light rail corridor requirements/impacts on site access and the frontage.
- Relocation of the Oceanway pathway.
- Loss or relocation of public parking that supports beach access.
- Relocation of the Friends of Federation volunteer base and storage.
- Potential relocation of the exercise equipment area.

A better understanding of the loading/logistics and movement between the building and jetty is also necessary, especially if a larger terminal is needed to support future growth and further consideration of the OCST is to be undertaken during phase three of the master planning process.

The following items are raised for further consideration during the design development phase for the OCST:

- traffic impact mitigation strategies and works
- security fencing to logistics area and service vehicle jetty access
- the appropriate treatment of low height under-croft areas to address potential safety and security issues
- lighting design and management to minimise impacts on fauna
- vegetation management and rehabilitation
- infrastructure connections and relocations if required
- existing stormwater management arrangements.

Additionally, further consideration of coastal management and erosion processes are expected to be required as part of the further investigation of the OCST.

While it is argued that the breakwater component of the OCST may ameliorate erosion and result in accretion, the implications for landside uses to the north and south of the site should be considered.

REFERENCES

AECOM (2018) Spit, Southport – User Surveys, January & February 2018.

AECOM (2016) Ocean-side Cruise Ship Terminal: Matters of National Environmental Significance.

BAAM, (2017) Terrestrial Ecology Assessment Gold Coast Cruise Ship Terminal, Main Beach.

CoGC (2018) Ocean-side Cruise Ship Terminal (OCST) User Brief and Background Information Report, Final V1 August 2018.

PWC (2018) Project Update Report 13 March 2018

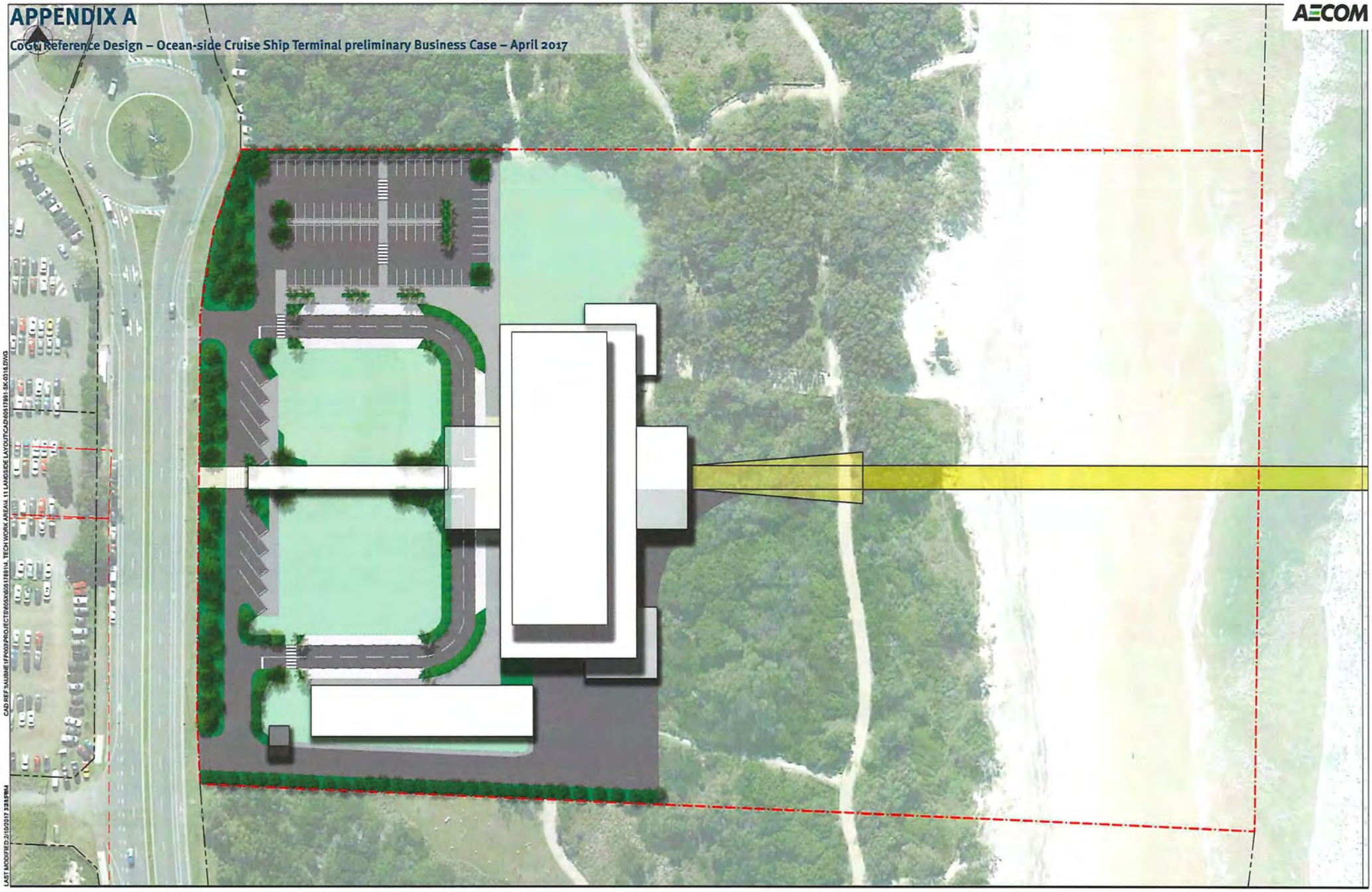
PWC (2017) Ocean-side Cruise Ship Terminal Business Case, Final Draft May 2017.

APPENDICES

APPENDIX A

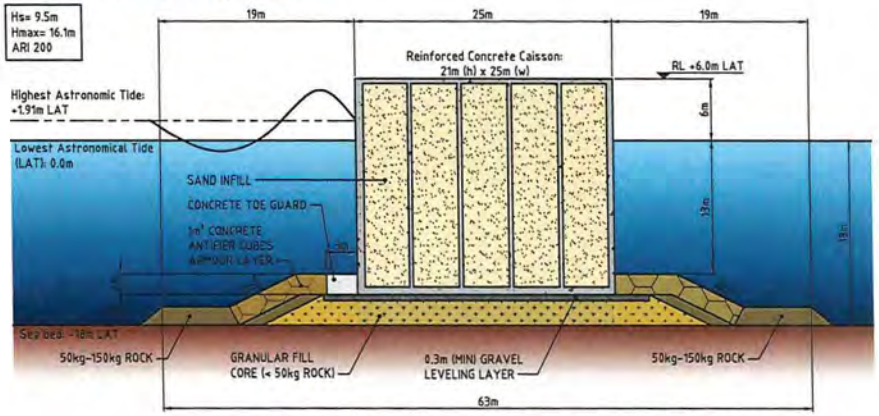
COGN Reference Design – Ocean-side Cruise Ship Terminal preliminary Business Case – April 2017

AECOM

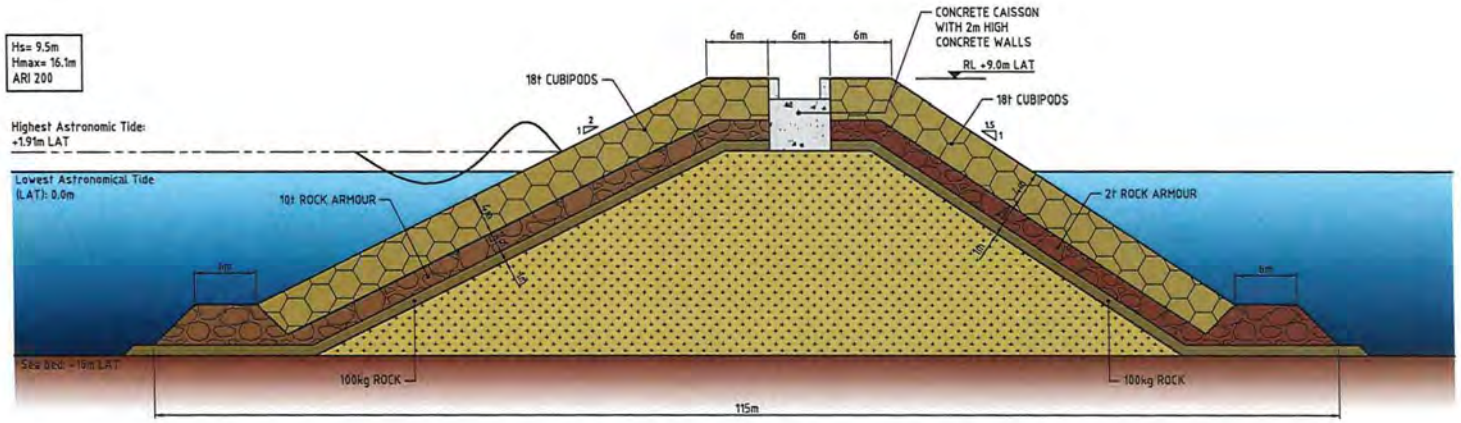


OCEAN-SIDE CRUISE SHIP TERMINAL
LANDSIDE LAYOUT OPTIONS

60517891-SK-0316



PREFERRED OPTION: DETACHED BREAKWATER – CAISSON BREAKWATER

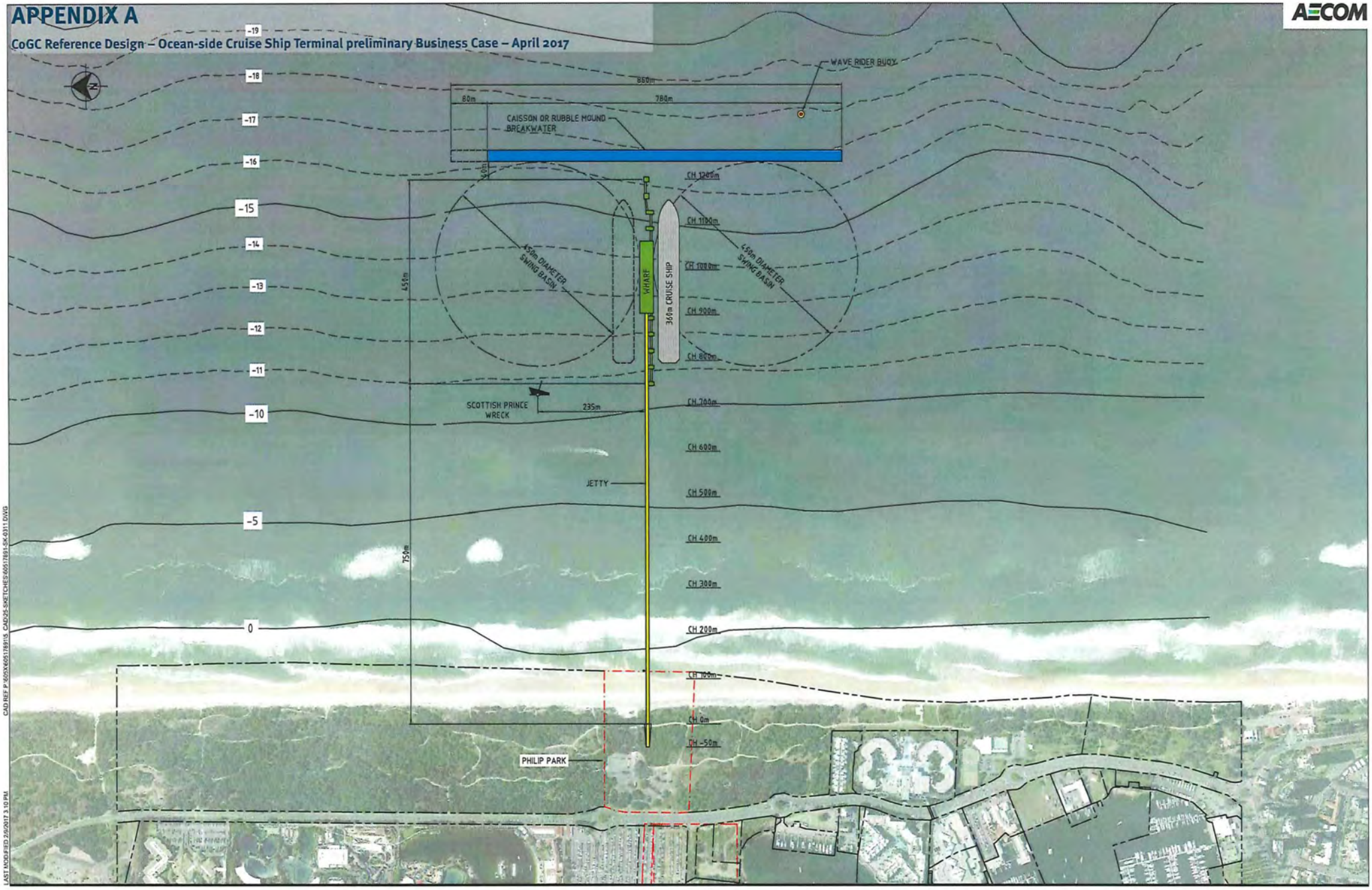


ALTERNATIVE OPTION: DETACHED BREAKWATER – RUBBLE MOUND BREAKWATER

APPENDIX A

CoGC Reference Design – Ocean-side Cruise Ship Terminal preliminary Business Case – April 2017

AECOM



OCEAN-SIDE CRUISE SHIP TERMINAL
GENERAL ARRANGEMENT
PREFERRED LAYOUT - HOMEPORT OPTION
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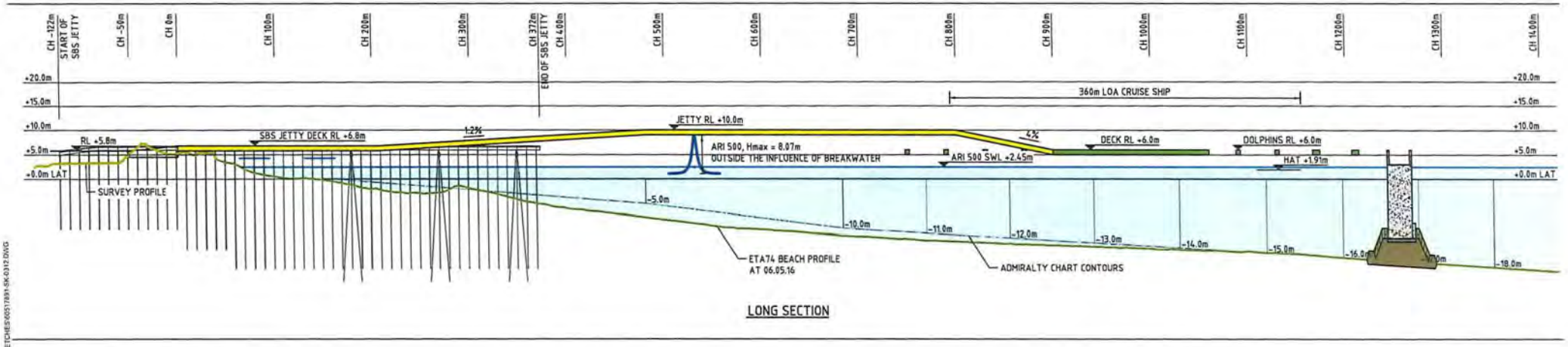

LONG SECTION

OCEAN-SIDE CRUISE SHIP TERMINAL
LONG SECTION
PREFERRED LAYOUT - HOMEPORT OPTION
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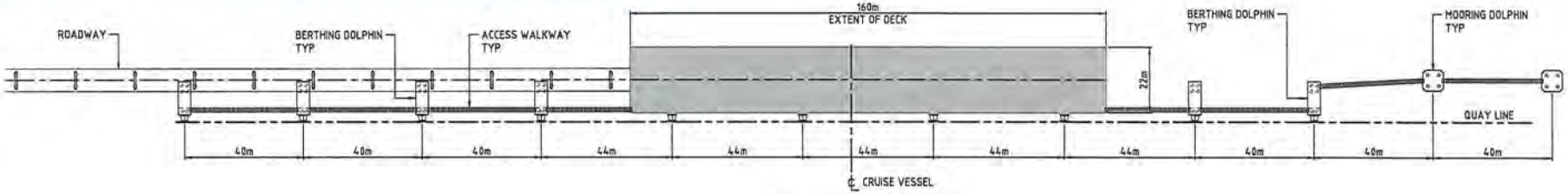

PLAN – WHARF STRUCTURE
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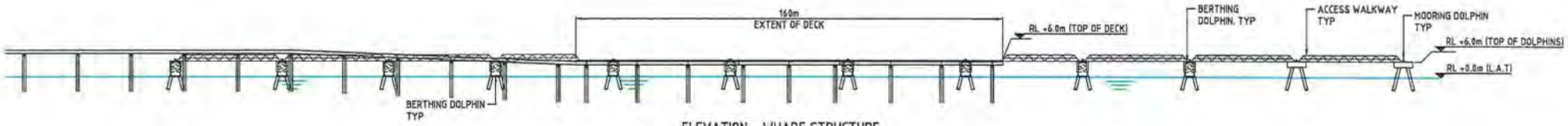

ELEVATION – WHARF STRUCTURE
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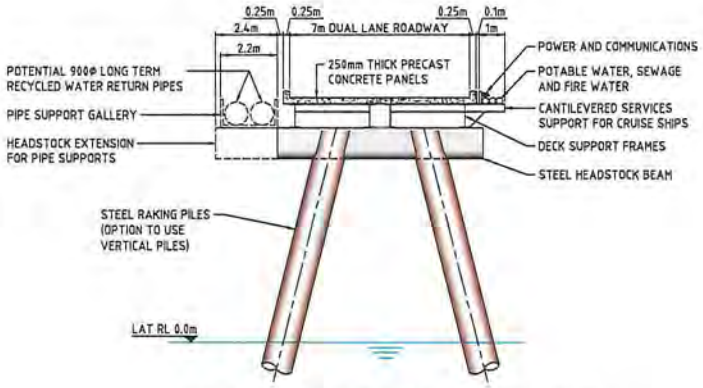
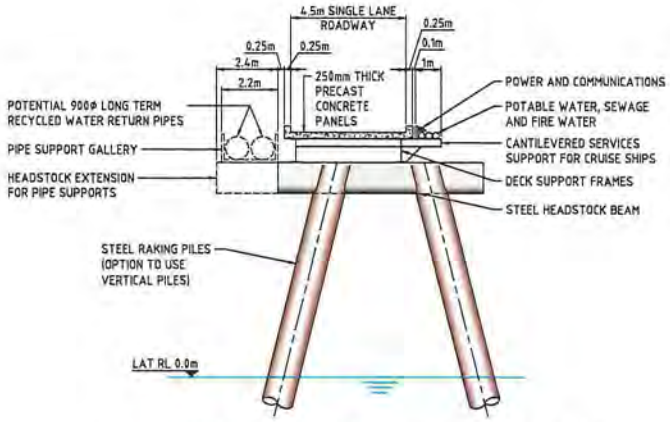


CROSS SECTION – JETTY ROADWAY 7m WIDE ROADWAY
SCALE 1:100



CROSS SECTION – JETTY ROADWAY 4.5m WIDE ROADWAY
SCALE 1:100

OCEAN-SIDE CRUISE SHIP TERMINAL
PLAN & SECTIONS
PREFERRED LAYOUT - HOMEPORT OPTION
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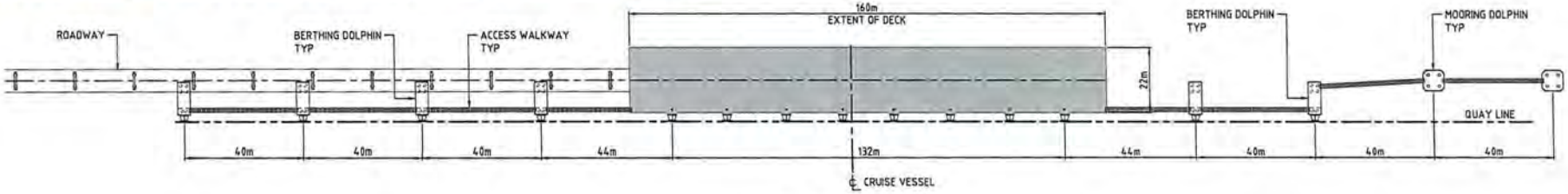
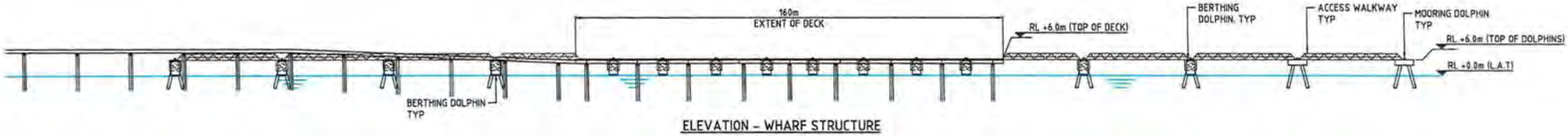
APPENDIX A

CoGC Reference Design – Ocean-side Cruise Ship Terminal preliminary Business Case – April 2017

AECOM



PLAN – WHARF STRUCTURE
SCALE 1:750



ELEVATION – WHARF STRUCTURE
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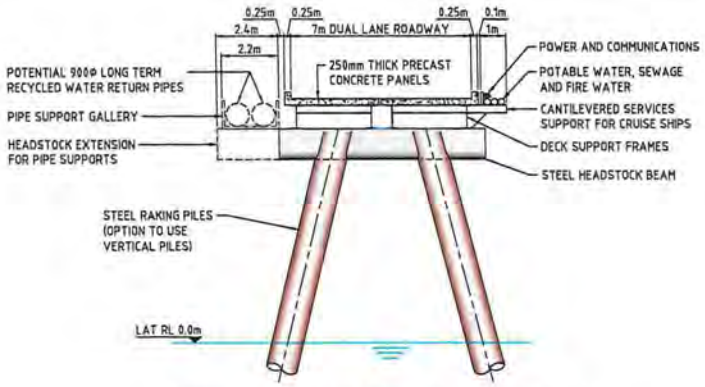

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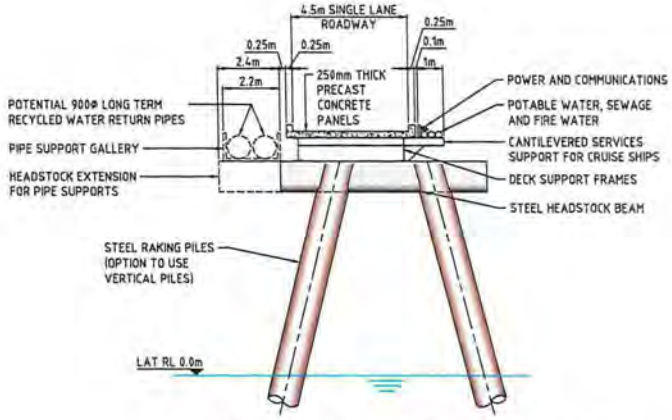
SCALE 1:100



CROSS SECTION – JETTY ROADWAY 4.5m WIDE ROADWAY
SCALE 1:100

B

OCEAN-SIDE CRUISE SHIP TERMINAL
PLAN & SECTIONS
PREFERRED LAYOUT - HOMEPORT OPTION
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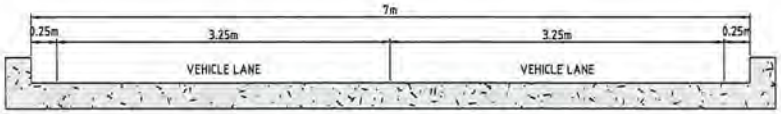
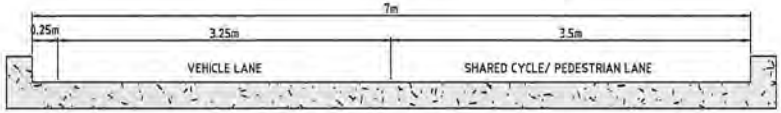
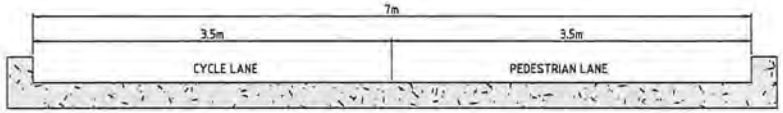


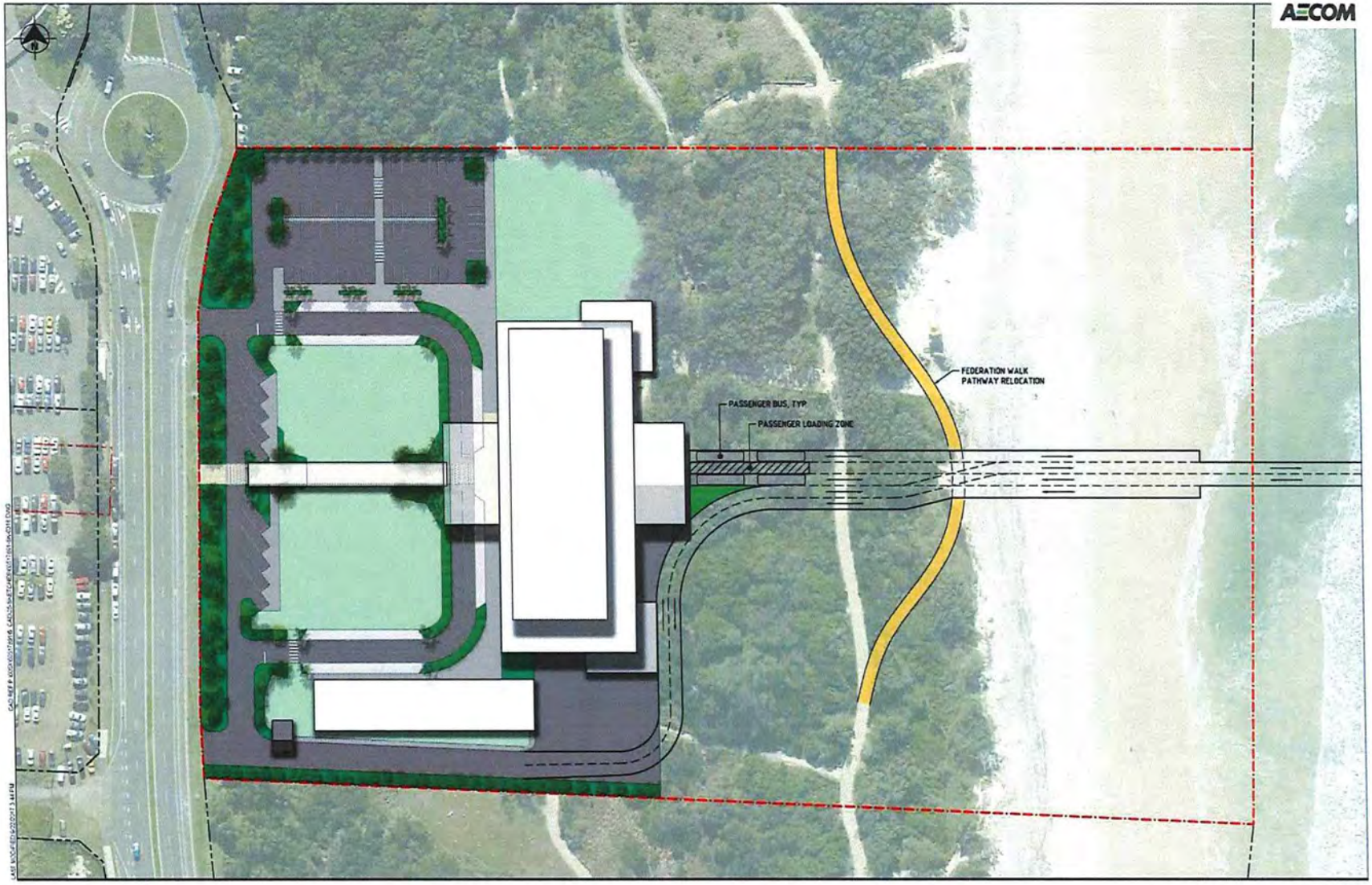
7m WIDE ROADWAY JETTY USE – CRUISE SHIP AT BERTH



7m WIDE ROADWAYJETTY USE OPTION – NO CRUISE SHIP



7m WIDE ROADWAY JETTY USE OPTION – NO CRUISE SHIP



OCEAN-SIDE CRUISE SHIP TERMINAL
LANDSIDE LAYOUT OPTIONS

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