BUILDING QUEENSLAND

CAIRNS SHIPPING DEVELOPMENT
DETAILED BUSINESS CASE

2018

D18/2663

ABOUT THIS DOCUMENT

Building Queensland finalised the Cairns Shipping Development Project Detailed Business Case in Q2 2018. Core elements of the detailed business case are presented in this document.

This document has been publicly released to ensure that stakeholders and community members are aware of the outcomes of the detailed business case, and have access to information that supports these outcomes. Commercially sensitive information has been removed to protect the State's commercial position during future project stages.

This detailed business case has been prepared with the support of funding from Ports North.

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EXECUTIVE SUMMARY

ABBREVIATIONS

ABBREVIATION	DESCRIPTION
ABS	Australian Bureau of Statistics
ACH Act	*Aboriginal Cultural Heritage Act 2003* (Qld)
AEIS	Additional Environmental Impact Statement
ANQP	Advancing North Queensland Policy
AMSA	Australian Maritime Safety Authority
ARMA	auto regressive moving average
ASS	acid sulfate soil
ASSMP	acid sulfate soils management plan
ATSIHP Act	*Aboriginal and Torres Strait Islander Heritage Protection Act 1984*
BCDF	Business Case Development Framework
BCLT	Brisbane Cruise Liner Terminal
BHD	backhoe dredger
CALPUFF	California Puff Model
CBRC	Cabinet Budget Review Committee
CEMP	construction environmental management plan
CEO	Chief Executive Officer
CG	Coordinator-General
CGER	Coordinator-General's Evaluation Report on the Environmental Impact Statement
CHMA	cultural heritage management agreement
CHMP	cultural heritage management plan
CLIA	Cruise Line Industry Association Outlook
CPI	Consumer Price Index
CRC	Cairns Regional Council
Cth	Commonwealth
D&C	design and construct
DAF	Department of Agriculture and Fisheries
DATSIP	Department of Aboriginal and Torres Strait Islander Partnerships
DBC	Detailed Business Case
DEHP	Department of Environment and Heritage Protection
DES	Department of Environment and Science
DILGP	Department of Infrastructure, Local Government and Planning
DITID	Department of Innovation, Tourism Industry Development and the Commonwealth Games
DMP	dredge management plan
DMPA	dredge material placement area

ABBREVIATION	DESCRIPTION
DNPSR	Department of National Parks, Sport and Racing
DOAWR	Department of Agriculture and Water Resources
DoEE	Department of the Environment and Energy
DPC	Department of the Premier and Cabinet
DSC	Douglas Shire Council
DSDMIP	Department of State Development, Manufacturing, Infrastructure and Planning
DSITI	Department of Science, Information Technology, Innovation
ECI	early contractor involvement
EIS	environmental impact statement
EMP	environmental management plan
EO Act	*Environmental Offsets Act 2014*
EP Act	*Environmental Protection Act 1994*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
ERA	environmentally relevant activity
ESD	ecologically sustainable development
FHA	fish habitat area
FNPV	financial net present value
FNQ	Far North Queensland
GARID	Guidelines for Assessment of Road Impacts of Development 2006
GBO	general biosecurity obligation
GBRCMP	Great Barrier Reef Coast Marine Park
GBRMP	Great Barrier Reef Marine Park
GBRWHA	Great Barrier Reef World Heritage Area
GDP	gross domestic product
GHG	greenhouse gas
GMPI	General Manager Planning and Infrastructure
GRT	gross registered tonnages
GOC	government-owned corporation
ha	hectares
ICNG	Interim Construction Noise Guideline (New South Wales Government)
IFO	intermediate fuel oil
ILUA	Indigenous Land Use Agreement
ILM	investment logic map
IMO	International Maritime Organization
IQQM	integrated quantity and quality model
ISO	International Organization for Standardization

ABBREVIATION	DESCRIPTION
LAP	local area plan
LAT	lowest astronomical tide
LG Act	*Local Government Act 2009* (Qld)
LGA	local government area
LNG	liquefied natural gas
LTDSDMP	Long Term Dredge Spoil Disposal Management Plan
LUP	land use plan
MDS	maintenance dredging strategy
MHLW	mean high low water
MNES	matters of national environmental significance
MOMP	maritime operations management plan
MSL	mean sea level
MSQ	Maritime Safety Queensland
NAGD	National Assessment Guidelines for Dredging 2009
NAIF	Northern Australia Infrastructure Facility
NC Act	*Nature Conservation Act 1992*
NCAP	Non-Current Asset Policies
NGER Act	*National Greenhouse and Energy Reporting Act 2007* (Cth)
NPV	net present value
NT Act	*Native Title Act 1993*
PAF	Project Assessment Framework
PASS	potential acid sulfate soil
P&O	P&O Cruises Australia
PBC	Preliminary Business Case
PBPL	Port of Brisbane Pty Ltd
PPP	public private partnership
PSC	Project Steering Committee
PWG	Project Working Group
QT	Queensland Treasury
QTC	Queensland Treasury Corporation
QTRIP	Queensland Transport and Roads Investment Program
RDEIS	Revised Draft Environmental Impact Statement
RHM	Regional Harbour Master
RMP	reactive monitoring program
SARA	State Assessment Referral Agency
SCR	selective catalytic reduction

ABBREVIATION	DESCRIPTION
SDAP	State Development Assessment Provisions
SDPWO Act	*State Development and Public Works Organisation Act 1971*
SF	sensitive receptor
SIP	State Infrastructure Plan
SP Act	Sustainable Planning Act 2009 (Qld)
SPD Act	*Sustainable Ports Development Act 2015*
SPL	strategic port land
SPP	State Planning Policy
SP Reg	Sustainable Planning Regulation 2009
SPRING	Species Recovery Information Gateway
TAG	technical advisory group
TAPM	The Air Pollution Model
TI Act	*Transport Infrastructure Act 1994*
TMR	Department of Transport and Main Roads
TNQ	Tropical North Queensland
TOR	terms of reference
TSHD	trailing suction hopper dredger
TWI	trade weighted index
VfM	value for money
VM Act	*Vegetation Management Act 1999*
VTMP	vessel traffic management plan
WHA	world heritage area
WHS	work health and safety
WQO	water quality objective
WSS	water supply scheme
WTP	water treatment plant

Overview

Located on Trinity Inlet, at the edge of the Coral Sea in Far North Queensland (FNQ), the Port of Cairns is a cornerstone of the region's tourism and trade sectors. Situated alongside the Cairns central business district (CBD), it serves as a gateway to international export and tourism markets and underpins Queensland's growing cruise ship industry.

More international and domestic visitors are arriving in Cairns each year, drawn by its easy access to the Great Barrier Reef, located just 25 kilometres offshore, and the Wet Tropics World Heritage Area—two of the world's largest natural attractions. Excellent rail, road and air links to other regional tourism destinations and capital cities across the country also make it an advantageous entry point for visitors. Visitations reached almost 2.8 million in 2015, with many visitors arriving via cruise ship.

Cruise shipping is the fastest growing tourism market worldwide. Steady long-run growth in cruise ship calls in Cairns over the past decade mirrors this growth. Last year, cruise ship visits reached an all-time high of 77, up from 34 cruise ship visits in 2010. Cairns is, however, largely missing out on one of the most lucrative emerging markets—the mega class market.

Globally, cruise shipping operators are moving towards larger sized ships—that is, vessels able to carry more than 2,000 passengers. Larger cruise ships improve economies of scale so operators can cut ticket prices and boost their market appeal.

Cairns cannot accommodate these 'mega class' vessels as the existing channel into the port is not wide or deep enough to allow safe access and the heritage listed wharves have insufficient structural capacity to handle increased berthing loads. Instead, larger vessels must anchor at Yorkeys Knob, 15 kilometres north of Cairns, and ferry passengers ashore. This practice is difficult and time consuming for passengers (taking up to 3.5 hours), diminishing their travel experience and is also expensive for cruise ship operators. It discourages visits by larger ships and limits onshore visitations when they do. About 10 per cent of ship visits are lost entirely when rough weather makes shore transfer by tender unsafe.

The channel's depth can also constrain the size of cargo ships able to enter the port, often forcing them to wait for the right tidal conditions, and limit the Australian Defence Force's ability to base larger ships at HMAS Cairns. HMAS Cairns, the second largest naval base on Australia's east coast, is located on Trinity Inlet but the location of the cargo swing basin used by navy ships restricts the base's capacity to expand. It also cannot host larger Australian and foreign navy ships.

Improving the Port of Cairns' capacity for larger ships was first proposed by the state government-owned corporation Ports North in 2012 through the Cairns Shipping Development Strategy. This strategy explored potential options for upgrading the channel and port and led to the Cairns Shipping Development Project (the Project), which has been the subject of rigorous environmental impact assessment.

A draft environmental impact statement (EIS) for the Project was prepared in 2015, with a Revised Draft EIS (RDEIS) prepared in 2017 following legislative change prohibiting marine disposal of capital dredging material, which was originally proposed. The Reference Project now complies with dredging-related legislation, and anticipated dredge volumes have been reduced from 4M cubic metres to 1M cubic metres.

Key components of the Reference Project include:

- dredging a wider and deeper entrance channel and cruise ship swing basin to allow access for ships up to 300 metres long
- relocation of the cargo ship swing basin to facilitate the expansion of the navy base
- placement of dredged material to two land-based dredge material placement areas (DMPAs)

- upgrading berth infrastructure within Trinity Inlet.

The Coordinator-General's Evaluation Report on the Environmental Impact Statement (CGER) sets out comprehensive conditions to manage potential environmental impacts, particularly on the Great Barrier Reef World Heritage Area (GBRWHA) and Great Barrier Reef Marine Park (GBRMP). Multiple laws and regulations must be addressed by the Project, requiring proactive management and significant documentation. Legislative change is also required to the Fish Habitat Area (FHA). The Department of Environment and Science (DES) (formerly the Department of National Parks, Sport and Racing) has confirmed in principle support for the proposed amendment.

The Reference Project will significantly contribute to achieving government objectives of economic development in Northern Australia, tourism growth and development in FNQ, a more competitive and efficient shipping industry in Cairns and Queensland, more resilient state infrastructure and a stronger Australian Defence Force capability in Northern Australia.

An economic assessment of the Reference Project found that it will deliver net economic benefits to Cairns and Queensland, primarily through greater visitor expenditure by cruise passengers. The Project will see almost a tripling of current ship visits within 13 years (based on 2016 figures), a higher incremental spend by overnight visitors and maturation of the cruise ship industry in Queensland.

It will also support the planned $635 million upgrade of HMAS Cairns, enabling the navy's larger ships to berth in Cairns, increase the port's resilience to extreme weather and improve the efficiency of existing cargo ship operations by giving vessels a larger window of entry and egress to the port.

Dredging is planned to commence in May 2019 and all works are expected to be completed by April 2020. Early works are commencing in the second half of 2018.

Recommendations

It is recommended that the Queensland Government endorses the DBC and notes:

- it is economically viable, with a benefit cost ratio (BCR) of 1.1 (P90) and 1.2 (P50) based on 7% discount rate (real)
- the economic NPV is $10.7 million (P90) based on 7% discount rate (real)
- the Reference Project is expected to deliver material non-monetised benefits in addition to the monetised benefits included in the BCR. The BCRs should not be relied upon in isolation of identified social impacts
- that Ports North forecast revenue received is only 10% of the monetised benefits included in the BCR whereas cruise shipping returns (visitor expenditure) is 83% and Navy benefits is 7%
- the total project capital cost of $127.6 million (nominal, P90) and whole-of-life costs of $65.5 million (nominal, P90)
- the Reference Project (Central Case) financial FNPV is ($49.4 million), P90 cost and ($39.6 million), P50 cost at 3.61% discount rate
- the preferred delivery model is construct only for the identified three packages of work, with Ports North undertaking the design and delivery
- the delivery program is challenging, and the cost estimate includes appropriate allowance for program delay risk
- the DBC will be presented to the Ports North Board seeking approval to submit the DBC to the shareholding Ministers (Deputy Premier, Treasurer and Minister for Aboriginal and Torres Strait Islander

Partnerships and Minister for Transport and Main Roads) to then seek approval to proceed to deliver and fund the Project.

The DBC recommends Ports North to undertake the following activities post the detailed business case:

- appropriately resource the Project to meet delivery timeframes
- undertake a benchmarking study to determine the optimal cruise ships charges (port dues) to maximise commerciality of the Project
- investigate opportunities to increase revenue through the charging regime for non-cruise beneficiaries (e.g. cargo, navy)
- confirm the delivery method in the procurement/development phase to determine the arrangements to best allocate and manage project risks through construction
- proactively work along with the cruise ship industry, related itinerary ports, all levels of government and tourism operators to realise and enhance cruise ship demand.

Chapter Summaries

Governance

The Project Owner is Ports North. This DBC was jointly developed by the Building Queensland Project Team and Ports North representatives under the leadership of the Building Queensland Project Director. Representatives from the Department of Transport and Main Roads (TMR), Queensland Treasury (QT), Department of the Premier and Cabinet (DPC), Department of Innovation, Tourism, Industry Development and the Commonwealth Games (DITID), Department of State Development, Manufacturing, Infrastructure and Planning (DSDMIP) assisted the Project through the Project Working Group (PWG) and Project Steering Committee (PSC), which also included representatives of Building Queensland and Ports North. The PSC provided strategic advice and direction to the Project during development of the DBC.

Methodology

This DBC was developed in accordance with Building Queensland's Business Case Development Framework (BCDF).

A three-step process was used for the options analysis, involving:

1. summarising previous studies and findings
2. defining the scope based on technical investigations and expert advice
3. considering government policies, plans and regulations, market conditions and public interest.

Extensive stakeholder engagement and consultation has also informed the Project, specifically for the EIS (from October 2012 to September 2014) and the Revised Draft Environmental Impact Statement (RDEIS from March 2016 to May 2017).

Multiple options have been assessed at various stages of the planning process over the past 10 years. Extensive investigation of options was undertaken before 2012 and for the Draft EIS, to support project recalibration following regulatory change in 2015, and for the preparation of the RDEIS and this DBC.

Project risks were assessed drawing upon the principles practices of the ISO 31000:2009 risk management standards. Risks were identified and categorised by project stakeholders and advisors through a workshop

and used as the basis of the Monte-Carlo simulation. Risks with a cost or time impact were included in the risk-cost analysis.

Adopted methodologies for ongoing management strategies, including risk and stakeholder management, are in line with the requirements of the BCDF and other industry practices.

Proposal Background

As a gateway to international markets and a key destination on the Queensland Cruise Itinerary, the Port of Cairns is an important component of FNQ's tourism and trade sectors. It also plays a role in the nation's defence, border and security operations in the Indo-Pacific region by hosting the Royal Australian Navy base of HMAS Cairns, the second largest naval base on the east coast of Australia.

The Port of Cairns is located on Trinity Inlet, which is subject to high siltation, as is the bay into which it flows. Trade winds during the dry season and cyclones during the wet combine with ocean currents and other natural processes to deposit, stir up and resuspend sediment in the water. Annual maintenance dredging counters this siltation to create a safe passage for vessels into the port. This dredging has been undertaken since 1876 when the Port was declared. However, the current width and depth of the shipping channel into the Port of Cairns is limiting its capacity to support the growth of the cruise shipping industry and Defence activities.

The channel is not wide or deep enough to accommodate mega class vessels (those able to carry more than 2,000 passengers), which represents a lucrative emerging cruise market due to the global trend towards larger ships.

Cairns' cruise shipping industry has experienced strong long-run growth over the past decade, which is expected to continue in parallel with broader industry growth. Cruise shipping is the fastest growing tourism market worldwide, with passenger numbers increasing at a compound growth rate of around five per cent. The Australian cruise industry has experienced a 12-year run of double digit passenger growth, with the industry's total national economic contribution reaching A$5.3 billion in 2016–17. Cruising is popular with Australians, with two million Australian cruisers predicted annually by 2020, and cruises tend to be longer in Australia than elsewhere across the globe. Ticket prices are dropping as ships become larger, and research shows that households of various incomes are willing to cruise.

More than 850,000 cruise passengers visited Queensland destinations in 2016–17, equating to 391 ship calls. Cairns hosted 60 ship calls in 2016, up from 34 in 2010. Ship calls were higher in 2017, primarily due to a homeporting trial by P&O Cruises Australia (P&O), which will cease in 2019. The Port of Brisbane acts as a feeder port for much of the traffic that passes through Cairns and there is potential for greater itinerary development with Brisbane following construction of the Brisbane International Cruise Terminal, leading to more transit visits and homeporting opportunities – provided capacity constraints for larger vessels can be addressed. Larger vessels and homeporting normally equate to a higher onshore spend per person.

Improving the Port of Cairns' capacity for larger ships was first proposed in 2012 through the Cairns Shipping Development Strategy, which explored potential options for upgrading the channel and port.

A Preliminary Business Case (PBC) was not prepared for the Project. However, a Draft EIS for the Project was prepared in 2015 (which was not assessed), with a RDEIS prepared in 2017 following legislative change. (In March 2015, the Queensland Parliament passed the *Sustainable Ports Development Act 2015* (SPD Act), which prohibited the disposal of capital or dredging material within the GBRMP as originally proposed).

The RDEIS recommended limiting the size of ships into the Port of Cairns to 300 metres, reducing the proposed size of the channel and the amount of dredge material. A Supplementary Report was published in December 2017.

Following the recalibration, the Project was revised to include the following elements:

- 8.8 metre declared channel depth
- deepening of Crystal Swing Basin
- new Smiths Creek Swing Basin with a diameter of 310 metres
- an outer channel width of 90–100 metres
- an inner channel width generally to 110 metres (outer bend to 180 metres).

Recalibration of the Project substantially reduced the scale of dredging required and made land placement opportunities for the dredge material viable. These were examined through the Dredge Material Placement Options Study (2016), with suitable locations identified at the East Trinity precinct and the Barron Delta precinct.

Service Need

The primary problem the Project will address is the Port of Cairns' inability to adequately support the growing cruise ship industry, specifically through:

- **insufficient channel size and wharf capacity to cater for larger vessels**, which means almost half of all cruise ships visiting Cairns are unable to enter the Port of Cairns due to their size
- **offshore tendering of passengers**, which diminishes the passenger experience as tenders are difficult and time consuming and discourages visits by larger ships and limits onshore visitations when they do. Tendering can also be expensive for cruise operators.

The Project will also address problems experienced by non-cruise shipping operations, specifically:

- **restrictions on the expansion of Australian Defence Force capability for basing larger ships at HMAS Cairns**, as the location of the swing basin used by navy ships restricts the base's capacity to expand and the channel's size means the base cannot host larger Australian and foreign navy ships
- **inefficient cargo shipping operations**, as the channel's depth constrains the size of cargo ships able to enter the port, often forcing them to wait for the right tidal conditions
- **disruption of port operations by natural disasters**, such as cyclones, which are a regular feature of FNQ.

Table E.1 presents the service requirements developed for the Project. These align with service requirements developed by Ports North for early project phases and government objectives.

Table E.1: DBC Service Requirements

SERVICE REQUIREMENT	DESCRIPTION
SR1	Provides value-for-money marine infrastructure that meets environmental and social expectations and is disaster resilient
SR2	Supports growth of the FNQ tourism industry, particularly cruise shipping and the development of tourism facilities in Cairns
SR3	Enables regional economic and employment growth by allowing broader opportunities for Cairns port and greater efficiency for cruise, freight and defence operations
SR4	Provides port infrastructure that is safe for operators and customers and offers reliable all-season access

Multiple options for meeting the identified service need have been examined over the past ten years (both through this DBC and previous work), including:

- do nothing scenario A (i.e. allow the channel to silt)
- do nothing scenario B (i.e. maintain the current channel dimensions by maintenance dredging – the status quo)
- relocation of the port to an area unaffected by siltation
- maintain current channel dimensions (i.e. maintenance dredge only) and provide new or enhanced landside infrastructure, including onshore and offshore jetties
- maintain current channel dimensions (i.e. maintenance dredging only) and provide new anchoring infrastructure and associated tendering.

The Preferred Option, selected as the subject of this DBC, involves widening and deepening the shipping channel, deepening the existing Crystal swing basin and relocating the cargo ship swing basin, placement of dredging material on land and upgrading the wharves and services.

Base Case

The Base Case assumes normal operational activities and growth at the Port of Cairns without the Project in the future.

Cruise ships above sun class currently cannot enter Trinity Inlet due to the width and depth of the shipping channel. All large vessels including the vista, grand and voyager class vessels must anchor off Yorkeys Knob and tender passengers to shore, which is difficult, time-consuming and limits the number of mega cruise ships visiting Cairns. It also restricts the number of passengers and crew members engaging in cruise-related expenditure and tourism activities in the region.

The Port of Cairns has experienced strong growth in the cruise ship market over the past decade. Demand modelling forecasts for cruise ship calls to the Port of Cairns (Trinity Inlet and Yorkeys Knob) show growth over time (albeit at a lower rate), taking into account global and regional cruise ship demand, trends in vessel types, historical and forecast data on cruise ship schedules and economic data and information. International visitors to Queensland, global economic conditions and domestic factors such as income, population growth and demographics are key drivers of cruise tourism demand.

Cruise ship calls to Cairns and Yorkeys Knob are forecast to increase from 77 in 2017 to 107 by 2027 and 170 by 2045:

- Growth in smaller cruise ships is assumed to be moderate beyond 2031 in line with population growth. This includes growth in the sub-regal vessel market, which currently accounts for around three quarters of cruise ship calls into Trinity Inlet and over 50 per cent of total cruise ship calls into Cairns in 2017. This is driven by demand for niche cruises such as adventure and boutique cruising. By 2045, sub-regal vessels are forecast to account for around 50 per cent of cruise ship calls, with the rest made up of sun, regal and larger vessels, namely vista, grand and voyager.
- Forecasts reflect a global trend towards larger cruise ships that is confirmed by the global forward order book (vista class vessels account for 20 per cent of forward orders in 2021) and consultation with the cruise shipping industry. However, the Port of Cairns cannot capitalise fully on this growth due to the need to anchor larger vessels off Yorkeys Knob, which diminishes the passenger experience. Larger vessels will comprise 12 per cent of total vessel calls to Cairns by 2045.

Reference Project

The key components of the Reference Project, as assessed by the RDEIS, include (refer Figure 6.1):

- dredging a wider and deeper entrance channel and cruise ship swing basin to allow port access for larger cruise ships, which requires:
  - widening approximately four kilometres of the 13-kilometre channel between 10 and 20 metres, with some additional localised widening of the channel bend and transits to maintain safe navigation of ships
  - increasing the channel's declared depth by 0.5 metres from - 8.3 metres to - 8.8 metres
  - deepening the existing Crystal Swing Basin
- delivery and placement of dredged material to land-based DMPAs, which requires:
  - establishing DMPAs on the Barron Delta for soft clays and Tingira Street for stiff clays
  - constructing a temporary pump-out facility three kilometres from Yorkeys Knob, a temporary dredge material delivery pipeline to the Barron Delta DMPA and a pipeline to deliver tailwater to the Barron River
- relocation of the cargo ship swing basin to allow future navy base expansion, which requires:
  - establishing the new Smiths Creek Swing Basin with a 310-metre diameter upstream of the existing Main Swing Basin
- upgrading berth infrastructure within Trinity Inlet, which requires:
  - upgrading Wharves 1 to 5 to accommodate larger, heavier ships and partially decommissioning Wharf 6 to construct a new section
  - upgrading ship services and some relocated navigational aids.

While the Reference Project will expand the channel footprint by 19 per cent, annual maintenance dredging will only increase by two to six percent (reflecting current variations). Overall the Project's capital dredge material volumes have been reduced from 4M cubic metres (original Project) to 1M cubic metres (Reference Project). Unlike the original Project, which targeted voyager class vessels (311 metres), the Reference Project accommodates up to vista class vessels (290 metres) only (and some grand class vessels with the right dimensions, 290m). The largest ships in this range will face tidal constraints.

The upgraded channel and swing basins of the Trinity Inlet will increase access for general domestic and international trade, and together with the upgraded wharfs and facilities, will enable servicing of larger cruise ships up to 300 metres. Other key benefits include access for larger navy vessels (both Australian and foreign) into the Port of Cairns and improved resilience of the channel during severe weather events.

The expected outcomes of the Reference Project are:

- a stronger cruise shipping industry in Cairns and Queensland through the capture of a share of the larger size vessel market
- tourism growth for FNQ and Queensland through increased tourism opportunities, bringing stability and diversity to the Cairns tourism sector
- a strengthened regional economy in FNQ, due to increased cruise-shipping returns
- enhanced safety for vessels using the deeper, wider channel featuring some relocated navigational aids

- improved efficiency in freight and cargo movements through reduced tidal and loading restrictions
- increased resilience for the Port of Cairns against extreme weather events as a result of the deeper, wider channel
- an improved cruise passenger experience due to wharf upgrades and less offshore anchoring and tendering of passengers
- additional employment during both construction and operational phases of the Project
- potential to expand HMAS Cairns through the relocation of the cargo shipping swing basin
- improved access for existing navy vessels and the capacity for larger Australian and foreign navy vessels to enter the port, increasing navy-related expenditure in the region
- capacity for more visitors to come ashore, increasing cruise-shipping revenues.

The Project will have a significant positive impact on the Cairns cruise shipping market. Assuming the existing cruise ship facilities plus the impact of the Brisbane International Cruise Terminal and homeporting in Cairns, the overall number of ship visits is projected to more than double to 151 by 2031, with 69 at Yorkeys Knob and 82 at Trinity Wharf. With construction of a revised channel and bunker availability, the overall number of ship visits is projected to increase a further 32 to 183. This means the Project will support almost a tripling of ship visits within 13 years (based on 2016 figures).

The Project will also improve the efficiency of ships required to deliver existing imports and exports cargo (tonnes). This, in turn, will improve the port's competitiveness for imports and exports, allowing Cairns to capitalise on future trade opportunities.

Strategic Considerations

Analysis shows that the Reference Project aligns with, and contributes to, the strategic objectives, programs and policies of all three tiers of government, specifically objectives to:

- build a more competitive and efficient shipping industry in Australia, particularly through deregulation of coastal shipping
- support economic development in Northern Australia, particularly through infrastructure, investment and tourism
- support the Queensland economy's transition from reliance on the resources sector to tourism-related industries by maximising existing tourism infrastructure and opening up new tourism and business opportunities
- deliver more resilient state infrastructure and strengthen regionally significant transport infrastructure
- strengthen the Australian Defence Force capability in Northern Australia
- preserve the Great Barrier Reef.

The Project was recalibrated following the release of the Australian Government's Reef 2050 Long-Term Sustainability Plan (Reef 2050 Plan). As a result, the Reference Project now aligns with the Reef 2050 Plan and complies with its ban on disposing capital dredging material in the GBRMP.

It also aligns with key federal, state and local government policy and planning documents including Our North, Our Future: White Paper on Developing Northern Australia (Northern Australia White Paper), State Infrastructure Plan (SIP), Far North Queensland Regional Plan 2009–2031 (FNQRP), Advancing North Queensland Policy (ANQP) and CairnsPlan 2016.

The ANQP recognises ports in North Queensland as critical gateways to international markets and highlights public and private sector efforts to improve port infrastructure to support economic development. The Northern Australia White Paper indicates the cruise shipping industry in North Queensland is hindered by provisions of current legislation and that deregulation is planned. The FNQRP recognises the Port of Cairns as key regionally significant transport infrastructure and includes strategies to encourage sustainable cruise shipping infrastructure and services.

The Australian Government recently announced a $635 million upgrade for HMAS Cairns over 12 years. The expansion of HMAS Cairns was identified in the 2016 Defence White Paper as a strategic shift to move military assets north and facilitate HMAS Cairns becoming a ship maintenance and sustainment hub for Northern Australia. The Reference Project will facilitate this upgrade, which would otherwise not be able to accommodate large Australian and foreign naval vessels. It will also provide safer access for existing navy vessels, with reduced operational restrictions.

The Reference Project offers an opportunity to grow Cairns as a cruise shipping hub, catering for both transit and homeporting operations and delivering economic benefits to both Cairns and Queensland. It will support infrastructure and investment for North Queensland and boost regional tourism and local business opportunities.

Legal and Regulatory Considerations

Multiple laws and regulations must be addressed by the Project, requiring proactive management and significant documentation. Changes are required to the existing legal and regulatory framework to deliver the Project, specifically legislative change to revoke, or amend the boundaries of, the Trinity Inlet fish habitat area (FHA) to permit dredging, which is currently prohibited under the Fisheries Act 1994 (Fisheries Act). The Department of Environment and Science (DES) (formerly the Department of National Parks, Sport and Racing) has confirmed in principle support for the proposed amendment to the FHA.

Key findings of the legal and regulatory review include the following:

- A cultural heritage management plan (CHMP) for the Project will be necessary to protect and preserve the cultural heritage of Aboriginal and Torres Strait Islander people under the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* (ATSIHP Act) and *Aboriginal Cultural Heritage Act 2003* (Qld) (ACH Act). It must be produced prior to commencing any works. An approved CHMP is also required for development associated with the Barron Delta DMPA and delivery pipeline, and the Tingira Street DMPA.
- The Project will be required to address native title. While the Project does not encroach on an existing native title area within Trinity Inlet, it will impact on part of the Inlet and its western landside area under native title claim by the Gimuy Walubara Yidinji People. Land under a claim by the Cairns Regional Claim Group will also be impacted by the dredge pipeline construction and operation. Specific CHMPs may need to be developed with each of these native title applicants.
- The Project has been referred to the Australian Government under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) and determined to be a controlled action as it impacts on seven matters of national environmental significance (MNES), specifically:
  - world heritage properties
  - national heritage places
  - listed threatened species and communities
  - listed migratory species
  - Commonwealth marine areas

  - GBRMP
  - Australian Government land.
- Environmental offsets may be required under the *Environmental Offsets Act 2014* (EO Act) to account for unavoidable ecological impacts in the dredging, pipeline access route and placement areas. Offset requirements and options will be identified during the detailed design stage of the Project as approvals are sought.
- Multiple regulations and protection policies apply to the Project under the *Environmental Protection Act 1994* (EP Act). Development permits and Environmental Authorities will be required for environmentally relevant activity (ERAs) with the potential to cause environmental harm, specifically dredging and chemical storage, prior to commencing works.
- *The Sustainable Ports Development Act 2015* restricts capital dredging to priority Queensland ports, however, there is a special exemption for the Port of Cairns, and the Project, as its EIS process started before the Act commenced. However, the SPD Act limits the extent of capital dredging permitted and prohibits disposing of dredge material in the GBRWHA.
- Capital dredging requires approval under the *Coastal Protection and Management Act 1995* (Coastal Protection Act), a marine park permit under the *Marine Parks Act 2004* (Marine Parks Act), approvals to disturb marine plants and a Resource Allocation Authority under the Fisheries Act, a development permit and Environmental Authority under the EP Act and development approval under the *Planning Act 2016* (Planning Act) before works begin.
- Various state government development permits and a marine parks permit will be required for the dredge material delivery pipeline, pump-out facility and tailwater discharge pipeline (Northern Sands) under the Planning, Coastal Protection, Fisheries and Marine Parks Acts, as well as the *Vegetation Management Act 1999* (VM Act). Local government development permits will also be required for the Northern Sands DMPA.
- Permits may also be required:
  - for the removal of contaminated soil for the wharf upgrade under the EP Act
  - to occupy or create easements under the *Land Act 1994*
  - for a temporary structure or mooring under the Marine Parks Act
  - for clearing of vegetation or damage mitigation under the *Nature Conservation Act 1992* (NC Act)
  - for ancillary works and encroachments, carrying out road works on, or accessing land alongside, a state government-controlled road under the *Transport Infrastructure Act 1994* (TI Act)
  - for transporting regulated wastes under the *Waste Reduction and Recycling Act 2011*.
- Under the Fisheries Act, approval is required before marine-based operational works within FHAs can begin, such as construction and operation of the delivery pipeline in the Yorkeys Creek FHA. The Act does not allow dredging within FHAs, so the Trinity Inlet FHA must be revoked, or its boundaries amended. The Department of Environment and Science (DES) (formerly the Department of National Parks, Sport and Racing) has confirmed in principle support for the proposed amendment to the FHA.

- Aspects of the Project will constitute assessable development, requiring approval under the Planning Act. Ports North will assess proposed development on strategic port land, such as land-based infrastructure for cruise ship operations, against its land use plan (LUP). Cairns Regional Council (CRC) will assess proposed development within the Cairns local government area, such as the delivery pipeline and the Barron Delta DMPA, against CairnsPlan 2016.
- Planning approval will also be required for development within or adjacent to the heritage-listed Cairns Wharf Complex, however, impacts on the existing structure will be minimal.
- Establishing the temporary pipeline may trigger the need for development approval under the VM Act if it involves clearing of relevant remnant or regrowth vegetation.
- The Project is consistent with the aims and objectives of key state and local government plans and policies such as the FNQRP, CairnsPlan, State Planning Policy 2016 (SPP), Queensland Coastal Contingency Action Plan (QCCAP), Queensland Coastal Management Plan 2014 (Coastal Management Plan) and state government environmental protection policies. It will also comply with relevant industry standards, guidelines and regulations such as the Standards for Hydrographic Surveys within Queensland Waters, National Assessment Guidelines for Dredging and Maritime Safety Queensland Regulation.

Public Interest Considerations

A public interest assessment undertaken for this DBC determined there were no issues that would prohibit the Reference Project proceeding. Mitigation and management measures have been developed for all public interest issues. Some respond directly to conditions set by the Coordinator-General in the CGER about social impacts, specifically for the Project to:

- submit a community and stakeholder engagement plan for approval prior to construction showing how community and stakeholder interests will be managed
- submit a social impact management report annually for three years reporting on the implementation of mitigation measures for social impacts.

The Reference Project is expected to increase local employment and visitor expenditure, improve the cruise passenger experience, grow the tourism sector, improve cargo shipping efficiencies and embed greater resilience to extreme weather in the port.

It will also support the future expansion of the HMAS Cairns and enhance navigational safety for navy, cruise and cargo vessels already visiting the Port of Cairns by providing additional safety margins while manoeuvring, additional under-keel clearance and reduced operational restrictions based on tidal fluctuations. The wharf upgrade will improve fender performance to reduce the risk of damage from berthing mishaps.

Expanding the port's berthing for cruise ships will improve access and equity for all passengers, for example, by providing better facilities for mobility and vision-impaired patrons.

Some residents will enjoy better access to their local business or tourism operations as potential customers. Wharf Street residents and moored boats may however experience increased noise and air quality impacts during construction and operation of the Project. Traffic at Holloways Beach may temporarily worsen during construction but traffic flows between Yorkeys Knob and Cairns will improve due to less passenger transfers. Ports North has committed to mitigation measures and providing timely notification to directly impacted stakeholders regarding forthcoming project activities.

Media coverage and engagement activities such as displays, fact sheets and websites have raised community awareness of the Project, while meetings, briefings and workshops have provided opportunities for

feedback. Extensive consultation has been undertaken with stakeholders including government departments and agencies, private sector operators, tourism bodies, business and industry groups, community and special interest groups, affected landowners and Indigenous groups.

Sustainability Assessment

Examined against sustainability principles that consider governance, environment, social and economic outcomes, the Reference Project performed strongly. Each sustainability principle was rated according to the five-scale rating criteria set out in Building Queensland's BCDF, with most outcomes receiving the second-highest rating of Moderate.

The environmental principles of ecology and water management were rated as Basic, meaning the Project avoids harm and that solutions adopted in these areas create project efficiencies. The principle of leadership, knowledge sharing and innovation was also rated as Basic, along with the principle of procurement and supply chain.

Social Impact Evaluation

The social impact evaluation (SIE) considered the positive and negative social, economic and environmental impacts of the Reference Project, both during construction and operation.

It concluded the Reference Project will have a significant positive impact through increased employment and business opportunities. This has flow-on effects to community health and wellbeing and the stability of local small businesses, which translates into intergenerational benefits. The Reference Project will also improve cruise passenger safety and experience, liveability for residents and traffic conditions for users of the road corridor from Yorkeys Knob to Cairns City.

All potential negative impacts were rated as low by the qualitative risk assessment, except for temporary disruption accessing the boat ramp (which dropped to low after mitigations were assumed) and the effects of landside construction and increased ship arrivals at the Port of Cairns on Wharf Street residents, which received a medium rating. Consultation with affected residents will inform the community and stakeholder engagement plan, which will include strategies to mitigate impacts. However, there remains a degree of concern among various groups, including some potentially affected stakeholders within the local community and other special interest groups.

Environmental Assessment

Detailed environmental impact assessment has been undertaken for the Project due to its location in an environmentally sensitive environment adjacent to the GBRMP. The Project's declaration in 2012 as a 'coordinated project' by the Queensland Coordinator-General resulted in a Draft EIS (2015) and subsequent RDEIS (2017).

Strategies have been developed to avoid, minimise, mitigate and manage impacts from the Project's construction and operation on the land and landscape, nature conversation areas, coastal processes, marine sediment and water quality, water resources, marine and terrestrial ecology, community and cultural heritage, noise, air quality, local transport, greenhouse gases and waste. Potential cumulative impacts will also be monitored and managed.

Key findings of the environmental assessment and associated mitigation measures are as follows:

- Dredging, port upgrades, the construction of ancillary infrastructure and dredge material delivery could adversely affect the marine and terrestrial environments and ecological values, unless managed.

- Trinity Inlet and Trinity Bay have naturally high turbidity levels, and dredging is predicted to increase turbidity by less than seven per cent at most locations. Where the impacts are more substantial, naturally occurring turbidity will remain the dominant form of turbidity. Implementing a dredge management plan (DMP) will limit potential impacts on marine water quality, which could affect marine plants, through measures such as limiting dredging to the dry season and monitoring water quality during dredging, an activity that will be overseen by a technical advisory group (TAG).
- Six seagrass meadows are located within Trinity Bay along the boundaries of the existing Trinity Inlet shipping channel. They are in poor condition but are showing signs of recovery. Seagrass communities will be surveyed before dredging works commence to identify newly established communities and offsets may be required if communities are disturbed.
- Dredging and land-based construction activities such as pile driving may disturb and mobilise marine sediments. Dredging will remove approximately 34.5 hectares of previously undisturbed potential benthic communities. Following this initial loss, dredging is expected to create similar benthic habitat in the newly disturbed area. Installing mooring piles will damage a further 53.76 square metres of potential benthic communities however the fisheries value of these communities is low. However, offsets may still be required for dredging and construction activities.
- Construction of the delivery pipeline and pump-out facility may affect marine plants including benthic communities, mangroves and a melaleuca wetland. Impacts on benthic communities would be temporary and short-term (six months), but proposed activities still require approval to proceed. Construction through the mangroves and melaleuca wetland will result in significant residual impacts, which will require offsets, and may require permits. (Part of the melaleuca wetland is contained within a regional ecosystem considered of concern.) These impacts will be avoided as much as possible by refining the pipeline route. Vegetation cleared for the delivery pipeline will be rehabilitated once the pipeline has been decommissioned.
- Vegetation to be cleared for the pipeline at Richters Creek mouth contains essential habitat for the southern cassowary and potentially, breeding habitat for the beach stone-curlew. Surveys prior to construction will be used to confirm the presence of this habitat, which is regulated. Works will be conducted outside breeding season for the beach stone-curlew and offsets may be required. Cleared habitat will be rehabilitated following decommissioning.
- While there is no important habitat for wildlife in or near Trinity Inlet, animals may transit through the project area during construction. Measures such as establishing an exclusion and observation zones around vessels and machinery, using low wattage lights and employing wildlife spotters will minimise injuries and noise, vibration and lighting impacts to dolphins, dugongs and turtles from moving vessels, dredgers and machinery. These are outlined in the dredge management plan (DMP).
- The project footprint overlaps the Trinity Inlet fish habitat area (FHA) by approximately 9.21 hectares. Dredging cannot commence in this area unless the FHA boundaries are amended, which is a legislative process that has the general support of the relevant Queensland Government agency. Proposed alterations would expand the FHA by five square metres overall. The risk of impacting fisheries resources through proposed activities is low.
- The delivery pipeline passes through Yorkeys Creek FHA, temporarily affecting approximately 0.32 hectares of the FHA for six months, for example, by creating a possible barrier to fish passage by trapping sand. Approvals must be obtained to support this activity, which will be monitored to prevent ecological damage. While the submerged delivery pipeline section in offshore areas is unlikely to trap fine-grain offshore sediment, it too will be monitored.

  - Dredging will disturb and expose potential acid sulfate soil (PASS) material, which could oxidise if exposed to air. However, the risk is negligible as the material remains waterlogged during normal operations of the trailing suction hopper dredger (TSHD). If PASS material is stored longer than 24 hours, it will be tested. An acid sulfate soils management plan (ASSMP) also will also be developed to guide activities.
  - Dredging will have low-to-negligible impacts on coastal processes. Concentrations of contaminants of concern released during dredging (i.e. metals or organic contaminants) are unlikely to pose a significant risk to the surrounding marine environment. No permanent or long-term adverse impacts on coastal processes are likely to occur from the delivery pipeline.
  - No ecological impacts are predicted for nearby coral reefs due to the Project.
  - A construction environmental management plan (CEMP), and the construction contractor's CEMP, will address potential marine water quality impacts by land-based construction activities, through measures such as soil sampling and stormwater management.
  - Spill of dredge material or pipeline failure poses the greatest risk to water quality from construction of the delivery pipeline. However, the potential risk is short-term and negligible, as is the risk to water quality from propeller wash disturbing sediments and earthworks.
  - Greenhouse gas (GHG) emissions will be generated during construction through capital dredging operations, and fuel combustion in plant equipment used in construction (22.95 ktCO2-e). While this amount does not trigger the *National Greenhouse and Energy Reporting Act 2007* (Cth) (NGER Act), measures such as training drivers in fuel-efficient practices will aid in reducing predicted GHG levels.

- Concurrent movement of existing shipping with dredges and other vessels associated with the Project's construction such as barges and those upgrading navigation aids will be managed through communication between vessel operators and Maritime Safety Queensland (MSQ) to reduce the chance of collisions, delays and congestion. A vessel traffic management plan (VTMP) will bolster existing port operational procedures. Ports North will work with the Regional Harbour Master (RHM) to determine appropriate measures, including an aid to navigation plan. Signage will be erected on the bank of Richters Creek outlining depth information to mitigate any potential danger to boat users from the delivery pipeline. The maritime operations management plan (MOMP) articulates measures to manage the environment, vessel safety, navigation and operational efficiency of the port post-construction of the Project.
- Land and underwater cultural heritage will be protected during the construction and decommissioning of the Project.
  - Future development applications for the heritage-listed Cairns Wharf Complex will include a heritage impact assessment and conservation management plan, and an archaeologist will monitor excavations near the 1940s multicultural camp, old Malay town, to preserve items of cultural heritage. A maritime archaeologist will be engaged to identify and preserve any potential historic shipwrecks in the area, which could include the Adieu, Mary and Miro.
  - Story places significant to the Gimuy Walubara Yidinji People may be impacted by dredging activities and port upgrades. Constructing the delivery pipeline across Richters Creek may also uncover Aboriginal artefacts or cultural heritage places, where the Yirrganydji (Irukandji) People #2 have a native title claim. CHMPs will be developed with affected parties. Precautionary measures such as surveying the proposed delivery pipeline corridor before works begin will be also undertaken.

- Dredging, port upgrades, the construction of ancillary infrastructure and dredge material delivery could adversely the community through noise, traffic, vibration and air quality impacts, unless managed.
  - The trailing suction hopper dredger (TSHD) will operate 24 hours a day, every day for 12 weeks. It will generally only operate near sensitive receptors moored in the Trinity Inlet shipping channel during standard construction hours, otherwise it will exceed noise targets. While noise levels may be experienced above noise targets during standard construction hours, works normally will last for limited periods of time only, as the TSHD is constantly moving. Vibration impacts will be negligible. Ports North will consult with potentially affected sensitive receptors, especially if scheduling constraints prove infeasible.
  - Ports North will also consult with moored sensitive receptors at Wharf Street waterfront and in Trinity Inlet during backhoe dredger (BHD) operations, which are planned for 24 hours a day, every day for five weeks, and wharf construction. Both activities will result in minor noise impacts. Works will be avoided outside of standard construction hours, as impacts would be high during these times. If night-time works are required, measures such as respite periods or even temporary accommodation may be required. Vibration will primary come from the piling hammer, which will be used on the heritage wharf but measures such as resilient pads and reducing the hammer energy will reduce impacts to negligible.
  - Levels of fine and heavy particulates, dust and nitrogen dioxide higher than standards are predicted at four nearby hotels and apartments from dredging and other construction activities. Using marine diesel fuel in the BHD and tugs will reduce predicted particulate matter, while measures such as water sprays will keep dust levels under control. To mitigate potential NO_2 exceedances, mobile cranes will be fitted with selective catalytic reduction (SCR) emission control technology. The CEMP outlines additional standard mitigation measures that will be employed. Baseline air quality monitoring of at least NO_2 and fine particles will be conducted prior to construction commencing at berth and a location representative of the Wharf Street apartments.
  - While noise and vibration associated with the Tingira Street DMPA is predicted to be minimal, fabrication of the delivery pipeline laydown site (Northern Sands DMPA) is predicted to exceed targets at sensitive receptors, unless mitigation measures are implemented. Sensitive receptors are not expected to be subjected to the predicted noise levels for more than a few days and measures such as temporary noise barriers will be used to reduce predicted noise levels.
  - Anticipated noise levels from the pump-out facility and booster pumps are expected to comply with the relevant noise level targets during best-case conditions, with possible night-time exceedances. Prior to construction, noise assessments of the pump-out facility, delivery pipeline construction noise and booster pumps will be undertaken to guide mitigation measures. A construction noise and vibration management plan will also be prepared for specific areas.
  - Land-based construction, particularly for the three pipeline laydown areas, will generate local traffic. Road haulage of the delivery pipeline segments and associated plant equipment is anticipated to occur outside of peak traffic periods and traffic impacts will be short-term. The road network can accommodate required truck movements and temporary vehicle access points will help manage traffic impacts.
- Operational impacts of the Project on the environment require management. More large cruise vessels docking at Trinity Inlet wharves and greater maintenance dredging, with the associated disposal of materials, could impact on marine water quality, noise and air quality.

- Existing legal requirements will reduce the potential for contaminants from increased shipping to impact on water quality. Only minor, long-term operational impacts are predicted.
- There will be more noise from ship engines, public address systems, docking and other aspects of shipping, adding to the already noisy environment of the port. Nearby hotels and apartments will be the most affected. Even in best-case conditions, noise above the Environmental Protection (Noise) Policy 2008 (EPP (Noise)) is predicted in some circumstances, such as the docking of medium and large cruise ships. However, this can be reduced to almost acceptable levels even in worst-case scenarios by closing doors and windows of sensitive receptors. No complaints have been received during these scenarios, which already happen at the port. If complaints are made in future, measures such as advance notice of impending visits by larger ships and avoiding docking and refuelling at night could be implemented.
- An increase in cruise ships, and larger cruise ships, at the port will see a corresponding increase in buses, taxis, private vehicles, delivery trucks and fuel tankers, all of which could pollute the air. Worse-case modelling shows levels of fine particulates and NO_2 that exceed standards could be expected at one sensitive receptor. The expected introduction of Commonwealth legislation from 2020 will reduce fine particulates from ships through the mandated use of low sulphur diesel (or an alternate such as engine scrubbers). Adoption of scrubbers would also reduce NO_2. Ports North will liaise with cruise ship companies and the Australian Maritime Safety Authority (AMSA)) to ensure compliance with regulations and encourage good practice to reduce emissions.
- Maintenance dredging operations and electricity use at port will generate GHG emissions. Mitigation measures will focus on the largest contributor of emissions – the dredge.

Of the 349 environmental risks identified, eight scored a medium risk rating when the adoption of tailored and best practice mitigation and management strategies was assumed. These include:

- increased annual siltation (two to six per cent) and maintenance dredging requirements
- saline water migrating from the DMPA and impacting on an aquifer
- unavoidable loss of a small area of low-value semi-tidal wetland habitat
- short-term reduction in ship arrivals impacting the Boat Club
- short-term reduction in ship arrivals impacting business and tourism operators
- temporary and reversible loss of coastal character from pipeline and laydown areas
- temporary and reversible visual intrusion from the pipeline and infrastructure.

Most residual risks are considered temporary and reversible and can be managed through specific strategies. No risks rated as extreme or high following this process. Low (122) and negligible (208) residual risks can be adequately managed by standard measures.

Economic Analysis

Economic analysis, utilising cost-benefit analysis (CBA), found the Project will deliver net economic benefits to Cairns and Queensland. At a seven per cent real discount rate the Reference Project has a net present value of $10.7 million and a benefit cost ratio of 1.1, as illustrated in Table E.2.

Table E.2: Key CBA Results (P90), Reference Project (Central Case)

COST-BENEFIT ANALYSIS RESULTS (P90)			
ITEM	4% (REAL)	7% (REAL)	10%(REAL)
PROJECT BENEFITS			
Total benefits	**$196,604,196**	**$124,793,612**	**$83,411,090**
PROJECT COSTS			
Capital costs	$114,501,189	$109,356,378	$104,594,834
Operating costs	$5,894,670	$4,704,311	$3,937,686
Total costs	**$120,395,859**	**$114,060,690**	**$108,532,520**
Net present value	**$76,208,337**	**$10,732,922**	**-$25,121,430**
Benefit cost ratio	**1.6**	**1.1**	**0.77**

Rigorous demand modelling informed the CBA, with the Central Case (or best estimate) adopted for the Reference Project. Highlights from the modelling include the following:

- Demand forecasts for the Base Case are outlined in Chapter 5: Base Case and reflect positive long-run trend growth in cruise ship calls in Cairns. The economic analysis assumed normal operations and maintenance activities under the Base Case including annual operational costs such as maintenance dredging and asset maintenance, plus activities outlined in Ports North's capital works program such as the demolition of Wharf 6 and a new fendering system.
- Demand modelling showed the Reference Project will increase total cruise ship calls in Cairns, with a step increase in ship calls into Trinity Inlet in 2020–21 as the Project comes online and faster growth from this point relative to the Base Case as the port capitalises on growing global demand for larger vessels, specifically vista class vessels and some grand class vessels with suitable dimensions (as shown in Figure E.1). It will also change the vessel mix by increasing vista class vessels (as shown in Figure E.2).

Figure E.1: Incremental Change in Cruise Ship Calls to Cairns (Relative to Base Case), Reference Project (Central Case)

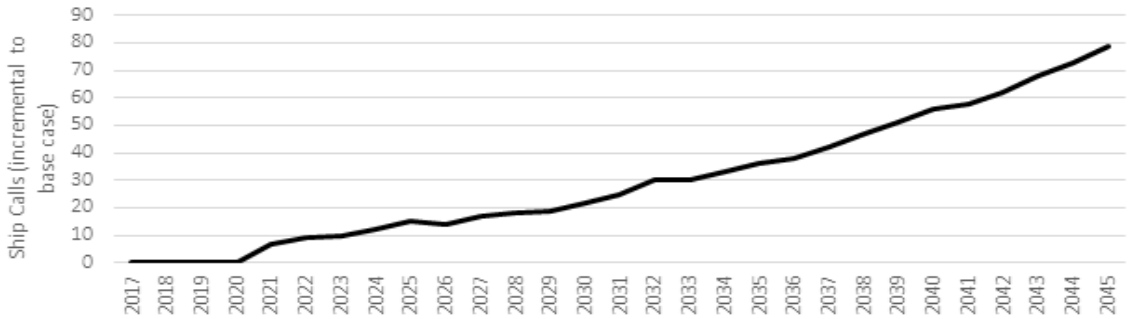
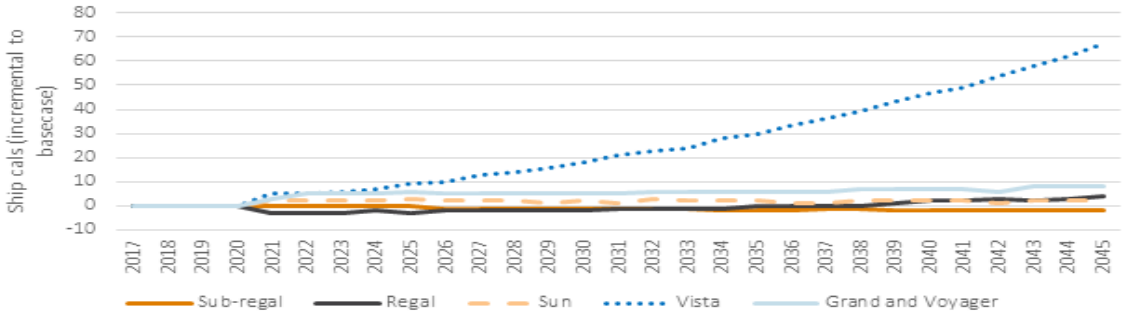


Figure E.2: Incremental Change in Cruise Ship Calls to Cairns (Relative to Base Case) by Vessel Type



Visitor expenditure by cruise passengers from overseas and interstate drives economic returns, which account for the bulk of project benefits (around 85 per cent of the total benefits). Widening and deepening Trinity Inlet and upgrading wharf infrastructure for longer ships will attract more vista class vessels (and some grand class vessels) to Cairns, which carry more passengers and tend to be associated with a higher average incremental passenger spends through longer stays and more overnight stays. This is estimated by the profit margin accruing to local businesses from additional cruise-related expenditure.

Enabling vista class vessels to dock at Trinity Inlet also allows cruise operators to develop new itineraries and more closely integrate the Port of Cairns with feeder ports such as Brisbane. This, in turn, would further support higher incremental spend by overnight visitors (cruise visitors and crew) and more transit visits. Industry confirmed this as one of the key benefits of the Project during consultation.

The Project will also improve access for other port users including the Royal Australian Navy and cargo movements and increase the resilience of the port to weather events. Relocation of the cargo ship swing basin will allow future navy base expansion. It would also enable the navy's larger ships (HMAS Canberra and HMAS Adelaide) to berth in Cairns, as well as large foreign navy ships.

Key monetised benefits from the Reference Project, in addition to cruise-shipping returns, include:

- additional port financial revenue linked to additional cruise ship calls by vessel type
- additional navy-related benefits through higher expenditure by visiting navy ships in the region.

Cargo movements could also experience improved efficiency through reduced operational restrictions, as may cruise passengers that no longer have to be tendered of Yorkeys Knob, but these benefits are only addressed qualitatively.

Sensitivity analysis indicates that the overall investment proposition provided by the Reference Project remains strong – with a positive NPV and BCR greater than one – even where a number of assumptions underpinning the assessment differ from the Central Case (refer to Table E.3). The results are particularly sensitive to the increased passenger spend and movement in the profit margin.

Table E.3: Sensitivity Analysis of CBA Results for Reference Project (Medium), P90, $2017–18 (@7%)

SENSITIVITY ANALYSIS			
ITEM	LOW	CENTRAL CASE	HIGH
CAPITAL EXPENDITURE	-10%	CENTRAL	10%
NPV	$21,668,560	$10,732,922	-$202,716
BCR	1.2	1.1	0.998

SENSITIVITY ANALYSIS			
ITEM	LOW	CENTRAL CASE	HIGH
Profit margin	**15%**	**16.5% Central**	**20%**
NPV	$463,226	$10,732,922	$34,341,233
BCR	1.0	1.1	1.3
Average occupancy rate	**90%**	**95% Central**	**105%**
NPV	$5,270,732	$10,732,922	$21,657,303
BCR	1.05	1.1	1.2
Increased passenger spend*	**$681**	**$851 Central**	**$1204**
NPV	-$10,988,100	$10,732,922	$55,725,046
BCR	0.9	1.1	1.5
Navy benefits	**-100%**	**Central**	**+50%**
NPV	$2,610,824	$10,732,922	$14,793,971
BCR	1.02	1.1	1.13
Crew benefits	**-10%**	**Central**	**+10%**
NPV	$3,609,710	$10,732,922	$17,856,134
BCR	1.03	1.1	1.2

Source: Deloitte Access Economics.
*Notes: * It is assumed that average overnight passenger spending increases to the regional average spend per international visitor.*

The economic analysis also considered two other potential demand scenarios, the results of which are presented in Table E.4:

- Possible but Unlikely (a downside scenario relative to the Central Case) – where developments at competing ports reduce large cruise ship calls into Cairns
- Optimistic (an upside scenario relative to the Central Case) – where developments at complementary ports increase large cruise ship calls into Cairns.

Table E.4: Scenario Analysis Findings, Demand, P90, $2017–18

COST-BENEFIT ANALYSIS RESULTS (P90)			
ITEM	4% REAL	7% REAL	10% REAL
NPV			
Reference Project (Medium)	$76,208,337	$10,732,922	-$25,121,430
Reference Project (Optimistic)	$192,520,756	$85,859,821	$26,152,551
Reference Project (Possible but Unlikely)	-$4,941,101	-$40,639,924	-$59,454,988
Reference Project (Medium)	1.6	1.1	0.8
Reference Project (Optimistic)	2.6	1.8	1.2
Reference Project (Possible but Unlikely)	0.96	0.6	0.45

Source: Deloitte Access Economics.

Financial and Commercial Analysis

The financial impacts of the Base Case and the Reference Project were examined over a 27-year evaluation term (two years for construction and 25 years for operations) for a medium demand scenario. All cash flows were risk-adjusted using probabilistic modelling. The financial analysis was independently peer reviewed.

Key findings of the financial analysis are as follows:

- The net cash inflow of the Reference Project is $27.4 million (nominal, unadjusted) lower than that of the Base Case. The net cash inflow of the Base Case is $77.3 million (nominal, unadjusted). The net cash inflow of the Reference Project is $49.9 million (nominal, unadjusted). However, the net position becomes an outflow of $13.7 million (FNPV, unadjusted) when the impact of discounting is considered.
- Sensitivity analysis of these net cash flow projections for the Reference Project suggests that introducing a new channel charge for vessels currently unable to access the port – considered feasible – would have a positive impact of $20.2 million, bringing net cash flows from a $13.7 million outflow to a $6.5 million inflow. Losing all homeporting activities – considered a worst-case scenario – would increase outflows by $11.3 million to $24.9 million. The net cash flow positions (unadjusted) are also positive under high and low demand scenarios in nominal terms.
- The total risk-adjusted (P90) net cash flow position of the Reference Project is ($49.4 million) (net cash outflow) in financial net present value (FNPV, P90) and $8.9 million (net cash inflow) (nominal, P90). These are respectively $89.2 million and $64.9 million lower than the net cash flow positions of the Base Case. Table E.5 summarises the risk-adjusted cash flow positions, while Table E.6 provides more detail on the financial analysis.
- The difference in net cash flows between the project options is largely driven by the intensive capital works required under the Reference Project, which accounts for approximately 70 per cent of total project costs based on the unadjusted values (FNPV). In comparison, capital costs required under the Base Case are considered minimal at approximately five per cent of total project costs based on the unadjusted values (FNPV).
- Total capital costs amount to $122.7 million (PV, P90 risk-adjusted) or $127.6 million (nominal, P90 risk-adjusted) under the Reference Project. In contrast, a total $1.6 million over the entire project life is required in capital costs under the Base Case.

- Over the life of the Project, maintenance dredging is projected to be the most significant ongoing cost under both Reference Project and Base Case.
- The revenue generated from cruise shipping activities is not sufficient to fund the capital costs required in the first two years of the evaluation period of the Reference Project. However, on an unadjusted basis it will be sufficient to offset the ongoing costs from FY2021 onwards.

Table E.5: Summary of Net Cash Flow Positions for the Base Case and Reference Project (P90)

NET CASH FLOW (P90 RISK-ADJUSTED)				
NET CASH FLOW	REAL ($ MILLION, $ YEAR)		NOMINAL ($ MILLION)	FNPV ($ MILLION)
	REF. PROJECT	REF. PROJECT	REF. PROJECT	
NET CASH FLOW	(37.3)	8.9	(49.4)	

Table E.6: Summary of Financial Analysis (P90 Risk-adjusted)

SUMMARY OF FINANCIAL ANALYSIS (P90 RISK-ADJUSTED)						
FINANCIAL ITEM	REAL ($ MILLION, $2018)		NOMINAL ($ MILLION)		PV ($ MILLION)	
	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT
REVENUE						
TOTAL REVENUE	*84.8*	*129.7*	*127.7*	*199.6*	*72.9*	*110.4*
CAPITAL COSTS						
TOTAL CAPITAL COSTS	*(1.6)*	*(123.1)*	*(1.6)*	*(127.6)*	*(1.6)*	*(122.7)*
ONGOING COSTS						
TOTAL ONGOING COSTS	*(37.5)*	*(46.0)*	*(53.7)*	*(65.5)*	*(32.8)*	*(40.2)*
NET CASH FLOW	**47.0**	**(37.3)**	**73.8**	**8.9**	**39.8**	**(49.4)**

Note: The risk-adjusted subtotals and totals presented in the above tables do not equal the sum of the individual line items. Aggregating the individual line items inappropriately overestimates risk-adjusted values on the subtotal and total levels, as it assumes that that each cost line item has experienced an unfavourable outcome.

Delivery Model Analysis

An analysis of the delivery models most likely to generate value for money (VfM) for government was undertaken for the Reference Project, developed in accordance with the PAF and Building Queensland guidance material. A workshop drawing together key stakeholders was central to this analysis.

After considering the key characteristics of the Reference Project, three discrete work packages for the Reference Project were identified, specifically:

- Dredging and Spoil Placement Works
- Bund Construction Works
- Wharf Infrastructure and Services Upgrade Works.

Examined against seven VfM criteria and precedent projects, a PPP was deemed unsuitable for all work packages as the Project has limited scope for innovation and cannot generate sufficient revenue and is too small to attract private sector interest. A PPP is also unlikely to offer a more efficient capital versus operating expenditure mix compared to traditional delivery models.

Traditional delivery models including construct only, design and construct (D&C), early contractor involvement (ECI), design, build and maintain, alliance, construction management and management contractor were considered for each work package. A construct only delivery model was found to be the best model for all three work packages as it has the ability to:

- achieve favourable capital cost outcomes, including cost certainty, in relation to Dredging and Spoil Placement Works and Bund Construction Works
- enable efficiency and efficacy in risk management by leveraging Ports North's ability to better manage key risks compared to the contractor
- ensure compliance with the strict conditions stipulated by the EIS and other legal requirements.

Overall, it was identified that Ports North is better placed to manage certain key project risks compared to a contractor due to its extensive experience in dredging and wharf construction projects.

Affordability Analysis

Despite the net cash inflow expected under the Reference Project in nominal terms, analysis of the cash flow profile indicates a funding gap during the construction period from FY2019 to FY2020, due to the capital-intensive nature of the Reference Project. Taking into account currently committed government funding, the funding gap related to the construction period is $67.5 million (nominal, P90) or $64.6 million (NPV, P90).

Without the committed government funding of $60.0 million (nominal), the Reference Project is expected to break-even by FY2045. With the government funding included, the break-even year would be accelerated to FY2038.

Potential additional funding sources must be explored to bridge the funding gap. Ports North is potentially capable of servicing additional debt to finance the Project. The potential for debt financing is further supported by the Reference Project's projected ability to generate surpluses throughout the operations period from FY2021 onwards.

Debt financing may be obtained from QTC and NAIF subject to Queensland Government approval. While the Reference Project appears to satisfy all five mandatory eligibility criteria stipulated by NAIF, debt from NAIF must satisfy NAIF's requirement that the return on the facilities it advances will cover at least the Commonwealth Government's cost of funding and NAIF's administrative costs.

The NAIF Board will also have regard to the potential effect of the project on other infrastructure and of the NAIF's financing on the Australian infrastructure financing market and on the potential of the NAIF investment to encourage private sector participation in financing the project.

Infrastructure Australia has highlighted the primacy of infrastructure investment in fast-growing regions in northern Australia, which includes Cairns. Given the Reference Project's ability to foster economic growth in the Far North Queensland region, there is potential for federal government funding.

Funding sources and partnership opportunities with the private sector including (but not limited to) cruise ship operators, superannuation funds and specialised investment funds and consortiums could potentially be pursued.

Conclusions

Located on Trinity Inlet, at the edge of the Coral Sea in Far North Queensland (FNQ), the Port of Cairns is a cornerstone of the region's tourism and trade sectors. Ideally situated alongside the Cairns central business district (CBD), it serves as a gateway to international export and tourism markets and underpins Queensland's growing cruise ship industry.

More international and domestic visitors are arriving in Cairns each year, drawn by its easy access to the Great Barrier Reef, located just 25 kilometres offshore, and the Wet Tropics World Heritage Area, two of the world's largest natural attractions. Excellent rail, road and air links to other regional tourism destinations and capital cities across the country also make it an ideal entry point for visitors. Visitations reached almost 2.8 million in 2015, with many visitors arriving via cruise ship.

Cruise shipping is the fastest growing tourism market worldwide. Steady long-run growth in cruise ship calls in Cairns over the past decade mirrors this growth. Last year, cruise ship visits reached an all-time high of 77, up from 34 cruise ship visits in 2010. Yet Cairns is largely missing out on one of the most lucrative emerging markets – the mega class market. Globally, cruise shipping operators are moving towards larger sized ships, that is, vessels able to carry more than 2,000 passengers. Larger cruise ships improve economies of scale so operators can cut ticket prices and boost their market appeal.

Cairns cannot accommodate these 'mega class' vessels as the existing channel into the port is not wide or deep enough to allow safe access and the heritage listed wharves have insufficient structural capacity to handle increased berthing loads. Instead, larger vessels must anchor at Yorkeys Knob, 15 kilometres north of Cairns, and ferry passengers ashore. This practice is difficult and time consuming for passengers (taking up to 3.5 hours), diminishing their travel experience. It discourages visits by larger ships and limits onshore visitations when they do. About 10 per cent of ship visits are lost entirely when rough weather makes shore transfer by tender unsafe.

The channel's depth can also constrain the size of cargo ships able to enter the port, often forcing them to wait for the right tidal conditions, and limit the Australian Defence Force's ability to base larger ships at HMAS Cairns. HMAS Cairns, the second largest naval base on Australia's east coast, is located on Trinity Inlet but the location of the cargo swing basin used by navy ships restricts the base's capacity to expand. It also cannot host larger Australian and foreign navy ships.

Improving the Port of Cairns' capacity for larger ships was first proposed by the state government-owned corporation Ports North in 2012 through the Cairns Shipping Development Strategy. This strategy explored potential options for upgrading the channel and port and led to the Cairns Shipping Development Project (the Project), which has been the subject of rigorous environmental impact assessment.

A draft environmental impact statement (EIS) for the Project was prepared in 2015, with a Revised Draft EIS (RDEIS) prepared in 2017 following legislative change prohibiting marine disposal of capital dredging material, which was originally proposed. The Reference Project now complies with dredging-related legislation, and anticipated dredge volumes have been reduced from 4M cubic metres to 1M cubic metres.

Key components of the Reference Project include:

- dredging a wider and deeper entrance channel and cruise ship swing basin to allow access for ships up to 300 metres long

- relocation of the cargo ship swing basin to facilitate the expansion of the navy base
- placement of dredged material to two land-based dredge material placement areas (DMPAs)
- upgrading berth infrastructure within Trinity Inlet.

The Coordinator-General's Evaluation Report on the Environmental Impact Statement (CGER) sets out comprehensive conditions to manage potential environmental impacts, particularly on the Great Barrier Reef World Heritage Area (GBRWHA) and Great Barrier Reef Marine Park (GBRMP). Multiple laws and regulations must be addressed by the Project, requiring proactive management and significant documentation. Legislative change is also required to the Fish Habitat Area (FHA). The Department of Environment and Science (DES) (formerly the Department of National Parks, Sport and Racing) has confirmed in principle support for the proposed amendment.

The Reference Project will significantly contribute to achieving government objectives of economic development in Northern Australia, tourism growth and development in FNQ, a more competitive and efficient shipping industry in Cairns and Queensland, more resilient state infrastructure and a stronger Australian Defence Force capability in Northern Australia.

Key findings of the detailed business case are summarised below:

- Total capital costs amount to $122.7 million (PV, P90 risk-adjusted) or $127.6 million (nominal, P90 risk-adjusted) under the Reference Project. The PV P50 risk adjusted capital cost is $112.9 million or $117.5 million (nominal).
- An economic assessment of the Reference Project found that it will deliver net economic benefits to Cairns and Queensland, primarily through greater visitor expenditure by cruise passengers. The Project will see almost a tripling of current ship visits within 13 years (based on 2016 figures), a higher incremental spend by overnight visitors and maturation of the cruise ship industry in Queensland. Utilising cost-benefit analysis (CBA), it was found the Project will deliver net economic benefits to Cairns and Queensland. At a seven per cent real discount rate the Reference Project has a net present value of $10.7 million (P90) and $20.0 million (P50), and a benefit cost ratio of 1.1 (P90) and 1.2 (P50).
- It will also support the planned $635 million upgrade of HMAS Cairns, enabling the navy's larger ships to berth in Cairns, increase the port's resilience to extreme weather and improve the efficiency of existing cargo ship operations by giving vessels a larger window of entry and egress to the port.
- The financial assessment found that despite the net cash inflow expected under the Reference Project in nominal terms, analysis of the cash flow profile indicates a funding gap during the construction period from FY2019 to FY2020, due to the capital-intensive nature of the Reference Project.
- The affordability analysis found that taking into account currently committed government funding, the funding gap related to the construction period is $67.5 million (nominal, P90) or $64.6 million (NPV, P90). Without the committed government funding of $60.0 million (nominal), the Reference Project is expected to break-even by FY2045. With the government funding included, the break-even year would be accelerated to FY2038.
- The social impact evaluation found that the Reference Project will have a significant positive impact through increased employment and business opportunities. This has flow-on effects to community health and wellbeing and the stability of local small businesses, which translates into intergenerational benefits. The Reference Project will also improve cruise passenger safety and experience, liveability for residents and traffic conditions for users of the road corridor from Yorkeys Knob to Cairns City. All potential negative impacts were rated as low by the qualitative risk assessment, except for disruption to accessing the boat ramp (which dropped to low after mitigations were assumed) and the effects of

landside construction and increased ship arrivals at the Port of Cairns on Wharf Street residents, which received a medium rating.

- The delivery model analysis conducted for this DBC identified three discrete work packages for the Reference Project (Dredging and Spoil Placement Works, Bund Construction Works and Wharf Infrastructure and Services Upgrade Works), with a construct only delivery model recommended for all packages. Dredging is planned to commence in early 2019 and be complete by April 2020 with channel dredging planned between May to September 2019. Early works are commencing in the second half of 2018.

Assurance

The DBC has been reviewed to provide assurance that it:

- is complete: that is, includes all necessary information for the investment decision
- includes reliable and reasonable information: that is, the quality of the information is appropriate and can be relied upon, assumptions and the methodology for assessments are documented and assessments were completed with appropriate expertise and rigour
- is comparable: that is, it utilises assessment methods and data that enable it to be compared to other business cases
- establishes a transparent case for the investment: that is, information has been prepared without bias and with all risks, implications and mitigations are clearly documented
- clearly identifies ownership: that is, it clearly articulates the single point of accountability for the development of the DBC, engagement of stakeholders and the delivery of the anticipated benefits.

Implementation Plan

Delivery of the Reference Project will be managed by Ports North. A Project Control Group (PCG) will manage and monitor the Reference Project, and report to the Ports North Board. It will be aided by a technical advisory group (TAG), consisting of subject matter experts with the responsibility of reviewing data related to water quality and ecosystem health. A Project Director will oversee all day-to-day management activities.

Ports North will engage suitably experienced, specialised contractors to undertake the DMPA preparation works, dredging (and associated works) and wharf construction works.

Assuming the Reference Project is approved for implementation in September 2018, development and procurement activities, including approvals and design development, would take place through to May 2019 when dredging begins. (Pre-construction works such preparation of the DMPAs and facilities for barges and dredges and environmental monitoring would begin in late 2018). The Reference Project would be complete by April 2020.

Ports North has established processes and procedures for the governance, procurement and management of major projects. Project management plans and associated documentation have also been prepared to guide and assist the Project's implementation, including:

- project procurement plan
- dredging and construction methodology
- cost estimate
- project schedule.

A detailed project management plan identifying key stakeholders, communications protocols, risk and treatment plans as well as program and budget for the next project phases will also be prepared.

A Benefits Register has been generated for the Reference Project which identifies draft metrics and proposed measures to identify the benefits realised. Specific roles and responsibilities for delivering, measuring and reporting on project benefits will be identified and assigned to ensure accountability.

CHAPTER 1
GOVERNANCE

CAIRNS SHIPPING DEVELOPMENT PROJECT

CHAPTER SUMMARY AND CONCLUSIONS:

- The Project Owner is Far North Queensland Ports Corporation Limited trading as Ports North.
- Ports North entered into a formal agreement in December 2017 for Building Queensland to lead the development of the DBC. The DBC was jointly prepared by Building Queensland's Project Team and Ports North representatives under the leadership of the Building Queensland Project Director.
- A Project Working Group (PWG) helped to develop the DBC content, with representation from Building Queensland, Ports North and other groups as required.
- The Project Steering Committee (PSC) provided strategic direction for the DBC and was comprised of representatives from Ports North, Building Queensland, Department of Transport and Main Roads (TMR), Queensland Treasury (QT), Department of the Premier and Cabinet (DPC), Department of Innovation, Tourism, Industry Development and the Commonwealth Games (DITID) and Department of State Development, Manufacturing, Infrastructure and Planning (DSDMIP). The PSC operated under a Terms of Reference.
- The PSC will consider the final DBC, endorse or reject the recommendations and submit the DBC to the Building Queensland Board.
- This DBC has been developed using Building Queensland's Business Case Development Framework (BCDF).

1.1 Purpose

This chapter sets out the governance structure and arrangements for the Project during the development of the DBC. Specifically, this chapter outlines:

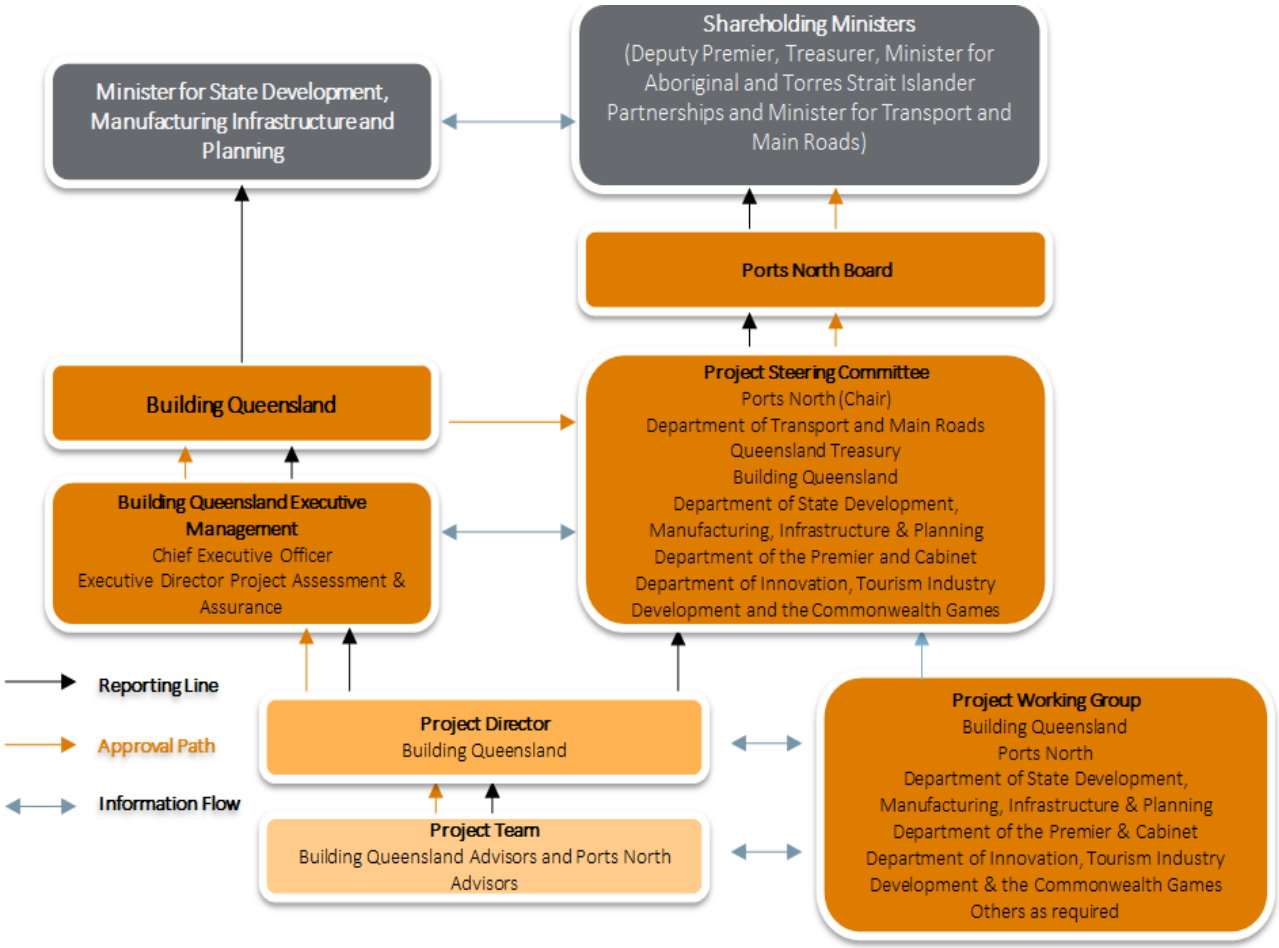
- the governance structure for the development of the DBC
- the roles and responsibilities of the key governance bodies during development of the DBC.

1.2 Governance Structure and Ownership

The governance framework was established by Building Queensland in conjunction with the Project Owner Ports North[1]. The Senior Responsible Officer for the Project is the Ports North Chief Executive Officer. The governance structure illustrated in Figure 1.1 was adopted for the DBC's development to guide and inform decision-making and to facilitate a transparent and accountable reporting framework.

[1] Far North Queensland Ports Corporation Limited, trading as Ports North, is a Queensland Government-owned corporation responsible for the development of the declared Ports of Cairns, Cape Flattery, Karumba, Mourilyan, Skardon River, Quintell Beach, Thursday Island, Burketown and Cooktown.

Figure 1.1: Project Governance Structure



Ports North entered into a formal agreement with Building Queensland in December 2017 to lead the development of the DBC.

DBC development was overseen by the PSC, which operated under a Terms of Reference.

1.2.1 Overview of Ports North

Ports North is the designated Proponent for the Project.

Far North Queensland Ports Corporation Limited, trading as Ports North, is a Queensland Government-owned corporation responsible for the development and management of declared ports including the Port of Cairns. Ports North is governed by key legislation including *Government Owned Corporations Act 1993* (Qld) and regulations and *Transport Infrastructure Act 1994* (Qld) and regulations. The Ports North Board has primary responsibility to its shareholding Ministers to establish strategic direction, pursue established corporate objectives and monitor business performance.

1.2.2 Overview of Building Queensland

Building Queensland, an independent statutory body established under the *Building Queensland Act 2015*, is responsible for leading the preparation of business cases for infrastructure initiatives proposed by government agencies with an estimated capital cost of $100 million or more[2], which includes this Project.

1.3 Roles and Responsibilities

Table 1.1 provides an overview of the roles, responsibilities and composition of the oversight and management bodies for the Project.

Table 1.1: Role of Key Governance Bodies

ATTRIBUTE	DESCRIPTION
PROJECT STEERING COMMITTEE (PSC)	
Role	The role of the PSC was to: ▪ provide leadership and direction for the development of the DBC ▪ endorse key elements of the DBC as it was developed, in accordance with specified control points ▪ consider the final DBC and make recommendations to the Building Queensland Board and Ports North Board
Composition	Membership of the PSC included: ▪ Ports North ▪ Building Queensland ▪ TMR ▪ QT ▪ DPC ▪ DITID ▪ DSDMIP The PSC could agree to vary the membership as required.
Responsibilities	The responsibilities and functions of the PSC included: ▪ meeting monthly (with special meetings called by the Chair to discuss critical issues as appropriate) ▪ issuing an agenda prior to all meetings and recording of minutes ▪ the functions described in 'Role' above ▪ being the primary control point approval body, addressing key components of the DBC systematically as it was developed ▪ endorsing key DBC outputs and documentation ▪ conducting a budget review and acceptance.

[2] Building Queensland's functions and powers are set out in the *Building Queensland Act 2015* and include leading the development of business cases for projects with potential government investment over $100 million.

ATTRIBUTE	DESCRIPTION
PROJECT DIRECTOR	
Role	The Project Director was responsible for managing the day-to-day activities required to develop and deliver the DBC.
Composition	Project Director, appointed by Building Queensland
Responsibility	The Project Director was responsible for managing the Project Team, overseeing the management of advisors, coordinating and responding to key stakeholder interests and needs, and progressing project-related recommendations to the PSC.
PROJECT WORKING GROUP (PWG)	
Role	The PWG provided a forum for the Project Team, Proponent representatives and government agency representatives to discuss DBC progress, critical and emerging issues, resolution strategies and the DBC work program.
Composition	Membership of the PWG included: ▪ Ports North ▪ Building Queensland ▪ TMR ▪ QT ▪ DPC ▪ DITID ▪ DSDMIP. The PWG could invite observers and parties to participate as required.
Responsibility	The PWG was required to: ▪ meet monthly to consider progress of the DBC, discuss and respond to critical and emerging issues, devise resolution strategies and discuss the budget for developing the DBC ▪ provide a forum for PWG members to access information to brief their respective agencies ▪ issue an agenda prior to all meetings and record minutes ▪ document the meetings and actions raised at all meetings ▪ identify issues to be raised with the PSC ▪ undertake budget review and forecasting and make recommendations.
PORTS NORTH EXTERNAL ADVISORS	
Role	▪ Ports North engaged various external advisors to assist with development of the DBC.
PROJECT TEAM	
Role	The Project Team supported the Project Director to develop the DBC.
Composition	▪ Project Manager/s ▪ Project Support Officers (Building Queensland) – as needed
Responsibility	Under the direction of the Project Director, the Project Team was responsible for: ▪ addressing and resolving issues to ensure the successful completion of the DBC ▪ assisting the Project Director to manage and oversee external advisors ▪ responding to issues raised by the Proponent ▪ maintaining appropriate records of issues and responses ▪ budget preparation and management.

ATTRIBUTE	DESCRIPTION
BUILDING QUEENSALND EXTERNAL ADVISORS	
Role	Building Queensland engaged external advisors (through competitive tendering processes) to assist with development of the DBC.
Composition and responsibilities of successful engagements	▪ External advisors were engaged to complete the demand assessment, price modelling, analysis of demand risks, economic feasibility analysis, accounting treatment, Reference Project analysis, operating model analysis, delivery model analysis, value capture assessment, market sounding, public sector comparator, value for money assessment, affordability analysis and chapter drafting. External advisors were also engaged to conduct peer and technical reviews.

CHAPTER 2
METHODOLOGY

CHAPTER SUMMARY AND CONCLUSIONS:

- This DBC has been developed in accordance with Building Queensland's BCDF and the Queensland Government's Project Assessment Framework (PAF).
- Various methodologies were utilised for specific assessments such as the sustainability assessment, economic analysis, social impact evaluation, environmental assessment, financial and commercial analysis, delivery model analysis and affordability analysis.
- Extensive stakeholder engagement and consultation has been undertaken for the Project, specifically for the EIS (from October 2012 to September 2014) and the RDEIS (from March 2016 to May 2017).
- Multiple options have been assessed at various stages of the planning process over the past 10 years. Extensive investigation of options was undertaken before 2012 and for the Draft EIS, to support project re-calibration following regulatory change in 2015, and for the preparation of the RDEIS and this DBC.
- Adopted methodologies for ongoing management strategies, including risk and stakeholder management, are in line with the requirements of the BCDF and other industry practices (including risk management principles and practices as outlined in ISO 31000:2009).

2.1 Purpose

This chapter outlines the approach used to develop the DBC and the methodologies utilised in the development and assessment of options. The DBC has been developed in accordance with Building Queensland's BCDF and the Queensland Government's PAF.

2.2 Methodologies Utilised

Various methodologies were used for specific analyses and assessments conducted for the DBC such as the sustainability assessment, economic analysis, social impact evaluation, environmental assessment, financial and commercial analysis, delivery model analysis and affordability analysis. Further details on methodologies can be found in relevant chapters.

Table 2.1 summarises the methodology employed for the options analysis.

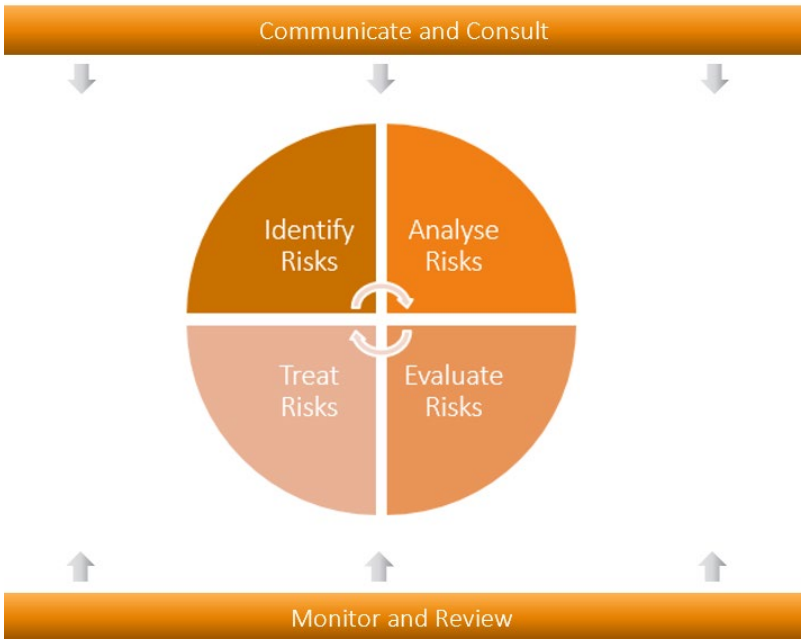
Table 2.1: Methodology Used for the Options Analysis

METHODOLOGY
OPTIONS ANALYSIS
1. Summarise previous studies and findings
2. Define scope based on technical investigations and expert advice
3. Examine the Reference Project in terms of the current and known policy environment, legal and regulatory requirements, market conditions and public interest considerations

2.3 Risk Framework and Approach

The risk management process implemented to assess project risk is based upon the practices of the ISO 31000:2009 risk management standards. The risk management process is documented in Figure 2.1.

Figure 2.1: Risk Management Process



The development, delivery and identification of operational risks will require ongoing management, overseen by the nominated Project Director. Risks were initially identified through a workshop comprising key internal stakeholders and advisors. Risks were categorised as inherent (planned) or contingent (unplanned) risks. This list formed the basis of the risk adjustment, calculated in the Monte Carlo simulation to determine the risk-adjusted cost estimate.

Risks identified in the risk register have been given due consideration and managed during the DBC development. This ensured the Reference Project accounted for key risks and considerations, and that risks were incorporated into cost estimates.

Following a review of the existing risk matrices used by Ports North, it was decided that a project-specific risk matrix (refer to Figure 2.2) should be developed to represent the likelihood and consequence of the risks expected to be encountered.

Figure 2.2: Risk Matrix

HEAT MAP		CONSEQUENCE					
		0%	5%	10%	30%	70%	100%
LIKELIHOOD	0%	0	1	2	3	4	5
	10%	1	L	L	L	M	M
	30%	2	L	L	M	M	H
	50%	3	L	M	M	H	H
	70%	4	M	M	M	H	E
	90%	5	M	M	H	H	E

Table 2.2: Risk Rating

	RANK	ACCEPTABILITY	CODE	DESCRIPTION	RATING
RATING	1	Broadly acceptable	L	Broadly acceptable, manage by routine procedures	Low
	2	Tolerable	M	Tolerable, implement controls	Moderate
	3	Undesirable	H	Undesirable, implement controls to reduce risk	High
	4	Extreme	E	Intolerable, do not undertake	Extreme

Guidance from Ports North was initially used to interpret the likelihood of risks and consequences.

The likelihood is linked to a probability range, which in turn is linked to a probability represented during the statistical analysis. The mid-point of the range is used as the value to represent the range for modelling purposes (refer to Table 2.3).

Table 2.3: Likelihood Rating

	RANK	PROBABILITY	%	DESCRIPTION	CHANCE OF OCCURRENCE	
LIKELIHOOD	1	Rare	10%	The event may occur only in exceptional circumstances	10%	Less than 10% chance of occurrence during the course of the Project
	2	Unlikely	30%	The event could occur at some time	30%	Less than 30% chance of occurrence during the course of the Project
	3	Possible	50%	The event should occur at some time	50%	Less than 50% chance of occurrence during the course of the Project
	4	Likely	70%	The event will probably occur in most circumstances	70%	Less than 70% chance of occurrence during the course of the Project
	5	Almost certain	90%	The event is expected to occur in most circumstances	90%	Less than 90% chance of occurrence during the course of the Project

The risk analysis considered both quantitative and qualitative implications from identified risk events. These included risks associated with:

- land (acquisition/easement and compensation)
- approvals
- environmental
- cultural heritage
- design and construction
- operations
- process risks (including governance, business case development, technical, financial and commercial, legal and stakeholders)
- revenue and demand risk.

For the purposes of the DBC, risks determined to have a cost or time impact were quantified and included in the risk-cost analysis and associated provisions. Table 2.4 summarises the cost impacts and time delays used for each consequence category.

Table 2.4: Consequence Categories

	RANK	CONSEQUENCE	%	FINANCIAL IMPACT		SAFETY	LEGAL IMPACT	REPUTATION
				% OF PROJECT VALUE	CR SET FINANCIAL RISK VALUE:			
	0			0%	$	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
CONSEQUENCE	1	Insignificant	5%	1%	$400,000	No injuries	Minor noncompliance	Minor adverse local public or media attention or complaints
	2	Minor	10%	2%	$3,000,000	First aid treatment	Minor legal issues	Media attention and heightened by concern by local community, state government scrutiny
	3	Moderate or medium	30%	5%	$6,000,000	Medical treatment	Serious breach of regulations with investigation and report, possible fine	Significant adverse media or public attention, federal government scrutiny
	4	Major	70%	10%	$10,000,000	Injuries resulting in surgery or permanent disability	Major breach of regulations and major litigation	Serious public and national media outcry
	5	Severe or critical	90%	25%	$20,000,000	Fatalities	Significant prosecution and fines, serious litigation, class actions	International outrage

2.4 Stakeholder Engagement Approach

During the preparation and submission of the EIS, Ports North conducted stakeholder engagement and consultation from October 2012 to September 2014. Extensive activities were also undertaken for the preparation of the RDEIS from March 2016 to May 2017. Engagement focused on the people and groups with the greatest potential to be impacted by dredging to expand the shipping channel as this is the major component of the Project.

A stakeholder engagement plan was not completed during the development of the DBC.

Table 2.5 summarises the key stakeholders identified during the EIS and RDEIS.

Table 2.5: Identified Stakeholders

AUSTRALIAN GOVERNMENT
▪ Department of Defence – Royal Australian Navy (HMAS Cairns) ▪ Department of the Environment and Energy (DoEE) ▪ Great Barrier Reef Marine Park Authority (GBRMPA) ▪ Federal Member for Leichhardt ▪ Treasurer of Australia
STATE GOVERNMENT
▪ Department of Aboriginal and Torres Strait Islander Partnerships (DATSIP) ▪ Department of Agriculture and Fisheries (DAF) ▪ Department of Environment and Heritage Protection (DEHP) ▪ Department of National Parks, Sport and Racing (DNPSR) ▪ Department of Science, Information Technology, Innovation (DSITI) ▪ Department of State Development – Coordinator-General ▪ Department of Infrastructure, Local Government and Planning (DILGP) ▪ QT ▪ TMR – Maritime Safety Queensland (MSQ) (Harbour Master) ▪ Minister for Trade and Investment ▪ Minister for Transport and Main Roads ▪ Minister Assisting the Premier on North Queensland ▪ State Member for Barron River
CAIRNS REGIONAL COUNCIL
▪ Mayor ▪ Councillors ▪ Council officers

BUSINESS AND INDUSTRY GROUPS
▪ Economic development bodies: – Advance Cairns – Cairns Chamber of Commerce ▪ Tourism industry: – Queensland Tourism Industry Council – Tourism Tropical North Queensland ▪ Cruise shipping companies and related industry bodies: – Australian Cruise – Ports Australia – Royal Caribbean – Carnival
COMMUNITY/SPECIAL INTEREST GROUPS
▪ User groups: – Port tenants – Local Marine Advisory Group – Ports Advisory Group (Cairns) – Technical Advisory Consultative Committee – Association of Marine Park Tourism Operators – Alliance for Sustainable Tourism ▪ Environmental groups: – Cairns and Far North Environment Centre – World Wildlife Foundation – Reef and Rainforest Research Centre ▪ Other: – East Trinity Group
INDIGENOUS GROUPS
▪ Indigenous Parties ▪ Irukandji People ▪ Gunggandji People ▪ Mandingalbay People ▪ Gimuy Walubara Yidinji People ▪ Other unknown native title claimants for the outer channel

2.5 Options Selection Approach

Ports North is in the process of updating and documenting a complete stakeholder and community engagement plan for the next phase of the Project.

The Project has been considered and under review for more than 10 years. During this time, a number of project options have been considered.

Extensive planning has been undertaken by Ports North for the Project, with options assessed at various stages of the planning process, including:

- pre-2012 activities of environmental management and investigation of options
- post-2012 and pre-regulatory change involving the Draft EIS
- post-regulatory change involving project re-calibration and preparation of the RDEIS
- preparation of this DBC, including a technical peer review.

CHAPTER 3
PROPOSAL BACKGROUND

CHAPTER SUMMARY AND CONCLUSIONS:

- Tourism and trade in FNQ make a significant contribution to the Cairns, Queensland and Australian economies. As a gateway to international markets and a key destination on the Queensland cruise itinerary, the Port of Cairns is an important component of the tourism and trade sectors.
- The Port of Cairns also plays a role in the nation's defence, border and security operations in the Indo-Pacific region by hosting the Royal Australian Navy base of HMAS Cairns, the second largest naval base on the east coast of Australia.
- Expanding Cairns' cruise ship facilities would improve tourism opportunities in FNQ and grow cruise shipping operations in Queensland. It also aligns with the long-term development intent for Cairns' waterfront urban revitalisation project, Cityport.
- The global and domestic cruise shipping sectors are growing strongly:
  - Globally, passenger numbers have increased at a compound growth rate of around five per cent (over the nine years to 2018).
  - The Australian cruise industry is also experiencing steady growth, with Australian passengers predicted to reach two million annually by 2020. Australia has the highest market penetration rate in the world, with further potential to develop if existing capacity issues and constraints in regional ports can be addressed.
  - Queensland is Australia's second largest cruise ship market. More than 850,000 cruise passengers visited Queensland destinations in 2016–17, injecting significant benefits into regional economies. This equates to 391 ships calls, representing annual growth of more than 18 per cent.
  - Cairns hosted 60 ship calls in 2016, up from 34 in 2010. Total ship calls reached 80 in 2017, boosted by a P&O homeporting trial. Overnight calls to Trinity Wharf are increasing in popularity.
- Globally, cruise ship operators are trending towards larger cruise ships to capitalise on economies of scale. This is reducing ticket prices for passengers and enhancing product appeal, which is likely to lead to greater sector growth.
- Cairns cannot currently capitalise on this trend as the existing channel into the Port of Cairns is not wide or deep enough to allow safe access for larger ships. The size of the channel and location of the existing swing basin also restricts the expansion of HMAS Cairns.
- The Project will enable Cairns to capture a greater share of the growing cruise shipping market and secure associated economic benefits. More vessels, and longer vessels, visiting the port would inject greater revenue into the local economy and help expand the cruise industry in FNQ and Queensland.
- A Preliminary Business Case (PBC) was not prepared for the Project. However, a draft EIS for the Project was prepared in 2015, with a RDEIS prepared in 2017 following legislative change prohibiting marine disposal of capital dredging material.

3.1 Purpose

This chapter outlines the background to the Project, including work undertaken prior to the development of this DBC. It also describes the broader context of the Project and contains a discussion on the global and domestic cruise shipping industry, with a specific focus on Cairns.

3.2 Cairns and Far North Queensland

3.2.1 Overview and Location

Cairns is located at the base of Cape York Peninsula on a coastal strip between the Coral Sea and the Great Dividing Range in Far North Queensland (FNQ). The city itself sits adjacent to Trinity Bay, with the Port of Cairns located on the bay's southern shore at Trinity Inlet, alongside the CBD.

The presence of the port and an international airport make Cairns highly accessible to the Asia Pacific region. Nicknamed the Gateway to the Tropical North, Cairns is FNQ's major transport hub. It has highway links to the rest of Australia, with good road connections to regional destinations such as Cape York Peninsula, Gulf of Carpentaria and Atherton Tablelands.

With a gross regional product close to $16 billion, the Cairns region has a diverse economy and a steadily growing population that is expected to reach 392,000 in 2036. The Bama Aboriginal People are the traditional owners of the Cairns region and 15 culture groups live in the area.

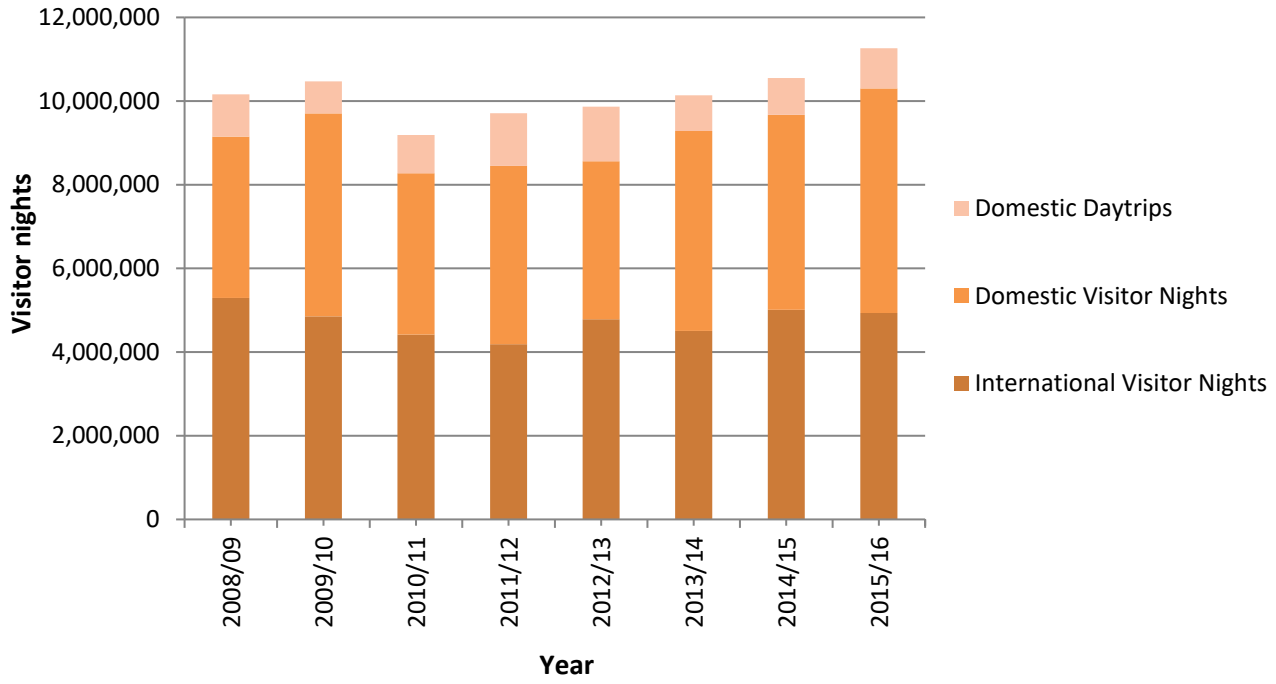
3.2.2 Tourism

Cairns is the gateway to two of the world's largest natural attractions, the Great Barrier Reef and Wet Tropics World Heritage Area, which attract thousands of local, intrastate, interstate and international tourists each year.

Tourism is a key economic driver for the Cairns region and has been identified as a focus for further economic growth under the Australian Government's Developing Northern Australia initiative. Cairns has long been FNQ's centre for domestic and international visitors, due to its easy access to major attractions and winter sunshine. In recent years, Cairns has seen a substantial increase in domestic and international visitors, with visitations reaching close to 2.8 million in 2015. Holidaymakers drawn to the combination of reef and rainforest make up 63 per cent of visitors to the region. In 2016, visitor expenditure contributed $2.1 billion to the Cairns economy.

Figure 3.1 below shows the breakdown of visitor nights in Cairns from 2008 to 2016. In the last eight years, Cairns experienced a gradual increase in visitor nights averaging four per cent per annum, with the 2015–16 year experiencing significant growth of seven per cent. International and domestic visitor nights are generally equally split, averaging 43:47 per cent of trips. The Cairns tourism industry is performing favourably when benchmarked against Queensland, which has experienced an average growth of three per cent per annum over the last five years.

Figure 3.1: Cairns Tourism Nights 2008–2016



Source: Tourism Research Australia National Visitor Survey and International Visitor Survey 2016.

Cairns is seen as an attractive opportunity for investment, as evidenced by tourism attractions, event infrastructure and resort developments in the pipeline, as shown in Table 3.1. Recently completed attractions include the $50 million Cairns Aquarium, completed in September 2017. The four-story attraction is the first aquarium to be built in Australia in 17 years. It exhibits aquatic displays of coral, plants, fish and animals found in habitats unique to Northern Queensland and is already drawing visitors to the area.

Table 3.1: Proposed Tourist Developments in Cairns

PROJECT	STAGE	DESCRIPTION
Crystalbrook Collection Cairns	Under construction	Tourism and hospitality group, Crystalbrook Collection, has invested $500 million in three new international five-star hotels in the Cairns CBD. The hotels will cater for a potential 600,000 guests a year. The first hotel is due to open in 2018, followed by the second hotel in 2019 and third hotel in 2020.
Cairns Convention Centre expansion	Proposed (Funded by Queensland Government in 2017–18 budget)	The proposed $176 million expansion and upgrade of the Cairns Convention Centre includes refurbishment of the existing centre, new exhibition space and meeting rooms. The proposed upgrade is predicted to have major economic benefits for Cairns, including an additional $30 million of economic benefit for the regional economy each year, 20,000 extra visitors annually and job creation.
Cairns Airport redevelopment	Proposed	The $1 billion development plan sets out the vision for the airport precinct over the next 20 years and includes an Asia-Pacific business centre, a private hospital, department stores, and leisure and tourism developments.

3.2.2.1 Tropical North Global Tourism Hub

Ports North, in partnership with the Queensland Government, is developing a proposed Tropical North Global Tourism Hub in Cairns targeting international tourists.

The preferred site for this dynamic new tourism opportunity is on strategic port land within the Cityport precinct at Wharf Street. It comprises of a total area of 4.85 hectares across two sites.

Cityport is a long-established waterfront urban revitalisation project on the eastern side of the Cairns CBD. The strategic waterfront location, scale and significant redevelopment capacity of Cityport continues to transform the Cairns CBD, offering unprecedented opportunities to stimulate the south-eastern edge of the city centre as a tourism, accommodation and entertainment destination for Cairns and the Asia Pacific region. Existing successful developments within Cityport include Cairns Marlin Marina, Shangri La Hotel, Reef Fleet Terminal, Cairns Harbour Lights Apartment Hotel, Hilton International Hotel, Cairns Cruise Liner Terminal and the heritage-listed Wharf Shed 2.

The Tropical North Global Tourism Hub will be an extension of Port's North vision for Cityport, developed in close consultation with the Cairns community, delivering even greater benefits for the community and region.

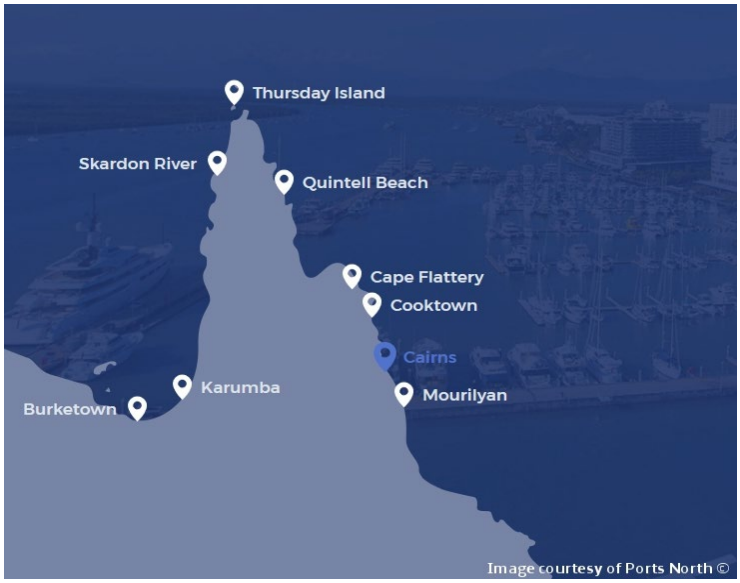
3.2.3 Trade and Infrastructure

The Australian Government recognises the strategic importance of infrastructure in Northern Australia, particularly transport infrastructure, to the nation's economic health and export industry. The Northern Australia White Paper identifies sea ports, airports and road and rail logistic centres as key gateways for Australia into international markets. Through the Northern Australian Infrastructure Facility (NAIF), the Australian Government is providing $5 billion towards loans to develop major infrastructure such as ports, rail, pipelines and electricity and water supply. A total of $75 million has also been promised over 10 years to establish a Cooperative Research Centre, which will identify opportunities for business and growth in the north, including through tourism.

The Port of Cairns provides vital export and import links to domestic and international markets:

- Strategically, it is Australia's closest port to the international ports of South East Asia and emerging markets in the Indo-Pacific region.
- It links trade to remote communities in the Gulf of Carpentaria and Cape York Peninsula, especially during the wet season when roads and highways are often closed due to flooding (refer to Figure 3.2).

Figure 3.2: Ports in Far North Queensland



The Port of Cairns is the most northern trading port on the eastern seaboard of Australia, and the natural centre for supplies shipped to the mining and coastal communities north and west of Cairns including the North East Mineral Province, the Torres Strait Islands and Gulf of Carpentaria. The port is a supply and service centre for the Freeport mine operations in Indonesia with regular mine-servicing shipping operations out of the port.

The port's bulk cargo includes petroleum products, sugar, fertiliser and liquid petroleum gas. The port's project cargo contracts range from the Rio Tinto Amrun Bauxite Mine construction project to the Ratch Australia Corporation's Mount Emerald Wind Farm project and the MSF Sugar Tableland Mill power station project.

Total trade through Cairns during 2015–16 was 1.1 million tonnes. This was a decrease of 158,859 tonnes compared to the previous year's figures. However, since 2011–12, the port has seen a significant increase in bulk exports (see Figure 3.3). Total imports and export of container trade also increased in that time period from 13,456 twenty-foot equivalent unit (TEU) in 2011–12 to 25,916 TEU by 2015–16[3].

Figure 3.3: Total Throughput at Port of Cairns[4]

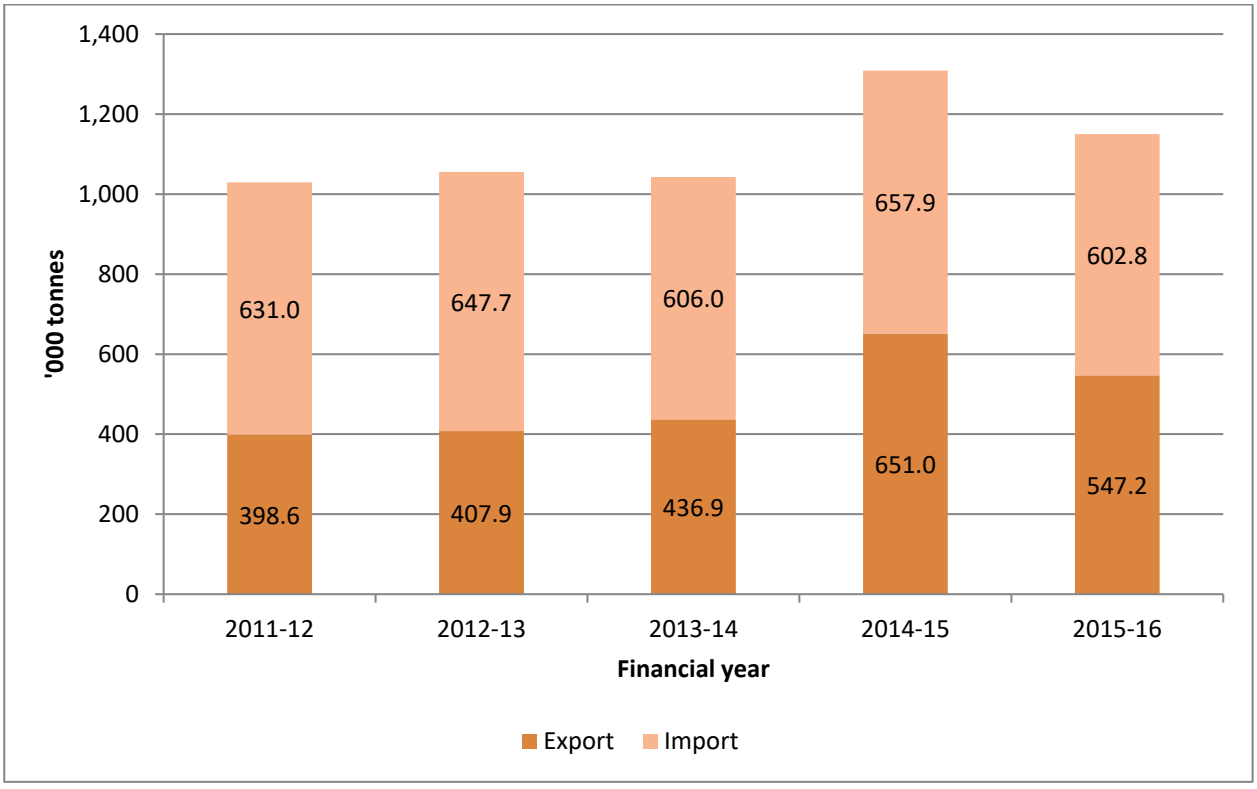
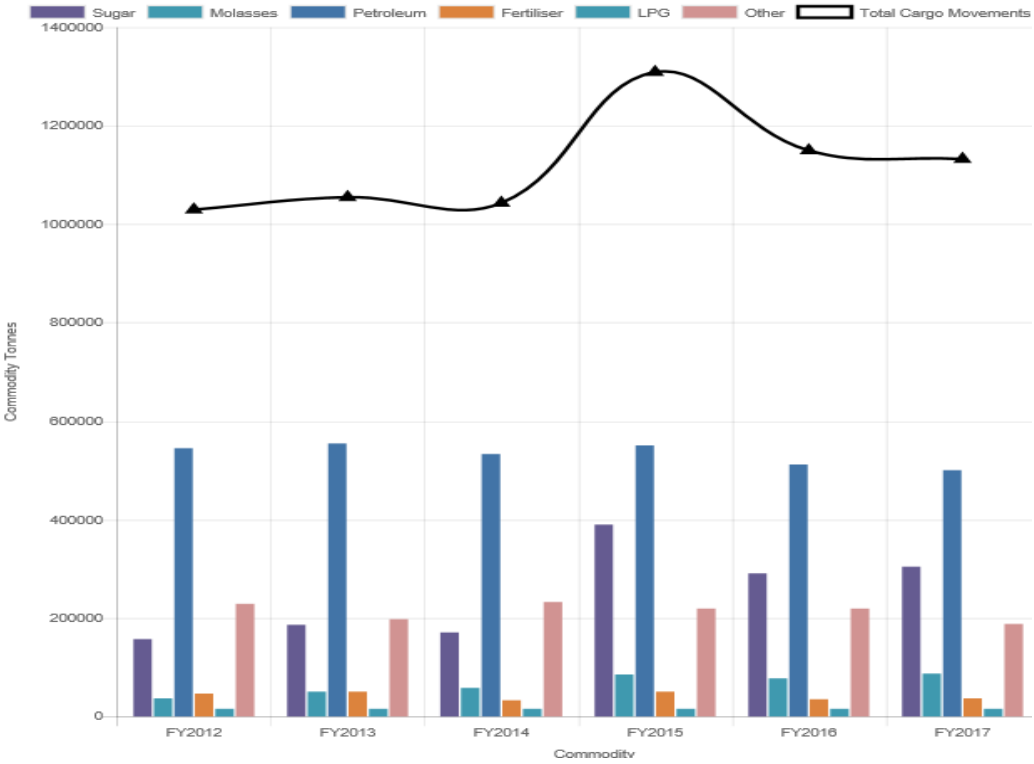


Figure 3.4 shows the cargo movements (tonnes) for the Port of cairns from 2012 to 2017 financial years.

[3] TMR, *Trade statistics for Queensland ports – throughput statistics for the five years ending 30 June 2016*, 2017.
[4] TMR, *Trade statistics for Queensland ports – throughput statistics for the five years ending 30 June 2016*, 2017.

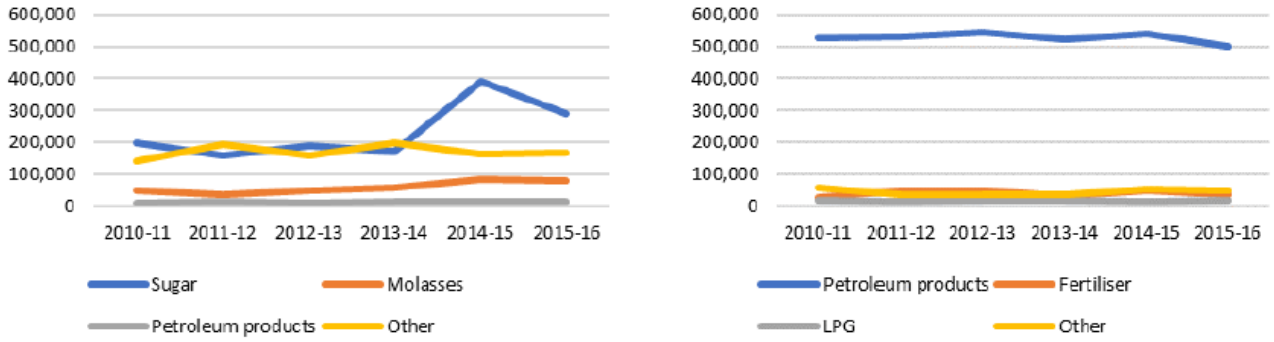
Figure 3.4: Port of Cairns – Cargo Movements (Tonnes)



Source: Ports North.

Figure 3.5 shows that the main export at the Port of Cairns is sugar and general cargo and the main import is petroleum products.

Figure 3.5: Port of Cairns – Cargo Movements (tonnes) – Exports and Imports Respectively



Source: Ports North.

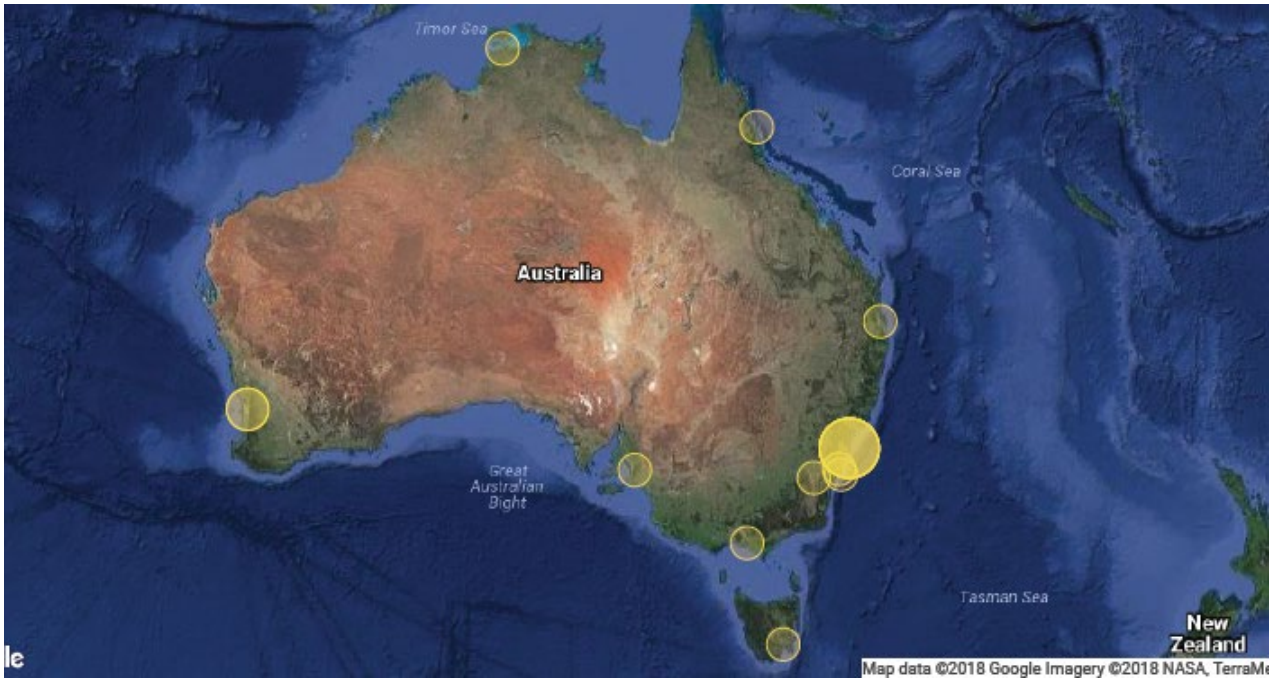
3.2.4 National Defence

Northern Australia is a hub for Australia's Defence capability and is essential for defence and security cooperation in the Indo-Pacific region. It is also focal point for Australia's defence cooperation with regional partners such as the United States, New Zealand, Japan, Indonesia, India, Singapore, Korea and China and is the primary staging ground for the United States force posture initiatives over the next decade. The Royal Australian Navy base of HMAS Cairns is located within the Trinity Inlet. As the second largest naval base on the east coast of Australia, it plays a major role in Australia's defence, border and security operations. Figure 3.6 shows the locations of HMAS establishments in Australian ports, including HMAS Cairns.

HMAS Cairns has responsibility for all Australian naval activity extending off north-eastern Australia, from Rockhampton to Thursday Island, with 900 navy and civilian personnel. It is the homeport for 14 naval vessels and the ships of the Royal Australian Navy Hydrographic Service. HMAS Cairns' primary responsibility is to provide maintenance, logistic and administrative support for Cairn-based units. HMAS Cairns also provides refit and training support for neighbouring Pacific Island nations (pacific class patrol boats).

The Northern Australia White Paper highlights the economic contribution of Defence activities and facilities in Northern Australia. This Defence presence is expected to grow in coming years, with the Australian Defence Force recently announcing a $635 million upgrade for HMAS Cairns over the next 12 years (refer to Chapter 7: Strategic Considerations for additional detail). However, the current size of the shipping channel into the Port of Cairns and the location of the existing cargo swing basin restricts HMAS Cairns' potential for expansion (refer to Chapter 4: Service Need for additional detail).

Figure 3.6: Key Defence Facilities in Australia

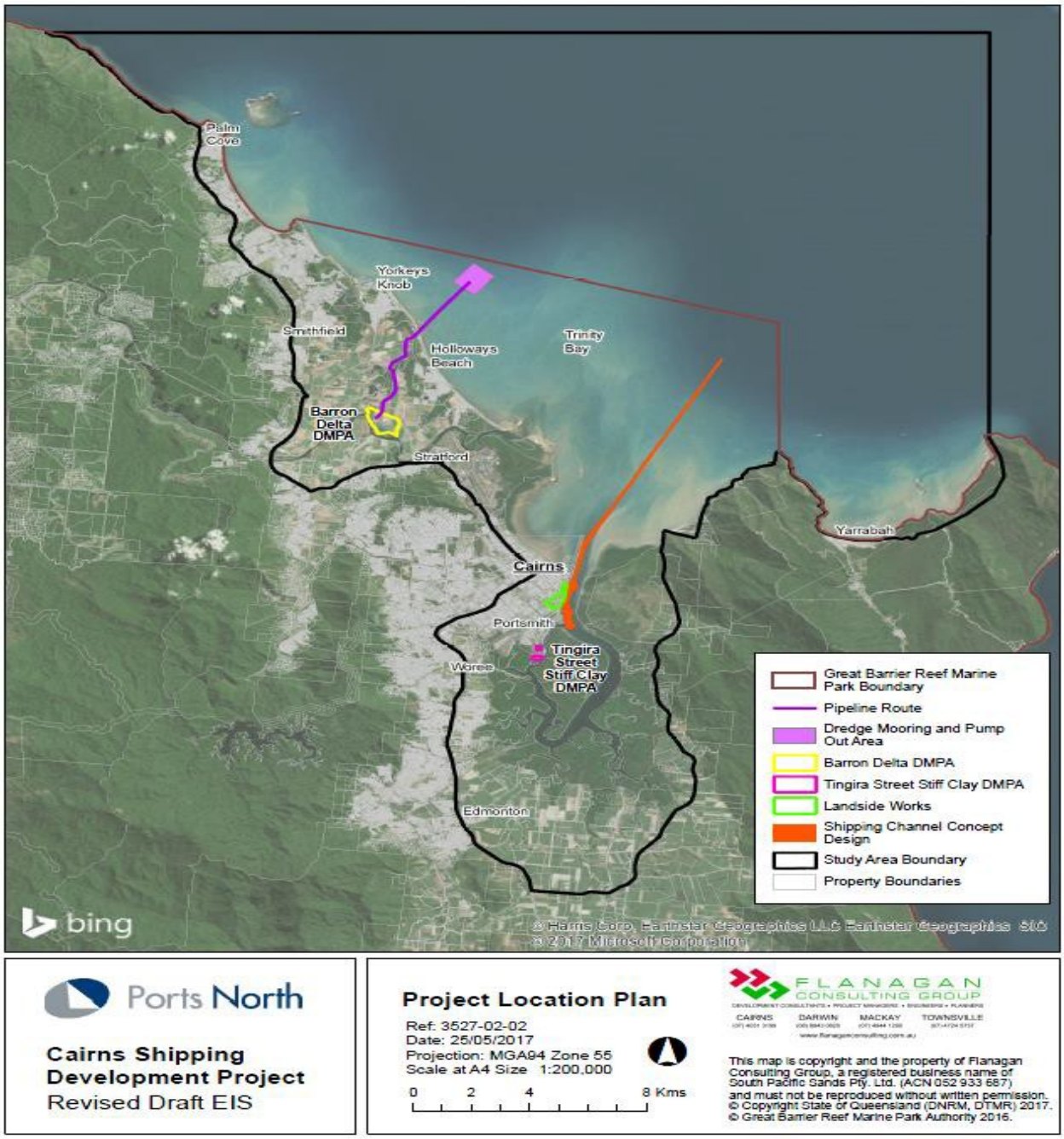


3.3 Cruise Shipping Industry in Cairns

Cairns has a strong cruise shipping industry. Cruise ships visiting Cairns either berth at Trinity Wharf at the Port of Cairns or anchor four kilometres offshore at Yorkeys Knob. The existing channel for the Port of Cairns is not wide or deep enough to allow safe access for larger vessels, particularly mega cruise ships, which must anchor at Yorkeys Knob and tender passengers ashore (refer to Chapter 4: Service Need for additional detail). Figure 3.7 shows the location of the Port of Cairns in relation to Yorkeys Knob.

Ports North's Cityport LUP guides development of the port. The Cityport Master Plan (amended March 2013) indicates that achieving the long-term development intent and vision for Cityport requires additional infrastructure such as a new marina and an international cruise liner terminal.

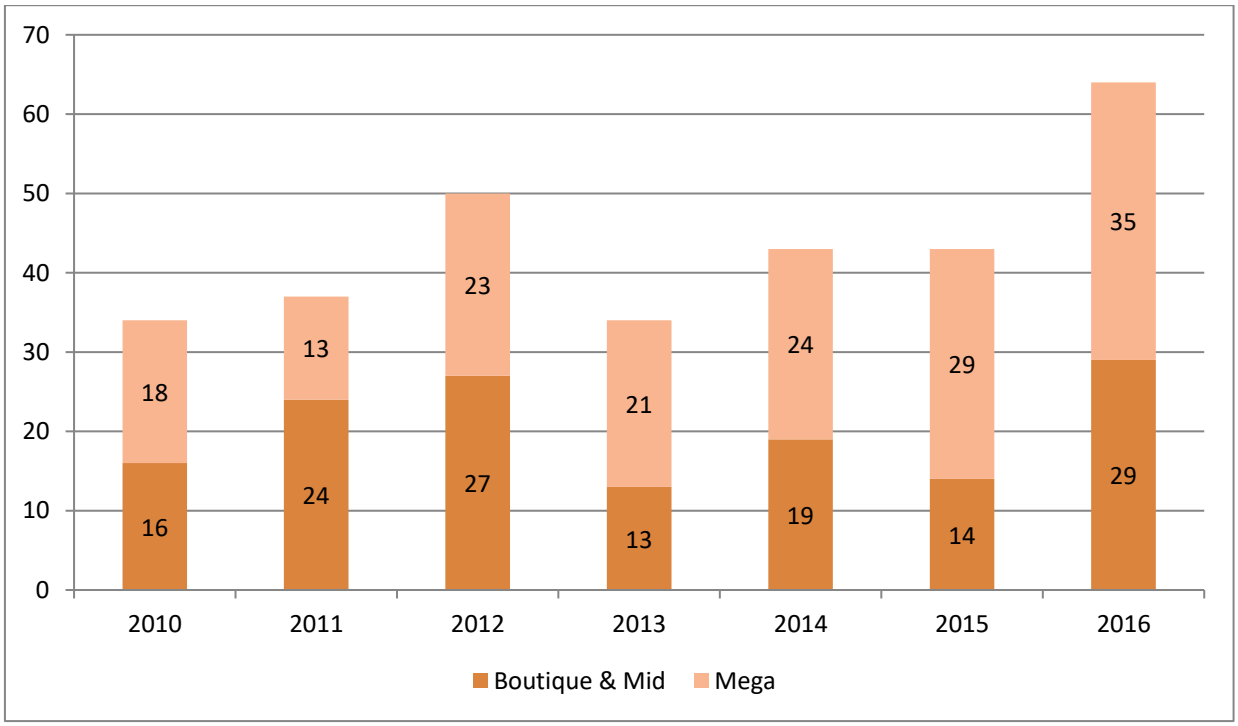
Figure 3.7: Locations of Port of Cairns in Relation to Yorkeys Knob



Excluding adventure ships, 43 cruise ships visited Cairns in 2015 and 64 in 2016, up from 34 in 2010, with an increasing proportion of mega class vessels, i.e. vessels that carry more than 2,000 passengers (refer Figure 3.8). Of these, 20 visited Trinity Wharf in 2015, up from 19 in 2010. In comparison, the share of ships to the Yorkeys Knob anchorage increased from 15 visits to 21 visits from 2010 to 2015, to 24 in 2016. This represents an increase in the CAGR to 8.1 per cent over the six-year period.

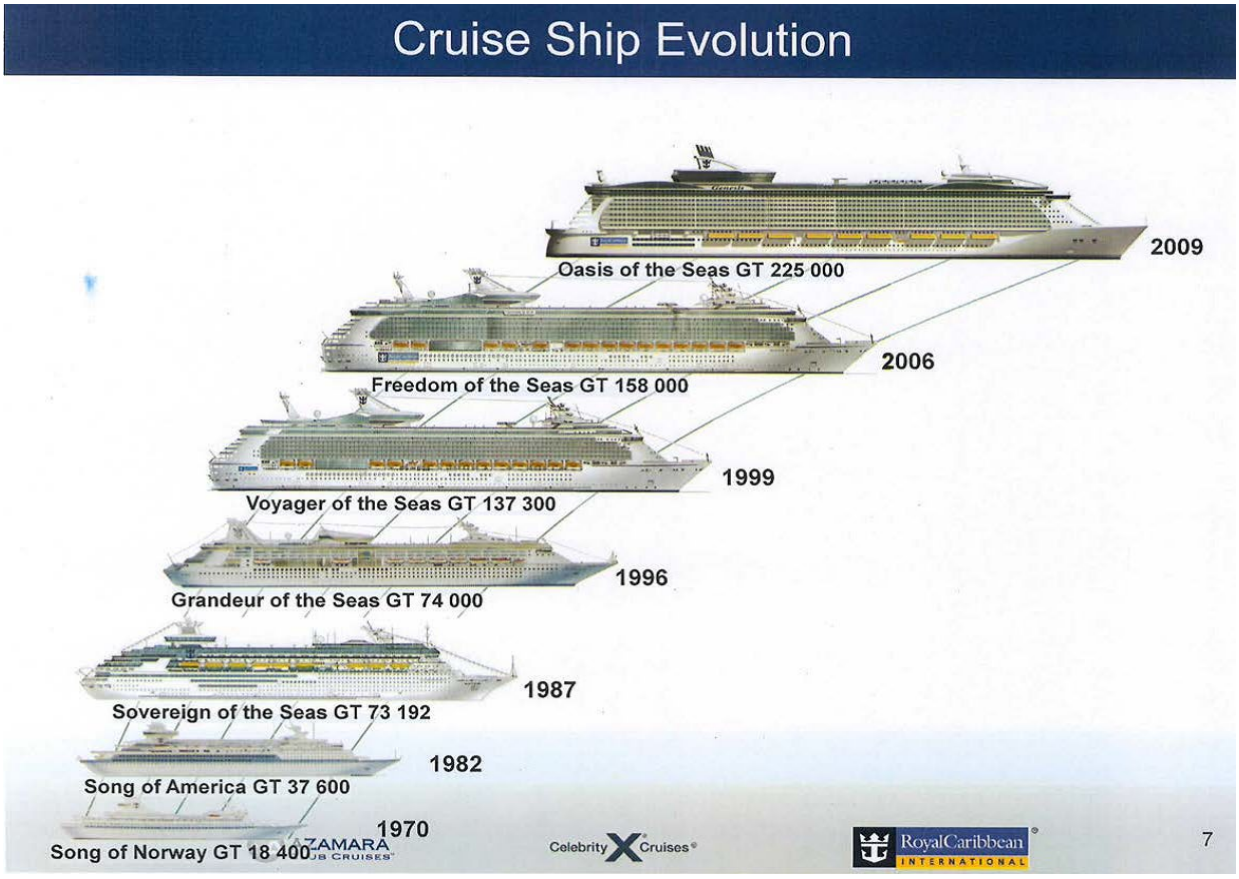
Scheduled cruise ship visits in 2017 reached 80 ships, with figures boosted by a homeporting trial by P&O, which will cease in 2019 (not shown in the Figure 3.8).

Figure 3.8: Cairns Historical and Scheduled Ship Visits (Boutique, Mid and Mega Class)



These figures demonstrate an increase in the size of cruise ships visiting Cairns reflecting a broader global trend towards larger cruise ships. The evolution towards larger vessels can be seen in Figure 3.9.

Figure 3.9: Royal Caribbean International Cruise Ship Evolution



3.4 History of the Project

Expanding cruise ship facilities at the Port of Cairns would enable Cairns to capture a larger share of the growing cruise shipping market and secure associated economic benefits. Increasing the number of cruise vessels – and the size of vessels – visiting the port would deliver considerable benefits to the local economy and the wider Queensland cruise industry. This, in turn, would strengthen FNQ's cruise shipping industry and bring growth, stability and diversity to the Cairns tourism market sector.

3.4.1 Review of Previous Work

Improving the Port of Cairns' capacity for larger ships was first proposed by Ports North in 2012 through the Cairns Shipping Development Strategy. This strategy explored potential options for upgrading the channel and port and led to the Cairns Shipping Development Project (the Project), which has been the subject of rigorous environmental impact assessment.

Broadly, the Project originally involved:

- expansion of the existing shipping channel and shipping channel swing basin
- placement of maintenance dredge material at sea within the GBRMP
- establishment of a new swing basin to support future expansion of the HMAS Cairns navy base
- structural upgrade of the existing shipping wharves
- provision and upgrade of services to the wharves.

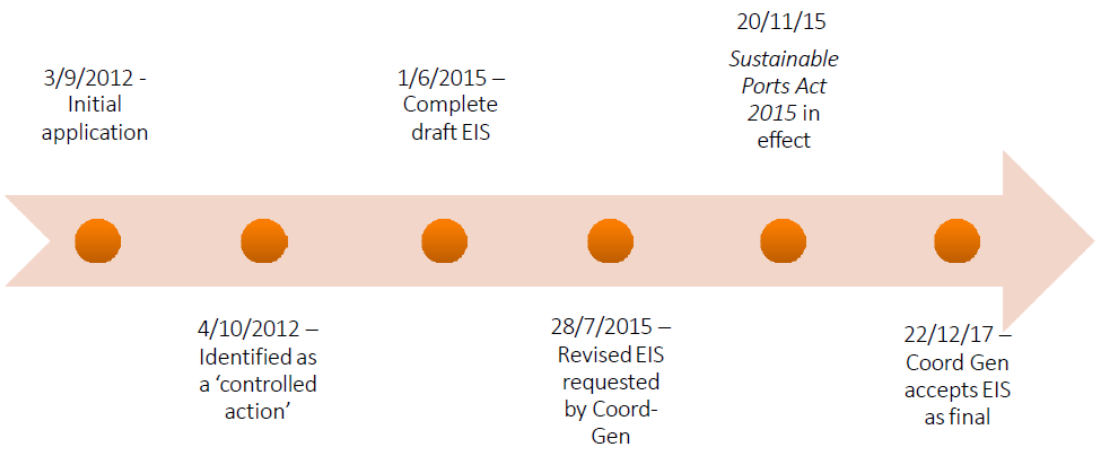
A Draft EIS was published for public and agency review in 2015. However, assessment of the Draft EIS by the Coordinator-General was not completed, and due to changed circumstances (described in Section 3.4.2 below), a Revised Draft EIS (RDEIS) was required.

The RDEIS commenced in 2016 and was finalised in 2017. It recommended limiting the size of ships into the Port of Cairns to 300 metres, reducing the proposed size of the channel and the amount of dredge material. The RDEIS also indicated how and where the dredged material could be on placed on land.

A Supplementary Report was published in December 2017. In 2018, work began on this DBC. A PBC was not prepared due to the in-depth study and analysis undertaken for the EIS and RDEIS.

The key decision timeline is shown in Figure 3.10.

Figure 3.10: Key Decision Timeline for the Project



3.4.2 Legislative Change

A fundamental shift in the regulatory environment occurred in June 2015 when sea dumping of capital dredge material in the GBRMP was banned and the Queensland Government passed the SPD Act.

This effectively prohibited dredging above certain thresholds at the Port of Cairns (except under the RDEIS process) and required, under section 36(2), that any substantial placement options or reclamation of land options within the GBRWHA would need to meet a 'beneficial reuse' test.

As marine placement was the basis of the original Project, there was a need to 'recalibrate' the Project to comply with the new regulatory environment and find an alternative to marine placement. Recognising the significant cost premium associated with land placement, it became evident that proposed dredge volumes would need to be reduced.

Ports North commissioned MSQ to undertake cruise ship navigation simulations to identify the channel characteristics that would optimise cruise ship numbers, while limiting required dredging volumes. Simulations focused on minimising channel widening and deepening to facilitate usage of the channel by vista and grand class vessels, without compromising safety.

The output of the MSQ simulations in 2015 determined that a recalibrated channel with the following characteristics would permit safe usage by cruise ship vessel classes up to vista classes (and some grand classes):

- 8.8 metre declared channel depth
- deepening of Crystal Swing Basin
- new Smiths Creek Swing Basin with a diameter of 310 metres
- an outer channel width of 90–100 metres
- an inner channel width generally to 110 metres (outer bend to 180 metres).

Key considerations in developing the design and the features of the Reference Project are outlined in Chapter 6: Reference Project. A significant reduction in the anticipated dredge materials was achieved through this process.

The size of the channel proposed by the RDEIS would also provide safer access for the Royal Australian Navy ships, including the new land helicopter dock class ships, with reduced operational restrictions. The larger United States Navy ships that cannot currently berth at the Port of Cairns could also be accommodated by the proposed channel upgrade.

Consequently, upgrading the Main Swing Basin and channel south of the Crystal Swing Basin included as part of the RDEIS would provide potential opportunities to expand the naval facilities in Cairns.

Recalibrating the Project and reducing the dredging required made land placement opportunities for the dredge material potentially viable. Ports North commissioned a Dredge Material Placement Options Study to examine dredging and land placement options further, building on work documented in the Draft EIS, to inform the RDEIS for the Project.

The selection process used to identify a preferred site (or a small group of sites) involved four main tasks as follows:

- Site selection – high level screening to define locations (placement precincts) where possible sites and types of sites could be located. The high-level screening did not include existing legislative/planning constraints.

- **Concept design** – preliminary concept design to produce a suite of potential sites within the placement precincts. These nominal sites are representative of the placement precincts.
- **Site evaluation** – evaluation of potential sites using multi-criteria analysis (MCA) techniques.
- **Suitability assessment** – assessment of the findings of the site evaluation task on a placement precinct-level and further refinement. This included consideration of planning constraints, cost, strengths, weaknesses and any serious deficiencies of sites to produce a shortlist of placement precincts for detailed assessment.

The work resulted in the identification of two possible precincts for a DMPA – the East Trinity precinct and the Barron Delta precinct.

Following publication of the RDEIS, and commencement of this DBC, the Coordinator General's Evaluation Report on the Environmental Impact Statement (CGER) (February 2018) was released. Findings within the document have been incorporated into the DBC.

3.4.3 Dredging in the Port of Cairns

The Project proposes capital dredging works in the shipping channel. Dredging has been a feature of the port's management since its inception.

Trinity Inlet is subject to high siltation, as is the bay into which it flows. Over time, large amounts of sediment have been deposited in the protected waters of Cairns harbour and Trinity Bay, mainly by the Mulgrave River, which formerly flowed into the bay. This sediment is subject to resuspension and transportation around the bay by local currents. Major weather events such as cyclones bring significant rainfall and storm surcharge, which not only affect sea levels but also increase the amount of silt suspended within the waterways and sedimentation in the inlet.

Since 1876 when the Port was declared, it has been necessary to maintain a channel through the bays' shallow waters so ships can enter the port located at the downstream end of Trinity Inlet. Over the years, this channel has been widened and deepened via several capital dredging campaigns to cater for larger vessels. Regular maintenance dredging has been undertaken to remove material deposited in the channel and maintain the channel dimensions. Material from capital and maintenance dredging has been placed both on land and offshore over this time, with the latter being the current situation. The current DMPA for maintenance dredging is located some 14 kilometres offshore, within the GBRMP.

3.4.3.1 Overview of Dredging Activities

On 1 November 1876, Cairns was declared a 'port of entry and clearance'. Subsequent to this declaration, the first capital dredging works were undertaken within the access channel and berths by the Platypus dredge in 1887 and later by the larger Trinity Bay dredge, which took up operations from 1913, deepening the channel and increasing its width to 45 metres by 1929. By the early 1940s the channel had been widened progressively to 60 metres. The Sir Thomas Hiley dredge replaced the Trinity Bay during the early 1970s and was responsible for further widening the channel to 75 metres and deepening it to 8.2 metres. The most recent capital dredging expansion occurred during 1990, widening the channel to 90 metres and deepening it to a design depth of 8.3 metres. This capital dredging campaign was required to accommodate the new Panamax class vessels and the Ampol TVA fuel carrier.

The Port of Brisbane dredge replaced the Sir Thomas Hiley in 2001 and has continued to provide dredging to the Port of Cairns annually since that time. Maintenance dredging by the Brisbane has been augmented by the Ports North's Willunga dredge to dredge the berthing pockets and other areas constrained by space.

3.4.3.2 Summary of Channel Enlargement

Table 3.2 summarises the channel dimensions since the first dredging. Depth is below lowest astronomical tide (LAT) or chart datum.

Table 3.2: Summary of Channel Enlargement

YEAR	WIDTH (M)	DEPTH (M LAT)
1876	40	4.0
1887	40	4.6
1929	45	6.7
1940	60	UNKNOWN
1970	75	8.5
1990 (Panamax capital program)	90	8.3
Current	90	8.3
Proposed (Project 2015) – did not proceed	130 (varies)*	9.4*
Proposed (Project 2018) – under review	100 (varies)*	8.8*

Source: Connell Wagner (1990b) for the period to 1990; updated to date (proposed – not implemented).*

3.4.3.3 Placement of Dredge Material History

Dredged material was originally placed on land and resulted in reclamation of many low-lying areas around the CBD and industrial area. It is estimated that the volume of dredge material placed for land reclamation projects in Cairns over the first 100 years of the city's history is between two million and three million cubic metres. The reclamation projects were undertaken over several decades and even after completion of the filling, using a capping layer of sand or other suitable fill to complete the reclamation, considerable time was still required for settlement of the material prior to site development.

Since the 1980s all channel capital and maintenance dredging material has been placed at sea, with a small amount of stiff clays or material unsuitable for marine placement being brought to shore. The 1990 Panamax capital dredging project was approved on the condition that a major study into dredging, placement and other issues be undertaken. This work was documented in Connell Wagner (1990b and 1992). These two reports addressed the history of and need for dredging, the nature and quantity of dredge material, and a search for onshore and offshore placement sites. It was conducted under the aegis of the *Environment Protection (Sea Dumping) Act 1981* (Cwlth) and the *London Sea Dumping Convention* and resulted in the selection of the existing offshore DMPA. This DMPA has been in use since 1991, with a typical average in situ volume of 300,000 to 400,000 cubic metres of material being placed at the site annually.

3.5 Global and Australian Cruise Shipping

This section provides an overview of the global and national cruise market to inform the Project, building upon the demand study completed by AEC in 2016 for the RDEIS. It also incorporates market industry intelligence and forecasts for the global and national cruise shipping industry.

3.5.1 Overview

The global cruise sector is forecast to grow strongly, building on five years of sustained growth.

The Australian cruise industry is a success story of Australian tourism, with a 12-year run of double digit passenger growth contributing significant economic benefits at both the national and regional levels. The

financial year 2016–17 saw the industry's total national economic contribution in Australia grow by 15.4 per cent to reach a record A$5.3 billion[5].

The AEC Group's research[6] revealed Australian cruise ship passenger numbers exceeded one million passengers in 2015 for the first time, recording an increase of 20 per cent on the previous year. Of these, 71.3 per cent departed from an Australian port to cruise the South Pacific, Australia or New Zealand. The number of passengers represents a market penetration of 4.5 per cent, the second year in a row that a cruising region has broken through the four per cent barrier. The South Pacific/Australia/New Zealand region represents a 6.1 per cent of total available lower berth days.

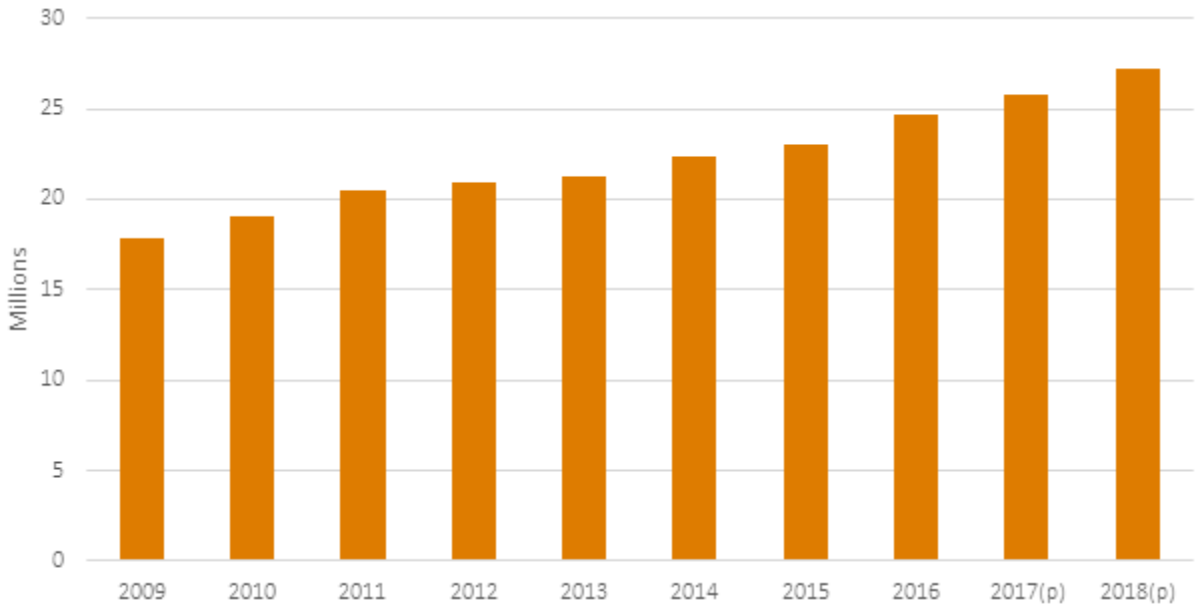
Queensland continues to be Australia's second largest cruise ship market, accounting for 26.7 per cent of cruise passengers in the 2015–16 season and generating $392.2 million in direct expenditure for Queensland from a total of 329 port visits. The cruise industry provides an economic boost to Brisbane and regional Queensland, including Cairns, Port Douglas, the Whitsundays, Fraser Coast and Townsville.

As demand for cruising grows, cruise lines have been adding capacity to their global fleet by building larger ships to take advantage of the economies of scale. As these new ships are added, older smaller ships are either refurbished and orientated to a particular market or decommissioned. Of the 81 cruise ships expected for delivery up to 2026, 59 are mega class ships (i.e. capacity of more than 2,000 passengers) and more that 60 per cent of these are voyager class.

3.5.2 Projections for the Global Cruise Market

The global cruise market has expanded over the past decade as demand for cruising globally increases. According to the Cruise Industry Association the number of cruises taken globally is projected to reach 27 million cruise passengers in 2018. The number of cruise passengers has increased at a compound growth rate of around five per cent (over the nine years to 2018) and the strong growth over time is reflected in Figure 3.11. This show global demand for cruising increasing steadily over time.

Figure 3.11: Global Ocean Cruise Passengers (Million)



[5] AEC, *Economic Impact Assessment of the Cruise Industry in Australia, 2015–16*, 2016, available at http://www.australiancruiseassociation.com/sites/default/files/aca-cruise-eia-2015-16-executive-summary.pdf

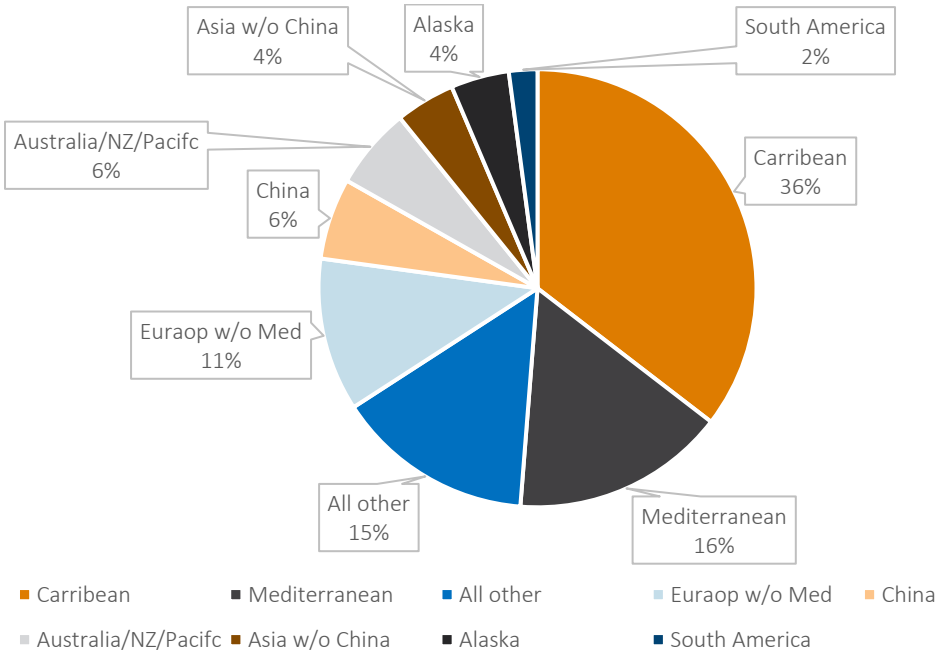
[6] AEC, *Economic Impact Assessment of the Cruise Industry in Australia, 2015–16*, 2016, available at http://www.australiancruiseassociation.com/sites/default/files/aca-cruise-eia-2015-16-executive-summary.pdf

Source: CLIA 2018 State of the Cruise Industry Outlook (p) – projection.

The deployment of the cruise fleet globally (in terms of allocated berth days) was largely in the Caribbean, Mediterranean and the remaining parts of Europe (excluding the Mediterranean). There were smaller shares of deployment in the other regions, however Australia/New Zealand captures about six per cent of total berth days, which was the same as China. The Caribbean, Mediterranean and other parts of Europe make up the bulk of the market. However, as evident from the growth trends in Figure 3.12, Australia/New Zealand still makes up six per cent of what is a large and expanding global market. Asia currently makes up around 10 per cent of the global cruise market and this is likely to increase as incomes continue to grow in Asian countries.

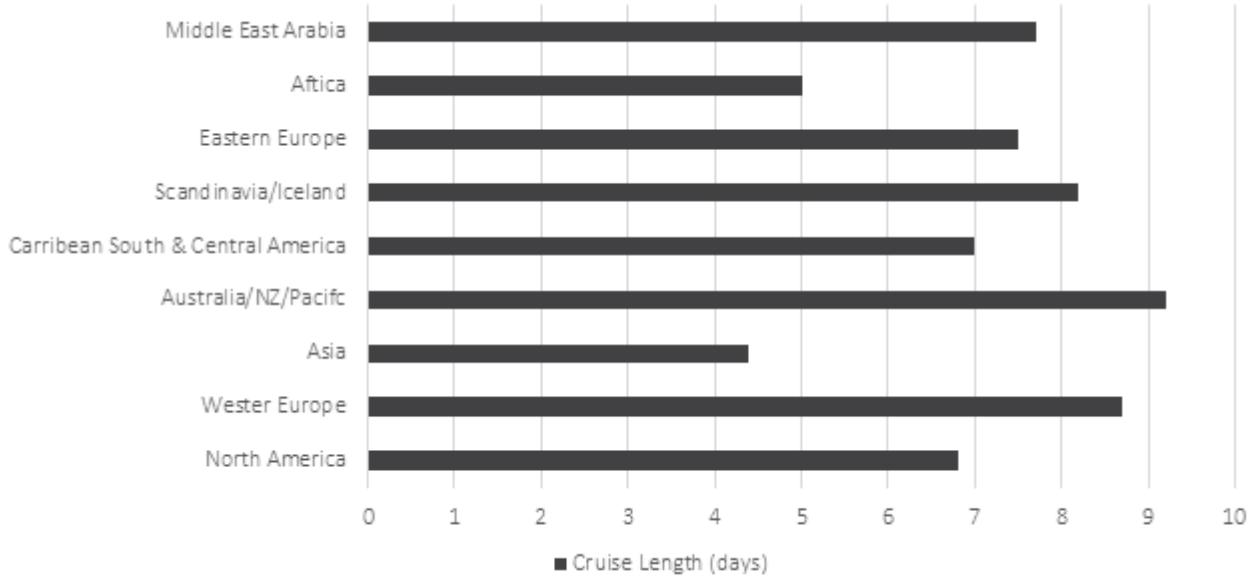
The length of cruise is an important determinant of the growth of the industry as cruise ships are essentially like floating hotels, with all facilities integrated into the modern cruise ship. The average length of cruises is notably higher in Australia than in other destinations across the global cruising market indicating potential growth opportunities in Australia. A longer average length of cruise may have implications for spend by passengers (and potentially average spend per cruiser) as well as the cruise shipping itineraries and returns to cruise industry operators. The deployment of the global fleet is shown in Figure 3.12.

Figure 3.12: Global Ocean Cruise Passengers (Million)



Source: CLIA 2018 State of the Cruise Industry Outlook.

Figure 3.13: Average Length of Cruise by Region (Days), Year to September Quarter 2017



Source: CLIA one resource 2016 and 2017 Quarterly Global Report (Q1, Q2, Q3), as of January2018.

A number of trends in the global cruise market will influence demand in the short to medium-term based on the latest Cruise Line Industry Association (CLIA) Outlook (2018).

Some observations about trends in the global market as follows:

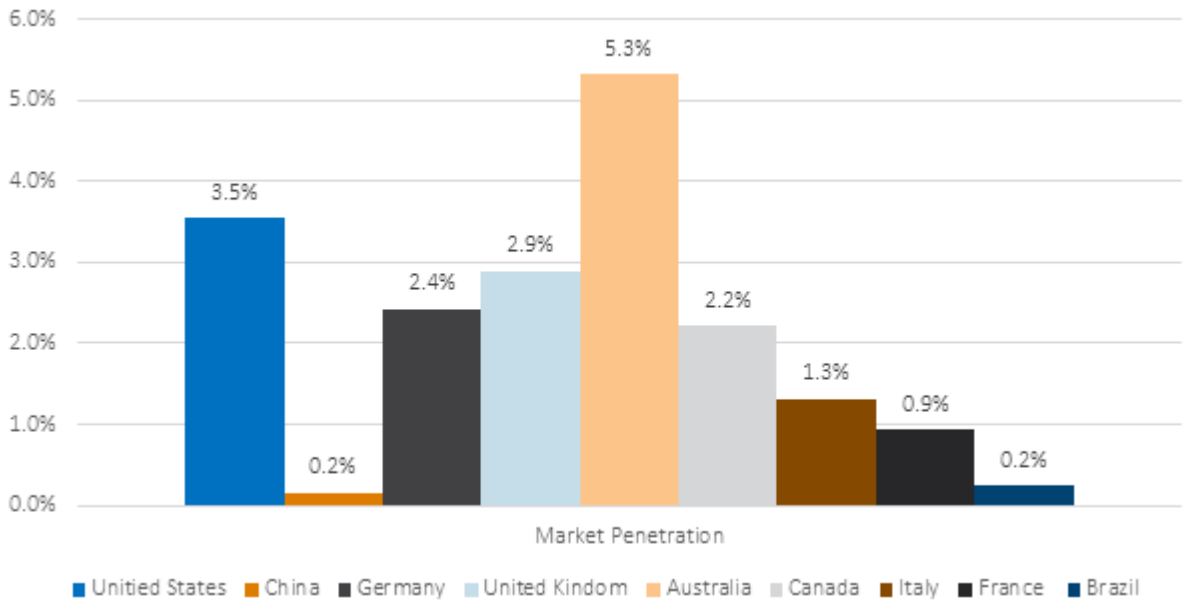
1. Households of varying budgets are willing to travel on cruises, with an estimated 33 per cent of cruisers in recent surveys having a household disposable income of less than $100,000.
2. There seems to be an increasing demand for cruise travel by millennials and this presents new market growth opportunities.
3. Skip-gen cruising is becoming more popular with grandparents travelling with grandchildren and without their parents.
4. Cruise liners are tailoring trips for a growing number of health-conscious travellers.
5. 2018 is predicted to see a rise in the use of traveller friendly onboard technologies that enhance traveller experiences.

Another growth market is adventure and expedition cruising, which offers a boutique product and targets the upper end of the market including high-wealth individuals. The expedition cruise sector is expected to experience solid growth in the short to medium-term. This is evidenced by an expected eight new ship builds serving this market anticipated to be on line in 2019. This could also lead to some capacity constraints in the places that they visit according to Cruise Shipping News.[7]

A measure of the popularity of the cruising ship in a market is the number of cruisers per head of population. On this measure Australia is a standout globally and this demonstrates a growing popularity for cruising by Australians. The market penetration ratio (based on the last five years) of Australia compared to other countries highlights the growing popularity of cruising in Australian compared to other countries. The market penetration for various countries is shown in Figure 3.14.

[7] http://www.seatrade-cruise.com/news/news-headlines/expedition-cruising-is-booming-for-better-or-worse.html

Figure 3.14: Market Penetration Rate of Cruises by Country (Past Five Years)



Source: CLIA 2018 State of the Cruise Industry Outlook.

Recent analysis by UBS notes the average age of cruisers for some major operators has been getting younger, with Royal Caribbean Cruises seeing a 30 per cent increase in millennials in the past two years, which supports the trend highlighted in the CLIA outlook. The dynamic of increased cruise demand goes beyond just demographic factors and is tied to broader consumer preferences for accumulation of experiences.

Constructing larger ships has allowed cruise ship operators to increase the number of passengers and capitalise on economies of scale. This has seen a reduction in ticket prices, which is likely to widen the appeal of cruising products. The trend towards larger ships is likely to continue, as evidenced by the Cruise Ship Orderbook, the global forward order book for cruise vessels.

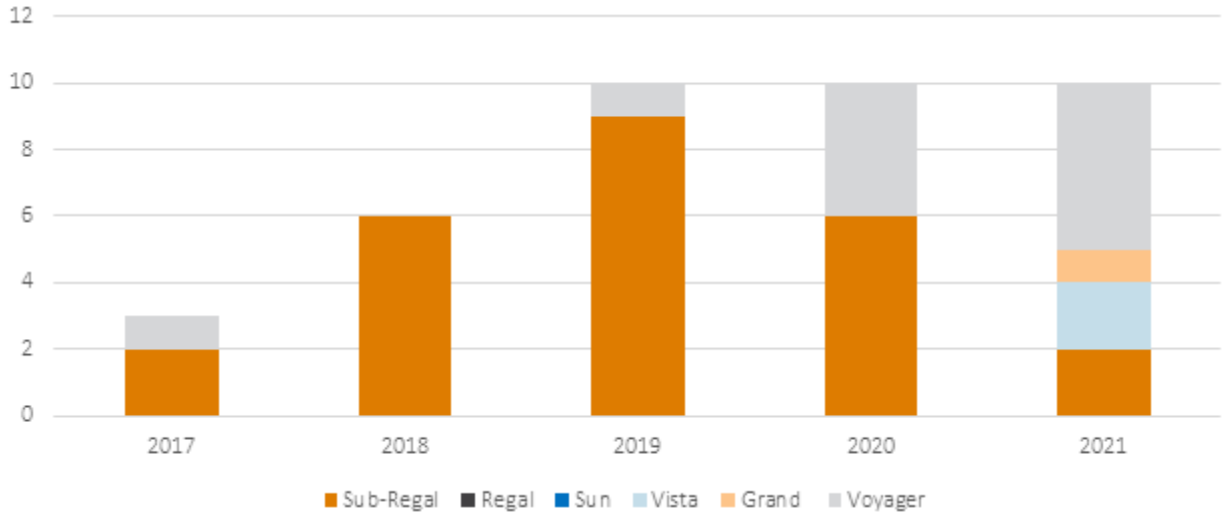
Key insights from the forward order book include the following:

- 91 ocean ships are on order (between 2017 and 2026), with an estimated value of $58 billion and an average cost of around $640 million
- the average cruise ship size is 103,615 tonnes (this is equivalent to vista class)
- the average ship capacity is 2,619 passengers with 238,374 berths.

Data from the global forward order book has been used to illustrate the number of vessels that would potentially service the Asia Pacific region and the world. It shows a much higher share of grand and voyager vessels on order, as well as the strong emergence of vista vessels in 2021 – accounting for 20 per cent of global cruise ships on order.

This coincides with the proposed opening year for the Project, which would allow two vista vessels to enter the shipping channel at a time. Industry consultations highlighted the adventure and boutique classes as another growth market, and confirmed the anticipated growth in larger vessel markets such as vista, grand and voyager.

Figure 3.15: Cruise Ships on Order 2017 to 2021



Source: Cruise Industry News. Global Ship Orderbook.

3.5.3 Trends in the Australian Cruise Shipping Industry

In the 2015–2016 cruise season, 46 cruise ships visited and/or operated in Australia, up from 42 in 2010–11 and 16 in 2004–05. The number of ships has increased over time, as has their average size and capacity.

There were 1,015 cruise ship visits to Australian ports/destinations in 2015–16, an increase of 139 visits or 15.9 per cent from the 2014–15 total of 876. Sydney (308), Brisbane (148), Melbourne (75), Fremantle (58), Cairns (50), Darwin (45), Moreton Is (33) and Hobart (32) were the most frequently visited ports/destinations in 2015–16.

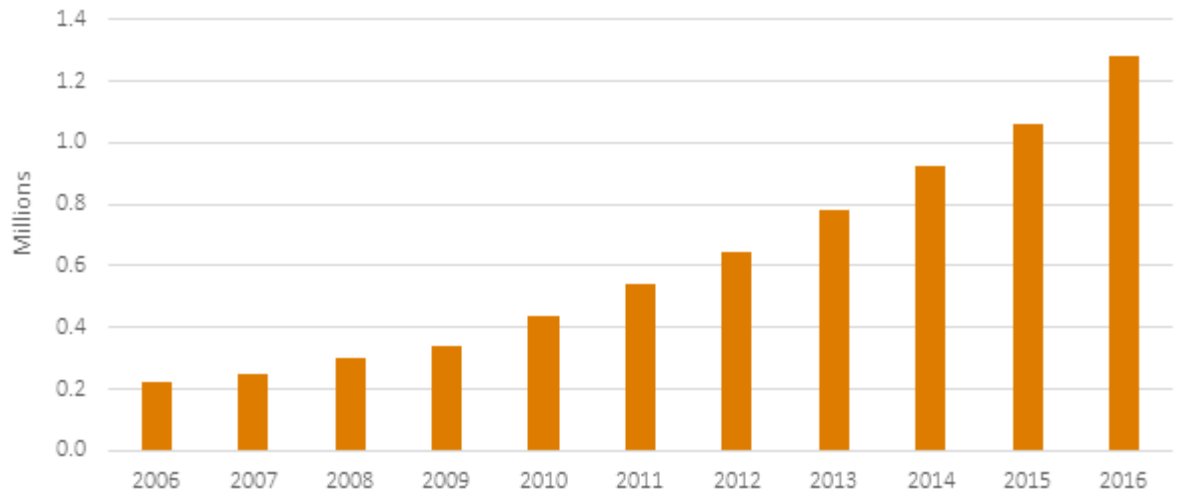
Sydney is regarded as a marquee port by cruise lines, however, it is rapidly becoming constrained with the Overseas Passenger Terminal fully booked for eight months of the year (October to April). While there is still capacity at the White Bay Cruise Terminal, access is limited to those cruise ships that can fit under the Sydney Harbour Bridge.

Australia's second most visited port is Brisbane, which is also constrained by the Gateway Bridges and the turning basin at Portside Cruise Terminal. However, the Brisbane International Cruise Terminal, which began construction in November 2017 at Luggage Point, will be available to both Carnival Australia and Royal Caribbean Cruise Lines. It is expected that the Brisbane International Cruise Terminal will be operational from 2019 and could triple the size of the Brisbane cruise industry by 2035. Cruise lines have indicated that this facility could see the homeporting of four ships in Brisbane. This increased traffic will have significant implications for visits to Cairns.

In recent years the CLIA has reported strong growth in the Australian cruising sector. Based on the CLIA 2016, an estimated 1.3 million Australians took a cruise in 2016. This explains the market penetration ratio increasing to a much higher level that other countries. If this trend continues, the market will become saturated and growth would be expected to moderate to more sustainable levels in the medium term.

The level of passenger numbers over the 10 years to ending 2016 is reported in Figure 3.16.

Figure 3.16: Australia Cruise Passengers



Source: CLIA Cruise Industry Source Market Report Ocean Cruise Passengers Australia 2016.

Based on CLIA data, new domestic cruise options helped to support solid growth in the Australian domestic cruise market in 2016. Short-haul destinations supported this growth. Passenger cruising to the South Pacific, New Zealand and cruisers within Australia account for the bulk of the Australian cruising market (around 75 per cent). Most of the longer haul destinations detracted from overall cruise passenger growth in 2016.

Table 3.3: Snapshot of the Australian Cruising Market, 2016

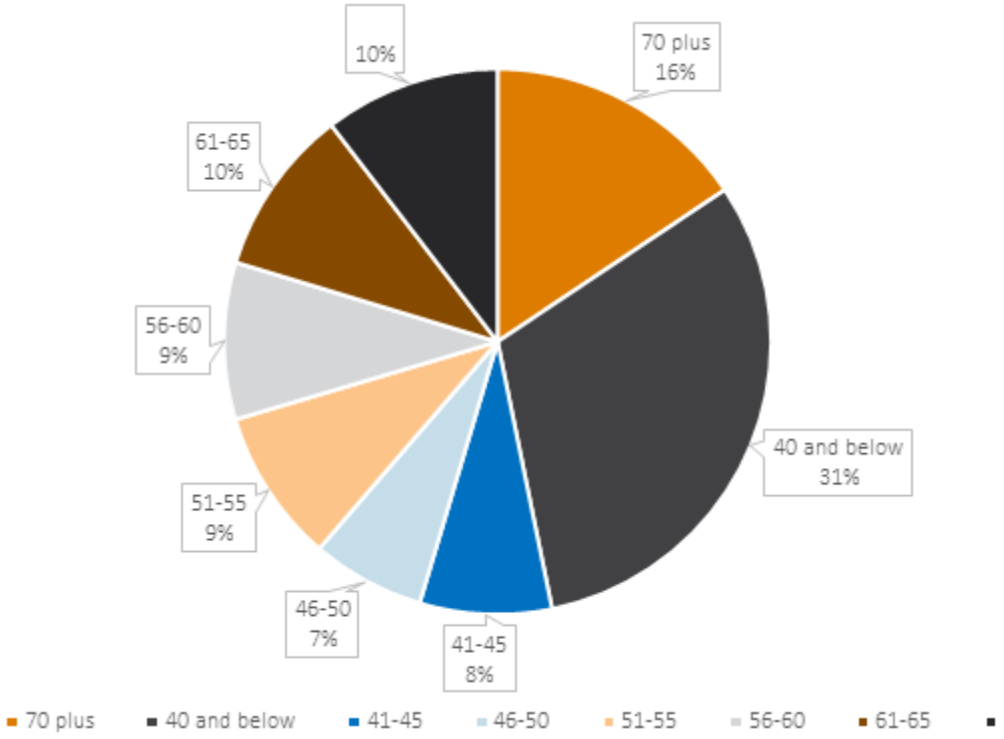
CRUISE REGION	2015	2016	CHANGE (000'S)	SHARE OF MARKET 2016 (%)	% PT CONTRIBUTION TO GROWTH
World Voyages	10,737	19,636	8,899	2%	0.8%
South Pacific	383,889	542,625	158,736	42%	15.0%
Alaska	33,315	41,804	8,489	3%	0.8%
Australia	269,915	332,979	63,064	26%	6.0%
South America	5,289	5,709	420	0%	0.0%
New Zealand	100,642	106,737	6,095	8%	0.6%
Caribbean/Bahamas/Panama	28,099	28,228	129	2%	0.0%
Other America	17,226	16,634	-592	1%	-0.1%
Mexico	4,129	3,889	-240	0%	0.0%
Mediterranean	71,459	65,778	-5,681	5%	-0.5%
Asia	95,016	85,374	-9,642	7%	-0.9%
Other destinations	9,015	7,916	-1,099	1%	-0.1%
Northern Europe	29,960	23,649	-6,311	2%	-0.6%
All Cruise destinations	**1,058,691**	**1,280,958**	**222,267**	**100%**	**21.0%**

Source: CLIA Cruise Industry Source Market Report Ocean Cruise Passengers Australia 2016.

Queensland was the second largest market in Australia with almost 305,000 passengers in 2016. An estimated 6.3 per cent of the population tool a cruise in 2016. This type of growth could potentially result in market saturation in the future and a flattening of growth.

The CLIA Source Market Report (CLIA 2016) shows that cruisers in Australia come from range of ages, with the largest share of cruisers being 70 years and older (15.6 per cent of total cruisers in 2016). This likely to reflect the large number of cruises and destinations. The age distribution of Australian cruise passengers in 2016 is shown in Figure 3.17.

Figure 3.17: Australia Cruise Passengers by Age Group

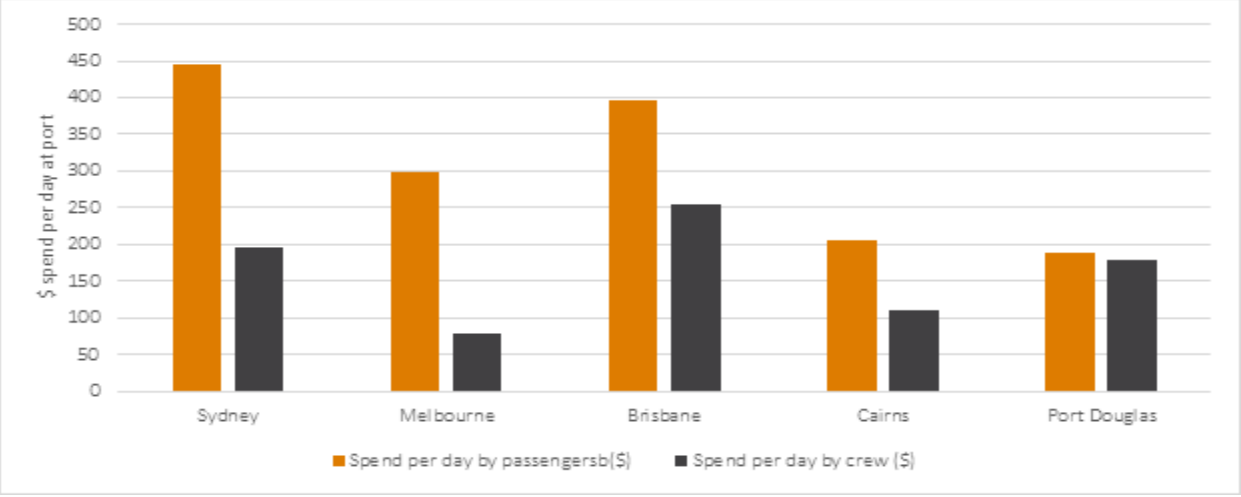


Source: CLIA Cruise Industry Source Market Report Ocean Cruise Passengers Australia 2016.

Benchmarking 2015–16 activity levels by port highlights opportunities for Cairns to increase average spend through higher homeporting and larger vessels. As an example, average spend per day at port in Cairns was around half that of Brisbane.

During consultation, cruise operators indicated the region is missing out on opportunities to maximise itinerary development, including with other ports in the network in both Australia and Oceania. One of the main opportunities for Cairns is with Brisbane, particularly following construction of the Brisbane International Cruise Terminal.

Figure 3.18: Expenditure per Day at Port in 2015–16



Source: AEC and CLIA.

3.5.4 The Cruise Network with a Focus on Key Australian Ports

Together, New South Wales, Queensland and Victoria account for around 85 per cent of total cruise passenger visits in Australia.

NSW (Sydney)

- Sydney is Australia's dominant cruise port with 308 ship calls, 1.29 million passenger days ($575 million expenditure by passengers) and total expenditure (including passenger, crew, operations, bunker and corporate) of circa $1 billion in 2015–16.
- As a home port, Sydney services departures and itineraries into the South Pacific, New Zealand and South East Asia, as well as coastal cruising.
- Sydney also benefits from longer average visits as many passengers stay overnight in the city before and after their cruise. This generates higher spend than transit ports.

Queensland (Brisbane)

- Brisbane is Queensland's dominant cruise port with 148 ship calls, 0.6 million passenger days (around $225 million expenditure by passengers) and total expenditure (including passenger, crew, operations, bunker and corporate) of circa $435 million in 2015–16.
- Brisbane enjoys close proximity to New Caledonia, which is a key destination in cruise itineraries originating from Brisbane as well as other locations.
- Brisbane is a feeder port for much of the cruise ship traffic that passes through Cairns (in recent times there has been some home porting in Cairns).

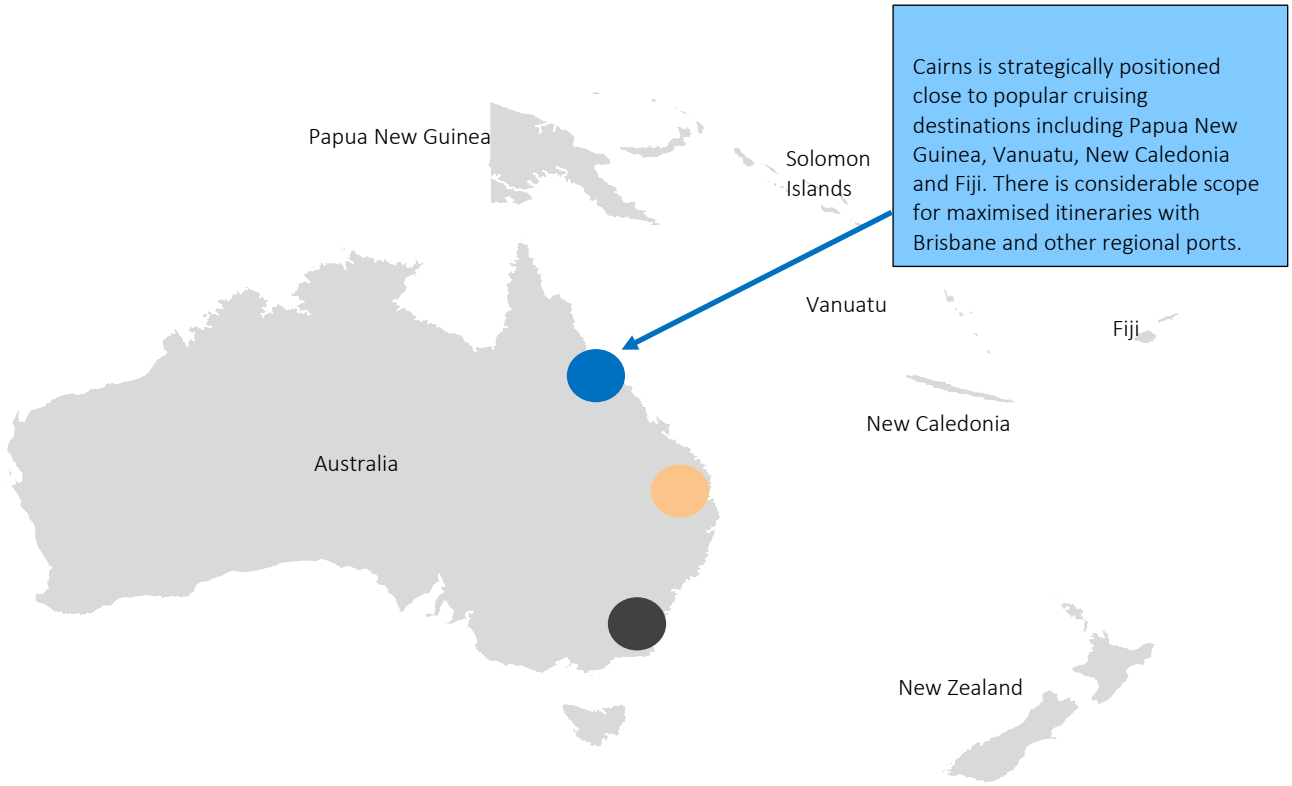
Queensland (Cairns)

- Cairns has enjoyed strong growth in ship calls. It had around 60,000 passenger days in 2015 and a greater than 50 per cent increase in ship calls over the two years to 2017 (compared to the five previous years to 2015). This recent surge in cruise ship calls has partly been driven by the larger sun class vessels, as well as growth in sub-regals.
- Cairns' proximity to the Great Barrier Reef as well as Papua New Guinea and the Solomon Islands allows it to absorb off-season capacity from Brisbane and Sydney.
- Seasonality is a key feature of cruise tourism in Cairns. The peak summer cruise season is November to April in Cairns. The majority of the port's cruise activity for alongside berthing smaller ships takes place in the summer season. The bulk of anchorage of larger ships takes place off Yorkeys Knob in winter months.
- Cairns' ability to draw larger ships away from Brisbane and Sydney in warmer months in the peak cruise season is a potential risk. However, developments such as the Brisbane International Cruise Terminal present opportunities for complementary activity, with Brisbane acting as a feeder port to Cairns.

Victoria (Melbourne)

- Melbourne is Victoria's dominant cruise port with 84 ship calls, 0.2 million passenger days (around $65 million expenditure by passenger) and total expenditure (including passenger, crew, operations, bunker and corporate) of circa $105 million in 2015–16.

Figure 3.19: Oceania Cruise Market



CHAPTER 4
SERVICE NEED

CHAPTER SUMMARY AND CONCLUSIONS:

- The primary problem the Project will address is the Port of Cairns' inability to adequately support the growing cruise ship industry, specifically through:
  - insufficient channel size and wharf capacity to cater for larger vessels
  - offshore tendering of passengers diminishing the passenger experience and limiting onshore visitation.
- The Project will also address problems experienced by non-cruise shipping operations, specifically:
  - restrictions on the expansion of Australian Defence Force capability
  - inefficient cargo shipping operations due to the channel's size
  - disruption of port operations by natural disasters.
- Service requirements developed for the Project include:
  - provides value-for-money marine infrastructure that meets environmental and social expectations and is disaster resilient
  - supports growth of the FNQ tourism industry, particularly cruise shipping and the development of tourism facilities in Cairns
  - enables regional economic and employment growth by allowing broader opportunities for the Port of Cairns and greater efficiency for cruise, freight and defence operations
  - provides port infrastructure that is safe for operators and customers and offers reliable all-season access.
- Multiple options for meeting the identified service need have been examined over the past ten years (both through this DBC and previous work), including:
  - do nothing scenario A (i.e. allow the channel to silt)
  - do nothing scenario B (i.e. maintain the current channel dimensions by maintenance dredging – the status quo)
  - relocation of the port to an area unaffected by siltation
  - maintain current channel dimensions (i.e. maintenance dredge only) and provide new or enhanced landside infrastructure, including onshore and offshore jetties
  - maintain current channel dimensions (i.e. maintenance dredging only) and provide new anchoring infrastructure and associated tendering.
- The preferred option, selected as the subject of this DBC, involves widening and deepening the shipping channel, deepening the existing Crystal Swing Basin, relocating the cargo ship swing basin, placement of dredging material on land and upgrading the wharves and services.

4.1 Purpose

This chapter outlines the need for the Project by examining the problems or opportunities it will address. It outlines the benefits and outcome sought from the Project and key service requirements. Detail is also provided on the options analysis used to inform the final reference design.

4.2 Problems or Opportunities

The primary problem the Project will address is the Port of Cairns' inability to adequately support the growing cruise ship industry, specifically through:

- insufficient channel size and wharf capacity to cater for larger vessels
- offshore tendering of passengers diminishing the passenger experience and limiting onshore visitation.

The Project will also address problems experienced by non-cruise shipping operations, specifically:

- restrictions on the expansion of Australian Defence Force capability
- inefficient cargo shipping operations due to the channel's size
- disruption of port operations by natural disasters.

The Project presents the opportunity to:

- capitalise on the global trend towards larger cruise ships and grow the cruise shipping industry
- support the upgrading of HMAS Cairns and the significant marine shipyards in Cairns
- improve the efficiency of existing cargo and freight shipping operations
- improve the Port's resilience to natural disasters.

4.2.1 Insufficient Channel Size and Wharf Capacity

The existing channel for the Port of Cairns is not wide or deep enough to allow safe access for larger vessels, particularly mega class cruise ships. At present, almost half of all cruise ships visiting Cairns are unable to enter the Port of Cairns due to their size. The number of cruise ships at Yorkeys Knob offshore anchorage increased from 15 visits in 2010 to 24 in 2016.

The existing wharves 1 to 5 are at capacity in terms of allowable berthing and mooring loads to the existing heritage-listed wharf structure. Both the existing fendering and wharf structure were upgraded to their maximum potential in 2010 as part of the Cairns Cruise Liner Terminal project. In order to allow larger cruise ships to berth and also to provide long-term protection of these culturally important wharves, additional independent structures will need to be incorporated into the wharves.

Cruise shipping is the fastest growing tourism market worldwide, with a trend towards larger mega class cruise ships which are generally unable to access the Port of Cairns (refer to Chapter 3: Proposal Background for additional detail). With the existing channel constraints, the region will be unable to take advantage of the significant growth and economic potential of the cruise shipping sector, particularly the mega class market. The impacts of this will be felt beyond Cairns in other cruise destinations, particularly those on the Queensland cruise itinerary.

Conversely, the Project has the potential to expand both the local and state cruise shipping industry by capturing a larger share of the cruise shipping market and enabling enhanced itinerary development. This would lead to broader growth, stability and diversity in the Cairns tourism sector, securing economic benefits for Cairns and Queensland.

Chapter 3: Proposal Background provides additional detail on global and domestic cruise shipping trends and the potential for growth in the tourism and trade sectors. Chapter 5: Base Case provides additional detail on the likely state of the Cairns cruise shipping industry if the Project does not go ahead. This underpins the economic analysis of the Reference Project.

4.2.2 Offshore Tendering of Passengers

Currently, larger mega class cruise ships must anchor offshore at Yorkeys Knob, located 15 kilometres north of Cairns. Yorkeys Knob does not have a cruise ship terminal and passengers and crew are ferried ashore to the Yorkeys Knob Boating Club facility before being transported by bus into the Cairns CBD and other day tour destinations. This practice is very inefficient for both cruise ship operators and the local economy. It is costly for operators to transfer passengers into Cairns, crew are generally unable to leave the ship, and during inclement conditions passengers are reportedly often reluctant to come ashore. It is estimated that approximately 10 per cent of ship visits are lost entirely when shore transfer by tenders becomes unsafe due to rough weather.

This situation creates a number of specific operational issues:

- The facilities at Yorkeys Knob are not set up for international standard cruise ship visitors and the location is not suitable for a cruise ship terminal. There is insufficient space to accommodate increasing visitors transferring between the large cruise ship vessels anchoring offshore and buses onshore. Passengers have to walk along an exposed jetty without shade, which can make for an uncomfortable transfer especially for families with children and passengers with mobility or vision impairments. It also creates traffic impacts on local streets and affects the amenity for local residents.
- Given the main cruise season is during the North Queensland monsoonal period, the practice of ferrying passengers and crew ashore can be difficult and time consuming. If the wind or rain creates unfavourable conditions, transfer becomes impossible and local businesses miss out.
- Transporting passengers from Yorkeys Knob to the various day trip destinations in and around Cairns is inefficient for cruise ship operators, the local economy and businesses. Additional operating costs and travel time is incurred and tourists who want to access the Cairns CBD have to travel 15 kilometres from Yorkeys Knob along the busy Captain Cook Highway. Opportunities for local tourism operators and businesses in the Cairns CBD are lost when passengers are transferred directly to out-of-town destinations.

4.2.3 Restricted Australian Defence Force Expansion

The location of the existing cargo swing basin (Main Swing Basin) restricts opportunities for HMAS Cairns to expand its wharves. The future upgrade and expansion of the navy base is critical to the regional economy as it will bring additional navy personnel to the City and support Cairn's significant marine shipyards.

HMAS Cairns operates 14 naval vessels and is to host 12 new offshore patrol vessels set to replace the Armidale class patrol boats from early 2020. There are plans to triple the size of the base to 3,000 personnel. The 2016 Defence White Paper allocates $420 million for a major expansion of HMAS Cairns. This has recently been increased to $635 million (refer to Chapter 7: Strategic Considerations for additional detail). Increasing the size of the shipping channel and swing basin is critical to this upgrade.

The HMAS Cairns upgrade will provide new local employment and businesses opportunities, as will the ongoing maintenance requirements of the new patrol vessels. The expansion will also generate greater navy-related spending in the local economy by enabling larger Australian and visiting allied navy ships to dock in the port after joint exercises and for relaxation and recreation.

4.2.4 Cargo Inefficiencies

The Port of Cairns plays an important role in the FNQ economy by providing access for cargo vessels bringing goods and services to the region and as far north as the Gulf of Carpentaria.

The current declared depth of 8.3 metres below LAT means vessels with an excess draft must wait for suitable tidal conditions for movement in and out of the port. This traffic is also constrained by the length, berth box size, wharf strength, handling gear (or its absence) and storage capacity provided at relevant cargo berths.

Increasing the size of the shipping channel would improve the economic efficiency of existing cargo shipping activities – the port's attractiveness to the export sector – by allowing bulk cargo carriers to carry larger loads and giving vessels a larger window of entry and egress to the port.

This economic efficiency would be passed on to producers (of sugar, molasses, silica sand, zinc, fuel, fertiliser, log product, project cargo and general cargo) and consumers (of petroleum imports).

4.2.5 Natural Disasters Disrupting Port Operations

The port and shipping industry is currently exposed to risks associated with loss of channel depth and restrictions to shipping due to significant weather events. Major weather events and natural disasters such as cyclones can disrupt the existing channel through siltation, reducing maritime operations into and out of the port.

Usually, after these events transport links with Cairns are relatively poor. The international airport is normally closed and can only operate once localised flooding and winds have dissipated. Even during a normal wet season there can be a number of road closures between Cairns and Townsville along the Bruce Highway. The extent of these closures increases with the size of the weather event.

The increased channel depth and width delivered by the Project would improve the port's resilience to natural disasters and the efficiency of existing shipping operations, with flow-on benefits to communities without road access.

With current projections of climate change and predications of more intense cyclonic activity, the Project would assist with future-proofing access into Cairns and the surrounding region.

4.3 Benefits Sought

The key benefits sought by this Project are summarised in Figure 4.1.

Figure 4.1: Benefits Dependency Map for the Project

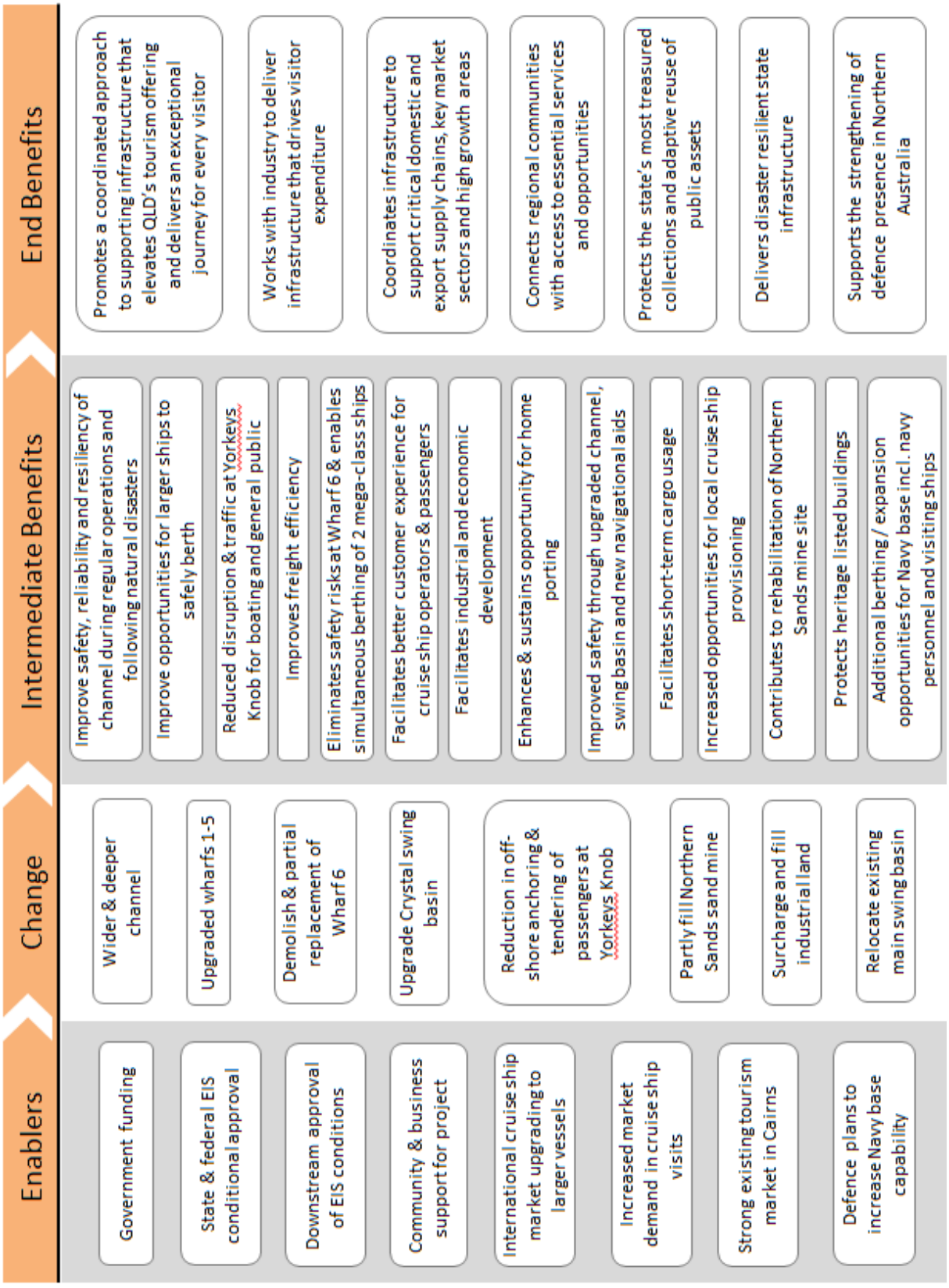
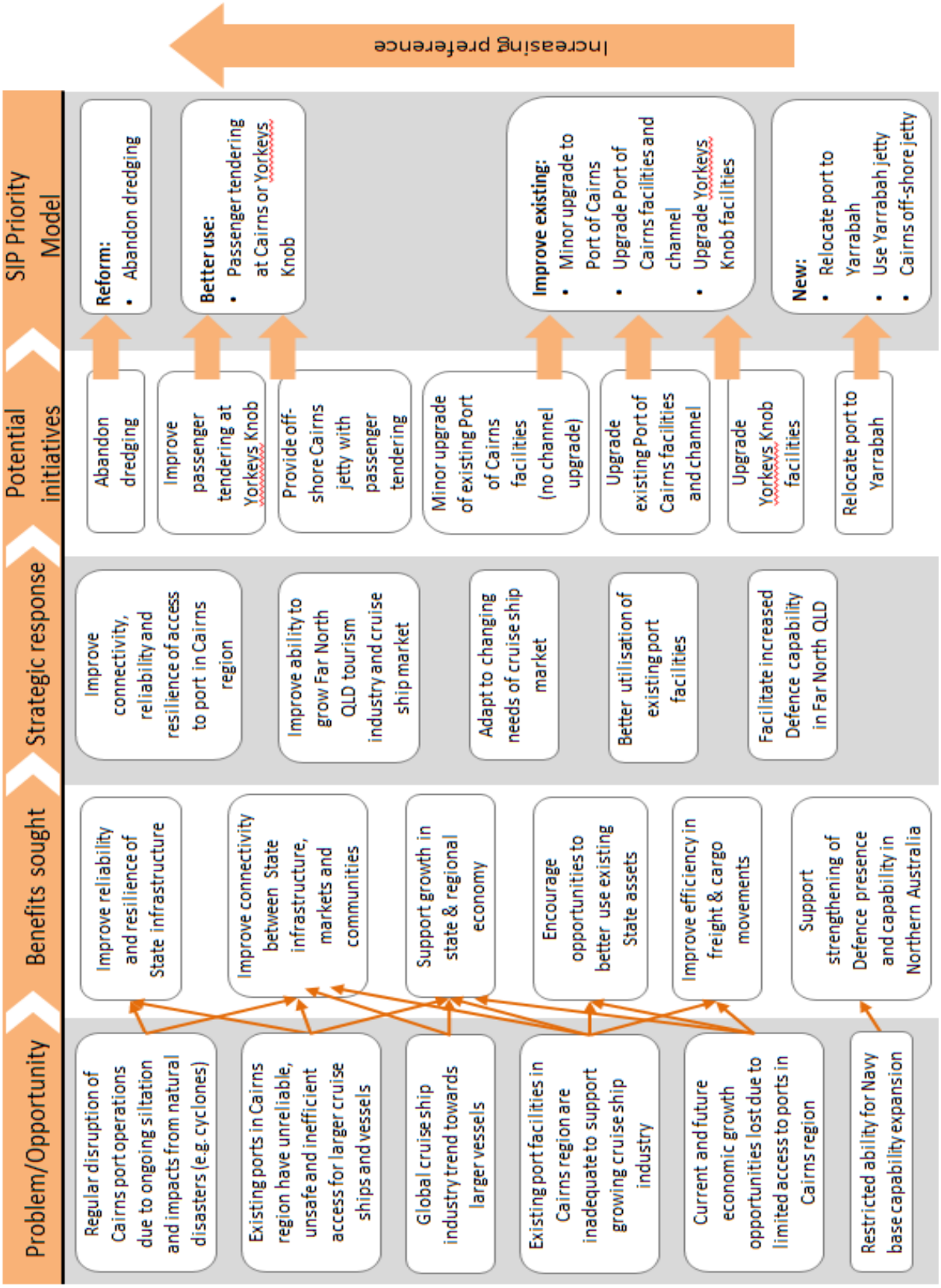


Figure 4.2 shows the combined investment logic and initiatives map (ILM) for the Project. The ILM summarises of the key problems, benefits sought, strategic responses and potential initiatives to meet the State Infrastructure Plan (SIP) Priority Model.

Figure 4.2: Combined Investment Logic and Initiatives Map (ILM)



4.4 Strategic Assessment and Outcomes Sought

Service needs and opportunities for economic growth in FNQ, identified by the Queensland Government, led to the strategic assessment of the service requirements for this Project. The strategic assessment was undertaken prior to 2012 and was largely driven by changes in the global cruise shipping industry, specifically the trend towards larger ships.

Ports North developed the Cairns Shipping Development Strategy in 2012, which identified the service need, outcomes sought and identified potential solutions to achieve the outcomes (refer to Chapter 3: Proposal Background for additional detail on project activities). The main outcome sought from the Project at this time was additional channel and wharf infrastructure capacity to enable access for modern cruise ships longer than 300 metres.

Other benefits sought for non-cruise forms of shipping included:

- support for the future expansion of the HMAS Cairns navy base through the relocation of the existing Main Swing Basin
- improved channel access for the existing navy vessels and capacity for larger Australian and foreign navy vessels (in particular, United States Navy ships) to enter the port for rest and relaxation visits
- reduced tidal and loading restrictions on bulk cargo ships accessing the Port of Cairns for greater port efficiencies
- increased resilience for the Port of Cairns to extreme weather events.

The Project has the potential to provide many benefits to the Cairns economy, the broader FNQ region and the state, including:

- promotes a coordinated approach to supporting infrastructure that elevates Queensland Tourism, offering an exceptional journey for every visitor
- works with industry to deliver infrastructure that drives visitor expenditure
- coordinates infrastructure to support critical domestic and export supply chains
- connects regional communities with access to essential services and opportunities
- supports the adaptive re-use of public assets
- delivers disaster resilient state infrastructure to maintain reliable links to communities
- supports the strengthening of defence presence in Northern Australia and increased deployment of personnel in Cairns.

4.5 Service Requirements

The service requirements for the Project (shown in Table E.1) were developed through an ILM workshop for this DBC. (These service requirements have been aligned with government objectives.)

Table 4.1: Reference Project Service Requirements

SERVICE REQUIREMENT	DESCRIPTION
SR1	Provides value-for-money marine infrastructure that meets environmental and social expectations and is disaster resilient
SR2	Supports growth of the FNQ tourism industry, particularly cruise shipping and the development of tourism facilities in Cairns
SR3	Enables regional economic and employment growth by allowing broader opportunities for the Port of Cairns and greater efficiency for cruise, freight and defence operations
SR4	Provides port infrastructure that is safe for operators and customers and offers reliable all-season access

Ports North also developed service requirements to guide the options assessment. These were used in the early development stages of the Project (for example, during the EIS process) and are shown in Figure 4.3, together with a brief rationale on their selection and application.

Figure 4.3: Ports North Service Requirements

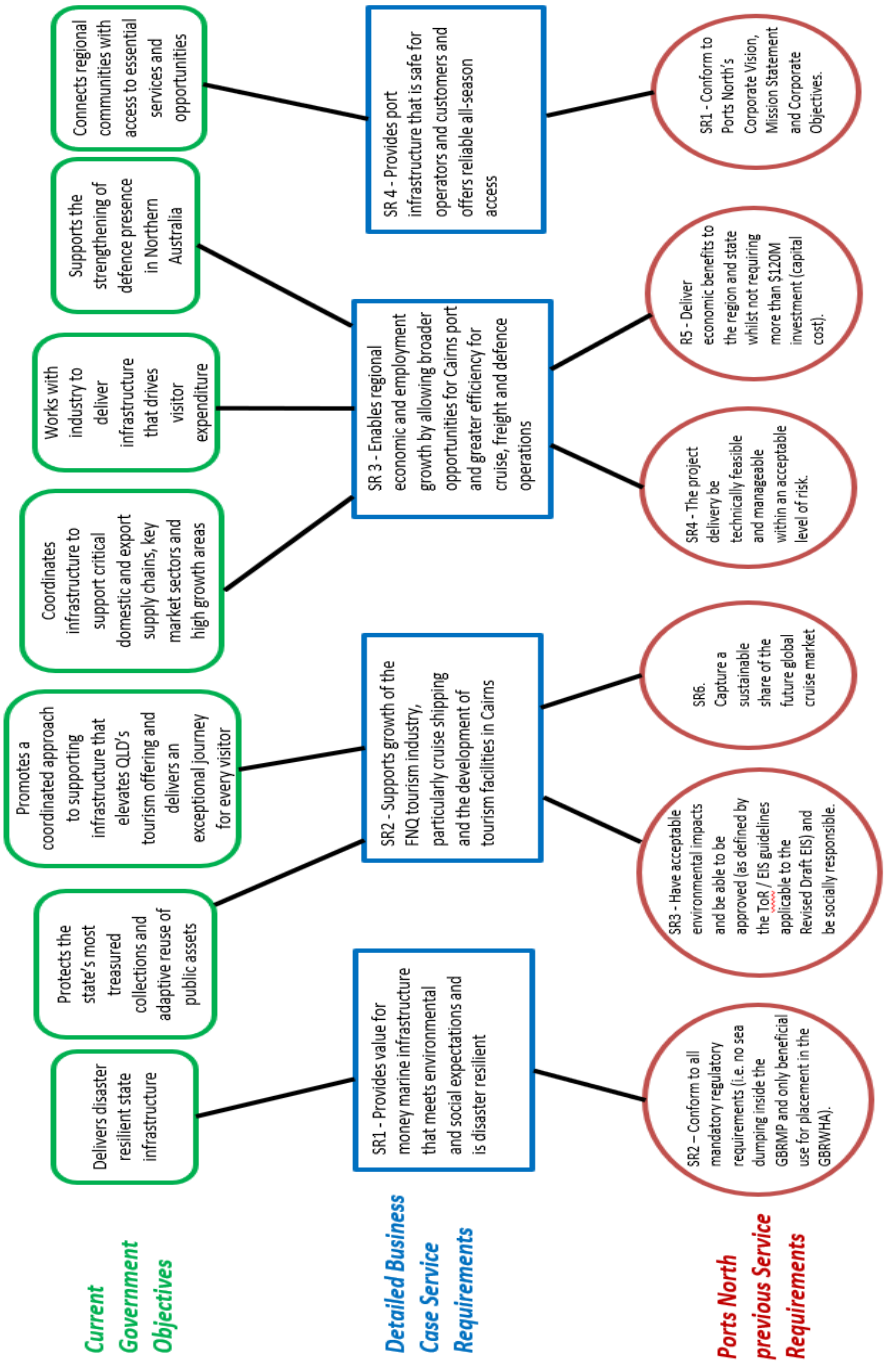
SERVICE REQUIREMENT	RATIONALE	APPLICATION
SR1. Conform to Ports North's Corporate Vision, Mission Statement, and Corporate Objectives	Ports North is a statutory corporation bound by legislation. It has adopted a formal policy position that is to guide its operations.	This is a desirable filter aimed at producing an acceptable fit between the project and the corporate commitments.
SR2. Conform to all mandatory regulatory requirements (i.e. no sea dumping inside the GBRMP and only beneficial use for placement in the GBRWHA)	Legislation prohibits marine placement in the GBRMP and placement elsewhere in the GBRWHA that does not have a beneficial reuse.	This is a 'pass / fail' filter as there is no discretion in the legislation.
SR3. Have acceptable environmental impacts and be able to be approved (as defined by the ToR / EIS guidelines applicable to the Revised Draft EIS) and be socially responsible	Apart from the prohibitions covered by SR2, the legislative framework is applicable via the formal EIS process established for the CSD Project and the underlying approvals process. Social sustainability / responsibility is also an important consideration.	The Terms of Reference and EIS Guidelines establish matters to be assessed and the associated legislation establishes acceptable standards. Because there is discretion in terms of performance, this is a comparative filter.
SR4. The project delivery be technically feasible and manageable within an acceptable level of risk	All options need to be technical feasible, practical, safe, and able to be maintained.	While this is a desirable filter aimed at producing technically acceptable projects, there are thresholds of performance below which projects must be ruled out.
SR5. Deliver economic benefits to the region and state whilst not requiring more than $120 m investment (capital cost)	The Queensland Government is to fund the CSD Project and has set a $120 m budget for the project.	This is a 'pass / fail' filter as there is an absolute funding threshold set by the Queensland Government.
SR6. Capture a sustainable share of the future global cruise market.	It is required that all options permit access by a sufficient number of vessels to allow Cairns to continue to participate in the industry.	This is a 'pass / fail' filter as there is a threshold of capacity below which Cairns will lose its place in the target market.

Figure 4.4 shows the relationship and consistency between:

- government objectives
- DBC updated service requirements
- service requirements used in early stages of the Project.

This shows a clear relationship between the service requirements developed for early stages of the Project and those selected for this DBC. It also shows strong alignment with government objectives.

Figure 4.4: Service Requirements Consistent with Government Objectives



4.6 Options Assessment

4.6.1 Previously Evaluated Options

The original Project (as defined by the original Initial Advice Statement (Ports North 2012)) was assessed in the Draft EIS prepared by Ports North in 2015. Broadly, the original Project proposed the following:

- expansion of the existing shipping channel and shipping channel swing basin
- placement of maintenance dredge material at sea within the GBRMP
- establishment of a new swing basins to support future expansion of the HMAS Cairns
- structural upgrade of the existing shipping wharves
- provision and upgrade of services to the wharves.

Ports North has considered many non-dredging options over the past decade, specifically:

- do nothing scenario A (i.e. allow the channel to silt)
- do nothing scenario B (i.e. maintain the current channel dimensions by maintenance dredging – the status quo)
- relocation of the port to an area unaffected by siltation
- maintain current channel dimensions (i.e. maintenance dredge only) and provide new or enhanced landside infrastructure, including onshore and offshore jetties
- maintain current channel dimensions (i.e. maintenance dredging only) and provide new anchoring infrastructure and associated tendering.

The following sections describe these options in more detail.

4.6.1.1 Do Nothing Scenario A

Previous studies indicate the only way to dramatically reduce dredge spoil is to abandon dredging altogether. A Connell Wagner study noted that every capital project to improve the dimensions of the channel generates spoil. Additionally, it is very likely that the larger the channel becomes, the greater its efficiency as a silt trap, requiring greater ongoing efforts to maintain its size. Connell Wagner also noted that even a slight reduction in channel width and depth would result in serious access limitations, which could be expected to deter shipping from the port. This could also cause major relocation in the local transport balance in favour of alternative methods (if price increase could be passed on). The Connell Wagner study concluded that the Port of Cairns is vital to the local and state economies.

4.6.1.2 Do Nothing Scenario B

Do nothing scenario B assumes no upgrade to the channel or infrastructure at the Port of Cairns (large cruise ships would continue to anchor at Yorkeys Knob or the channel entrance) and ongoing maintenance dredging. This scenario is essentially the status quo.

Cruise shipping is the fastest growing tourism market worldwide. Globally, cruise ship operators are moving towards larger sized ships, which are generally unable to access the Port of Cairns. With existing channel constraints, the region will be unable to take full advantage of the growth potential and economic value of the cruise shipping industry. This will not only impact Cairns but other destinations on the Queensland cruise itinerary.

The location of the existing cargo swing basin location used by navy ships also restricts opportunities for HMAS Cairns to expand.

4.6.1.3 Relocation of the Port

Operation of the Port of Cairns requires maintenance dredging of the entrance channel, swing basin and berths. Two options were examined that would virtually eliminate the need for dredging by relocating the port to an area unaffected by siltation:

- option 1: an offshore jetty utilising existing port facilities
- option 2: a new deep-water port at Yarrabah with its own onshore facilities.

Investigations concluded that, although technically feasible, the two options examined were expensive and would entail significant environmental impacts. The capital cost of the Yarrabah port was estimated to be in excess of $300 million in 1992 dollars (approximately $560 million in 2017 dollars). Relocation of all users to an alternative port would also result in severe operational disruption, particularly for tourist-related uses. As the offshore jetty would be unconnected to land, it would still require tendering.

Furthermore, it was assumed that smaller craft such as tourist vessels, pleasure craft, fishing trawlers and navy ships would continue to use the existing port. Some dredging of the channel and berths (albeit much reduced) would still be required in the longer term (e.g. after three or four years), as ongoing siltation would eventually deny access to even these vessels.

Relocation of the port as a means of reducing dredge spoil volume is not considered a viable option.

4.6.1.4 Maintain Current Channel Dimensions and Enhance Landside Infrastructure

Three options to enhance landside infrastructure while continuing to use Trinity Wharf were considered:

- heavy fuel oil (HFO) infrastructure
- Yorkeys Knob Jetty
- Yarrabah Jetty.

These options are detailed below.

HFO Infrastructure (2012)

The Cairns Cruise Shipping Development Strategy assessed enhancement to landside infrastructure by what was referred to as:

- scenario 2: provide HFO infrastructure only (plus maintenance dredging).

The Cairns Cruise Shipping Development Strategy also investigated a number of other scenarios:

- scenario 1: do nothing (maintenance dredging only) – this is the status quo identical to that described above
- scenario 3: provide HFO infrastructure and widen the channel to 130 metres – this is essentially the Project assessed in the Draft EIS
- scenario 4: provide HFO infrastructure and widen the channel to 140 metres – this is fundamentally equivalent to the Project assessed in the Draft EIS.

Scenario 4 was preferred, with scenario 2 being recommended as an interim measure. The strategy investigations noted that the incremental increase in cashflows due to the availability of HFO infrastructure (scenario 2) resulted in a positive NPV for the duration of the modelled period at all levels of cruise ship visitation, provided that the capital works were funded by others, regardless of whether or not the port levied an additional charge on cruise ships.

The enhancement of landside infrastructure is beneficial to the Project, not an alternative to the Project. In summary, while there was some marginal economic benefit in providing these services, it would not improve the ability of large-sized vessels to moor at the Cairns Cruise Liner Terminal. However, it may attract boutique and mid-sized vessels and increase the port's attractiveness for homeporting. Upgrading landside infrastructure without upgrading the channel infrastructure would not increase utilisation of the port in the longer term.

Yorkeys Knob Jetty (2014)

In 2014, Ports North investigated a fixed wharf structure in a suitable depth of water adjacent to Yorkeys Knob that would allow large cruise ships to berth and provide vehicular (bus) access to shore via an approach jetty. Under this option, vessels able to navigate the channel would continue to use Trinity Wharf.

The new wharf and berth would need to be positioned at a depth of 10 metres below LAT as is the currently designated anchorage area for ships anchoring and tendering into port.

The wharf structure would need to be about 300 metres long and would require additional mooring dolphin structures either side with footbridge access for handling mooring lines. A 600-square metre building would also be required to shelter, screen and coordinate passengers.

The access jetty was priced as a single lane (four metres wide), with passing bays at approximately 400-metre spacings. A larger bus queuing, security check and turning area at the junction to the wharf would also be required. Services such as power, water, sewerage and telecommunications would also have to be run from land and significant landside road and revetment works would be required. A cost of $320 million in 2014 dollars was estimated (about $330 million in 2017 dollars).

This option was discounted due to:

- visual and navigational safety impacts
- potential megafauna impacts if permanent structures out to sea where established
- potential impacts of nearby sensitive receptors such as the coral at Double Island
- ongoing environmental risks associated with trestles such as protective recoating and risk of contamination from fuel spills and paints.

Significant and unacceptable costs were also identified with the construction and maintenance of the structure. The cost of the trestle wharf at Yorkeys Knob was estimated in the RDEIS to be $400 million. The trestle structure would not provide the same benefits for ships as wharf-side porting. Additionally, ships would not have access to services such as fuel options and maintenance.

Yarrabah Jetty (2017)

Locating a ferry terminal at Yarrabah approximately 10 kilometres east of Cairns is currently under consideration. Marine surveys have been completed and funding has been provided for a study. Queensland Government funding has been issued for the construction of a small jetty at the northern end of Mission Bay (Yarrabah). This will be a minor structure that will extend to only -0.5 metres LAT depth.

However, the Yarrabah Jetty is not an alternative to the Port of Cairns, but rather complementary infrastructure that provides access to a cultural experience. This experience is different from that offered by the Cairns CBD and is not aimed at the mass cruise shipping market. It is located over a steep mountain (low speed) range quite a distance by road from Cairns and would thus limit the economic benefits that a Port of Cairns docking would deliver.

As with Yorkeys Knob, Yarrabah does not offer any port services or fuel options. Given its strong cultural setting, it is likely there would be potential cultural heritage challenges in expanding the jetty to a size that could cater for all classes of cruise ships.

4.6.1.5 Maintain Current Channel Dimensions and Adopt Improved Tendering Alternatives

In 2014, Ports North also investigated enhanced tendering opportunities for large ships. These were an alternative to, or enhancement of, the current offshore anchoring and an adjunct to the continued use of Trinity Wharf by vessels that could navigate the existing channel.

Two options were considered:

- Cairns channel tendering
- Yorkeys Knob enhanced tendering.

Considerable logistics analysis was undertaken for larger cruise ship sizes, including different combinations of numbers and sizes of tendering vessels. (The number of vessels employed in the transfer would be limited by the cruise ships' available exit points for passenger groups.) Benchmarking against Yorkeys Knob as well as Port Douglas, Whitsundays and Thursday Island was also undertaken to establish the level of service and acceptability of the Cairns channel tendering option.

The analysis found the Cairns channel tendering option has considerable benefits.

The Cairns channel tendering option involves locating an anchorage area as close as possible (depth-limited) to the channel and port to both minimise travel time and exposure to wind and sea conditions. The proposed location is 12 kilometres from the CBD. This would allow transfer by tenders straight to the CBD via the existing channel and wharves. It does not involve a fixed jetty structure.

Although this option can cater for larger vessels, tendering operations will always remain a limitation to the growth of cruise in the destination and is not preferred by cruise operators. In addition, industry feedback suggests that ship-to-shore tendering creates a poor cruise customer experience.

Ports North consulted with the RHM, the most regular visiting cruise company, and local providers of vessels for tendering about a potential tendering trial, funded by Ports North. This was not taken up by the cruise company.

4.6.2 DBC Options Assessment

Various non-asset and asset options were assessed against the service requirements developed for this DBC. Table 4.2 summarises the options analysis and how these options performed against the service requirements for the Project.

Table 4.2: Options Analysis Summary and Achievement of Service Requirements

OPTIONS		SERVICE REQUIREMENTS ACHIEVED			
		SR1	SR2	SR3	SR4
BASE CASE					
1	Do nothing scenario B (i.e. maintain the current channel dimensions through maintenance dredging, tendering at Yorkeys Knob as usual)	X	X	X	X

OPTIONS		SERVICE REQUIREMENTS ACHIEVED			
		SR1	SR2	SR3	SR4
NON-INFRASTRUCTURE TREATMENTS					
2	Do nothing scenario A (i.e. abandon maintenance dredging and hence over time abandon the channel, tendering at Yorkeys Knob as usual)	X	X	X	X
3	Non-shipping options (road and rail)	X	X	X	X
EXISTING INFRASTRUCTURE TREATMENTS					
	Maintain current channel dimensions and enhance landside infrastructure – HFO infrastructure	Partial	X	X	X
	Maintain current channel dimensions and enhance landside infrastructure – Yorkeys Knob Jetty	Partial	X	X	X
	Maintain current channel dimensions and enhance landside infrastructure – Yarrabah Jetty	Partial	X	X	X
	Maintain current channel dimensions and enhance landside infrastructure	Partial	Partial	X	X
	Maintain current channel dimensions and adopt improved tendering alternatives – Cairns channel tendering	Partial	X	X	X
	Maintain current channel dimensions and adopt improved tendering alternatives – Yorkeys Knob enhanced tendering	Partial	X	X	X
	Widen channel to 130 metres including associated landside wharf upgrade (original Draft EIS)	Partial	✓	✓	✓
	Widen channel to 100 metres including associated landside wharf upgrade (current, RDEIS)	✓	✓	✓	✓
NEW INFRASTRUCTURE TREATMENTS					
	Relocate port to an area unaffected by siltation – an offshore jetty utilising existing port facilities	✓	Partial	Partial	X
	Relocate port to an area unaffected by siltation – a new deep-water port at Yarrabah with its own onshore facilities	✓	Partial	Partial	X

4.6.3 Options Summary

The table below shows how the options assessed support the achievement of key benefits and reasons for the Project.

OPTION	DESCRIPTION	BENEFIT 1 Enable larger cruise ships to enter port	BENEFIT 2 Support HMAS Cairns operations	BENEFIT 3 Increase domestic and international trade	BENEFIT 4 Increase resilience to natural disasters	REASON FOR OPTION EXCLUSION/ INCLUSION
Do nothing scenario B	▪ Maintenance dredging ▪ Continuation of offshore area at Yorkeys Knob	Not supported ▪ Option does not support enhanced cruise industry opportunities ▪ Potential for degradation of cruise tourism to Cairns (and potentially state) as larger ships begin to dominate the cruise market	Not supported ▪ Option does not support expanded future Defence presence	Not supported ▪ Option does not support expanding trade opportunities ▪ Restricts importing and exporting of goods from local area ▪ Maintains current unreliable access during flooding events	Not supported ▪ Channel remains exposed to risks associated with loss of channel depth and restrictions to shipping due to significant weather events such as cyclones	Does not achieve any benefits sought and has potential to significantly impact future tourism, defence and trade opportunities
Relocate the port	Relocate the port to an area unaffected by siltation: 4. an offshore jetty using existing port facilities 5. a new deep-water port at Yarrabah with its own onshore facilities	Not supported ▪ All vessels will be able to access port however passenger transfer issues to Cairns CBD still exist ▪ Minimal opportunity for port or fuelling services to be offered	Not supported ▪ Defence vessels will still require access to naval base via the channel	Not supported ▪ All vessels will be able to access port however access issues to Cairns CBD still exist ▪ Minimal opportunity for port or fuelling services to be offered	Not supported ▪ Channel remains exposed to risks associated with loss of channel depth and restrictions to shipping due to significant weather events such as cyclones	▪ Overall cost ▪ Proximity of port to central Cairns ▪ Potential negative navigational safety, visual and environmental impacts

OPTION	DESCRIPTION	BENEFIT 1 Enable larger cruise ships to enter port	BENEFIT 2 Support HMAS Cairns operations	BENEFIT 3 Increase domestic and international trade	BENEFIT 4 Increase resilience to natural disasters	REASON FOR OPTION EXCLUSION/ INCLUSION
Maintain current channel dimensions and enhance landside infrastructure	▪ HFO infrastructure ▪ Yorkeys Knob Jetty ▪ Yarrabah Jetty	Not supported ▪ Option does not allow larger ships to enter the port ▪ HFO may attract boutique and mid-sized vessels and increase the port's attractiveness for homeporting	Not supported ▪ Option does not support expanded future Defence presence	Not supported ▪ Option does not support expanding trade opportunities ▪ Maintains current unreliable access during flooding events	Not supported ▪ Channel remains exposed to risks associated with loss of channel depth and restrictions to shipping due to significant weather events such as cyclones	▪ Yorkeys Knob Jetty was discarded due to safety and environmental impacts and costs ▪ HFO and Yarrabah Jetty are complementary infrastructure, not a replacement to the Project
Maintain current channel dimensions and adopt improved tendering alternatives	▪ Cairns channel tendering ▪ Yorkeys Knob enhanced tendering	Not supported ▪ Option does not allow larger ships to enter the port	Not supported ▪ Option does not support expanded future Defence presence	Not supported ▪ Option does not support expanding trade opportunities ▪ Maintains current unreliable access during flooding events	Not supported ▪ Channel remains exposed to risks associated with loss of channel depth and restrictions to shipping due to significant weather events such as cyclones	▪ Tenders are still required, making this option unattractive to cruise operators ▪ Ship-to-shore tendering creates a poor cruise customer experience

OPTION	DESCRIPTION	BENEFIT 1 Enable larger cruise ships to enter port	BENEFIT 2 Support HMAS Cairns operations	BENEFIT 3 Increase domestic and international trade	BENEFIT 4 Increase resilience to natural disasters	REASON FOR OPTION EXCLUSION/ INCLUSION
Preferred option	▪ Deepening and widening the channel Structural upgrade of existing shipping wharves and provision and upgrade of services to the wharves	Supported ▪ Increases opportunity for growth of cruise ship sector and broader tourism industry in the region ▪ Reduces need to tender and transfer passengers from offshore anchoring to the Cairns CBD	Supported ▪ Enables future expansion of HMAS Cairns and personnel numbers, including incentive to have approval granted for creation of dry-dock maintenance facilities for HMAS Cairns	Supported ▪ Reduces current tidal and loading restrictions on bulk cargo ships accessing the Port of Cairns, thereby improving port efficiency ▪ Allows access for larger foreign navy vessels	Supported ▪ Provides increased resilience for the Port of Cairns to extreme weather events	Achieves all benefits sought and has potential to significantly support future tourism, defence and trade opportunities

4.7 Preferred Option

The preferred option, the Reference Project, selected as the subject of this DBC, involves:

- deepening of the existing various channel segment target depths to increase the depth clarification from -8.3 metres to -8.8 metres
- widening approximately three kilometres of the outer channel by 10 metres and widening the channel bend from 150 metres to 180 metres
- realignment and widening of the channel bend transits over approximately three kilometres by 10 metres to 60 metres
- widening of the inner channel by 20 metres over about a one kilometre-length
- deepening of the existing Crystal Swing Basin and creation of a new (relocated) cargo ship swing basin (Smiths Creek Swing Basin)
- a substantially reduced dredging volume based on the above widening and deepening (up to 1,000,000 cubic metres in situ material volume), with this material being required to be placed on land
- structural upgrade of the existing shipping wharves
- provision and upgrade of services to the wharves.

Other aspects of the project are essentially unchanged from the original Project.

CHAPTER 5
BASE CASE

CHAPTER SUMMARY AND CONCLUSIONS:

- The Base Case or 'business as usual' assumes a normal level of operational activities and growth into the future at the Port of Cairns without the proposed channel widening and deepening project at Trinity Inlet.
- Trinity Inlet at the Port of Cairns has limitations as the depth of the shipping channel means it can only accommodate cruise ships of up to 290 metres length. Larger cruise ships such as the vista, grand and voyager class vessels are unable to access Trinity Inlet. In the Base Case, larger vessels that visit Cairns must anchor offshore at Yorkeys Knob and this requires tendering of passengers to shore. This is a difficult and time consuming process and is currently limiting the number of mega ships visiting Cairns. During some rough weather circumstances it is not possible to anchor and disembark at Yorkeys Knob. Not having access to Trinity Inlet due to the existing channel size restricts both the number of ships visiting the region as well as the number of passengers and crew members leaving the cruise ship and engaging in cruise related expenditure and tourism activities in the region.
- In the Base Case, demand modelling forecasts for cruise ship calls to the Port of Cairns (Trinity Inlet and Yorkeys Knob) show growth over time (albeit at a lower rate) taking into account cruise ship demand (globally/regionally) and historical/forecast data on cruise ship schedules and trends from Ports North and economic data and information. There are no limitations to the entry of smaller cruise ships although growth is assumed to moderate beyond 2031 in line with population growth for smaller sub-regal vessel classes based on consultation with Ports North. This is also supported by market sounding feedback that stated a major trend in the future is toward larger size cruise ships and the global forward order book, which confirms a trend toward orders of larger cruise ships in the near future (e.g. by 2021). The Base Case supports growth in the smaller vessels including the sub-regal vessel market, which currently accounts for around three quarters of total cruise ship calls into Trinity Inlet and over 50 per cent of total cruise ship calls into Cairns in 2017. This is driven by demand for niche cruises such as market adventure and boutique type cruising. The Base Case also factors in growth in larger vessels (vista class and above) into Yorkeys Knob.
- In the Base Case, maintenance costs are required for Ports North to sustain a normal level of operations (including cruise shipping and commodity trades) at Trinity Inlet. Maintenance works include annual dredging to sustain the depth of the existing channel and regular maintenance on the asset (and these costs are based on the P90 and P50 financial estimates). The average annual in situ quantity dredged is approximately 350,000 cubic metres, of which 90 per cent is removed from the channel and 10 per cent is removed from the inner port area. Capital works such as the demolition of Wharf 6 and a new fendering system are incorporated into the Base Case. The Base Case includes port fees and charges paid by cruise ships when they call into Trinity Inlet and ongoing operating costs. The evaluation period for the Base case is 25 years after the completion of the Reference Project in 2021. Demand forecasts are developed out to 2045.
- In 2017, there were 77 cruise ships calls to Cairns, with almost 70 per cent going to Trinity Inlet. This is forecast to increase to around 107 cruise ship calls to Cairns by 2027 and around 170 by 2045. By 2045, sub-regal vessels are estimated to account for around 50 per cent of total cruise ship calls, to Cairns with the rest made up of sun, regal and larger vessels, namely vista, grand and voyager. Larger vessels will comprise 12 per cent of total vessel calls to Cairns by 2045. All large vessels anchor off Yorkeys Knob and tender passengers to shore. In the Base Case, cruise ships above Sun class cannot enter into Trinity Inlet.

5.1 Purpose

This chapter defines the Base Case for the Project. Development and analysis of a Base Case is essential as it is the benchmark for assessing the Reference Project. A well-articulated Base Case provides decision-makers with information on the situation in the absence of the proposed project.

5.2 Broad Context

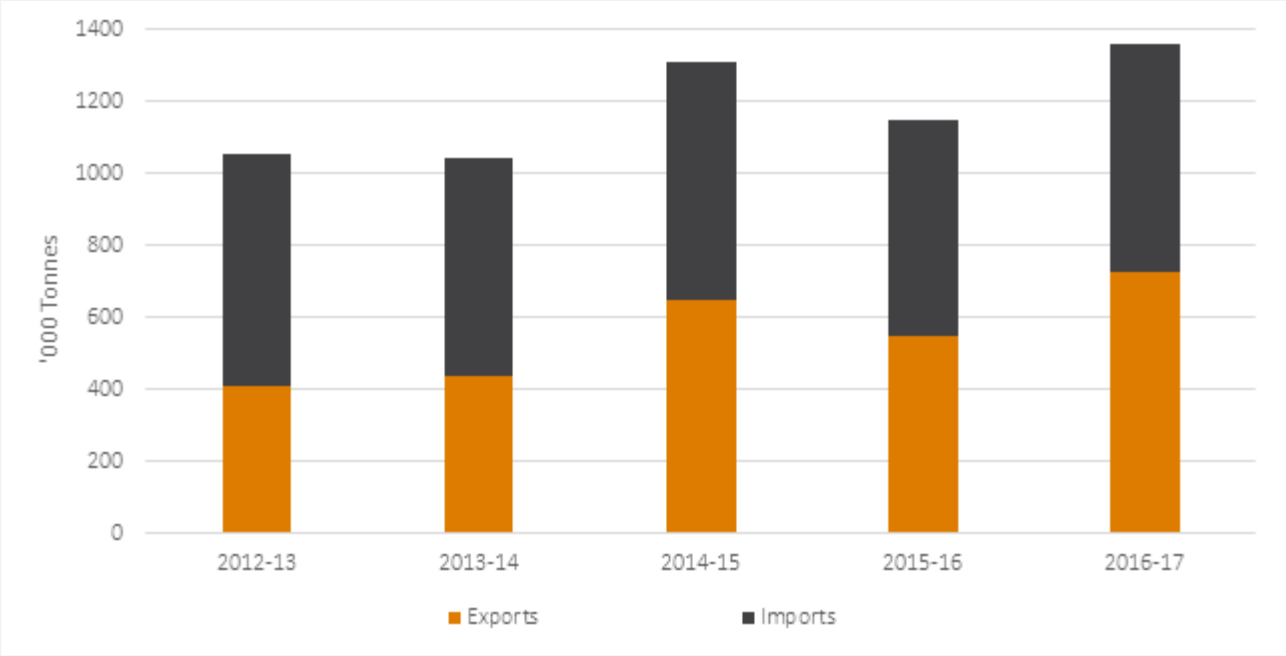
To provide context to the development of the Base Case, the following section summarises the nature and operation of Ports North, focusing on the Port of Cairns as a whole (including Trinity Inlet and Yorkeys Knob). It discusses Trinity Inlet operations (specifically port revenue and operating expenses), the Cairns regional economy and the cruise shipping industry. The section concludes with an overview of the data and information used to develop the Base Case demand forecasts for cruise shipping, which underpins the Base Case and economic analysis of the Reference Project.

5.2.1 Nature and Operation of Port of Cairns

Far North Queensland Ports Corporation Limited, trading as Ports North, is a government-owned corporation responsible for the development and management of the declared ports of Cairns, Cape Flattery, Karumba, Mourilyan, Skardon River, Quintell Beach, Thursday Island, Burketown and Cooktown.

Ports North's operations and facilities are vital to the economic development of the regional centres they service and the state's tourism and export performance. The Port of Cairns at Trinity Inlet handles bulk shipments of sugar, molasses, crude fertilisers, petroleum products, liquefied petroleum gas (LPG) and general cargo. Total throughput in commodities (both imports and exports) is shown in Figure 5.1.

Figure 5.1: Total Throughput at the Port of Cairns



Source: Department of Transport and Main Roads – Trade Statistics of Queensland Ports – five years to 2017.

The Port of Cairns also has extensive marina and tourism facilities and this facilitates cruise ship calls into Cairns that generate tourism benefits for the Cairns region and Queensland as a whole. This includes vessel calls into the Port of Cairns by smaller cruise vessels and larger vessels such as sun class vessels, which are up to 260 metres in length. These ships carry a large number of passengers and crew. The width and depth of

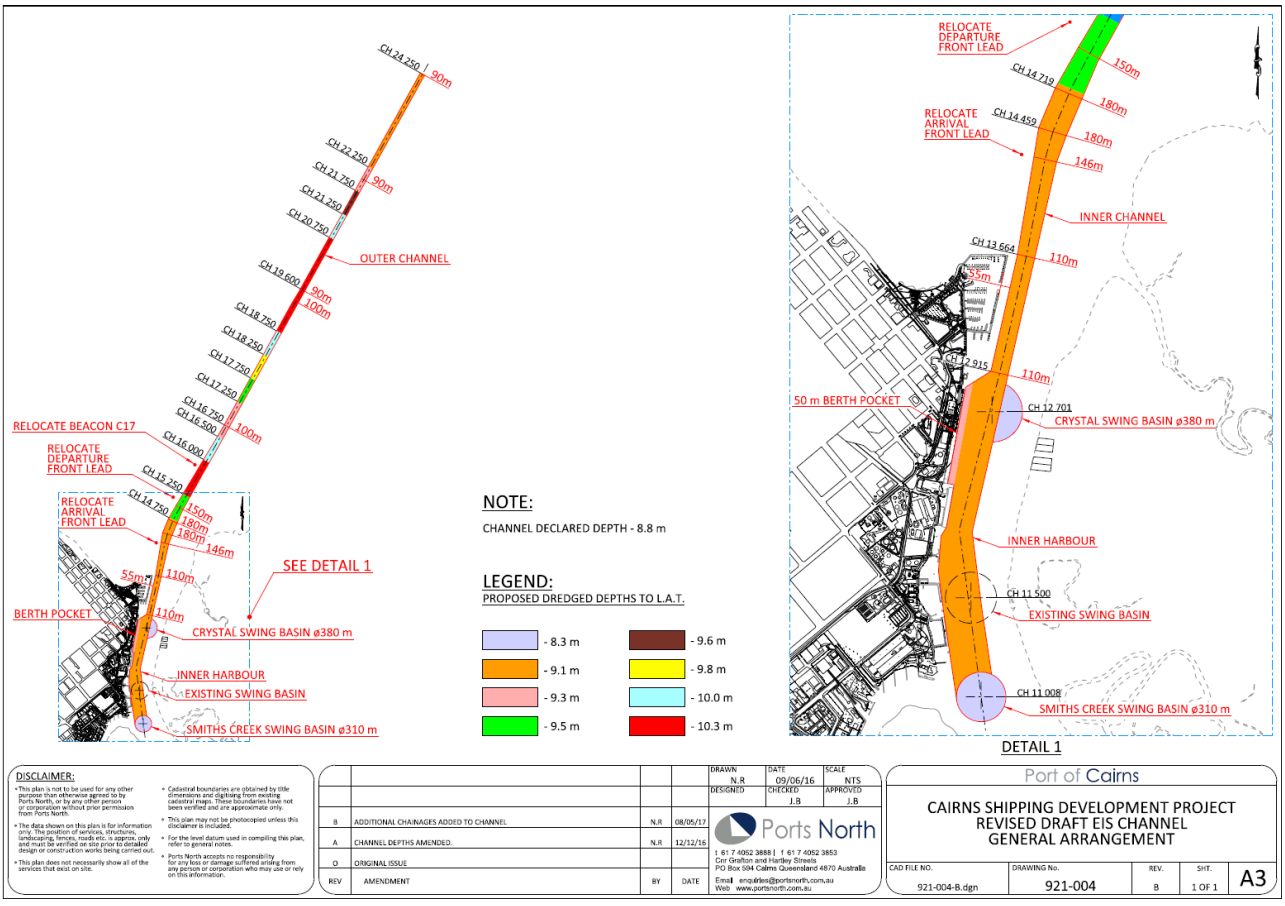
the current channel means that larger cruise ships (over 290 metres in length) are not normally able to access the channel.

The Cairns Cruise Liner Terminal and heritage-listed wharf, together with other cargo handling berths, lie on the western bank of Trinity Inlet adjacent to the Cairns Central Business District. The current shipping channel includes an outer channel and an inner harbour channel. The inner harbour channel terminates at the Main Turning (Swing) Basin, while the outer channel commences at the channel bend adjacent to beacon number 20 and extends out to sea, to the end of the channel.[8]

The inner channel in the Port of Cairns extends for 2.5 kilometres in length, with variable widths adjacent to the swing basins and berths. The two current swing basins are the Main Swing Basin (310 metres in diameter and -8.3 metres LAT) and the Crystal Swing Basin (360 metres at -7 metres LAT design depth and 380 metres at -6.3 metres LAT design depth).[9]

The Crystal Swing Basin is the principal swing basin currently used by cruise ships to access Wharves 1–5. The Main Swing Basin is primarily used by cargo ships berthing at the general cargo wharves, fuel berth and sugar wharf as well as vessels berthing at the Cairns Naval Base (HMAS Cairns). The existing location of the Main Swing Basin restricts future opportunity for HMAS Cairns to expand its berthing capacity.[10] Refer Figure 5.2

Figure 5.2: Channel placement and Swing Basin placement

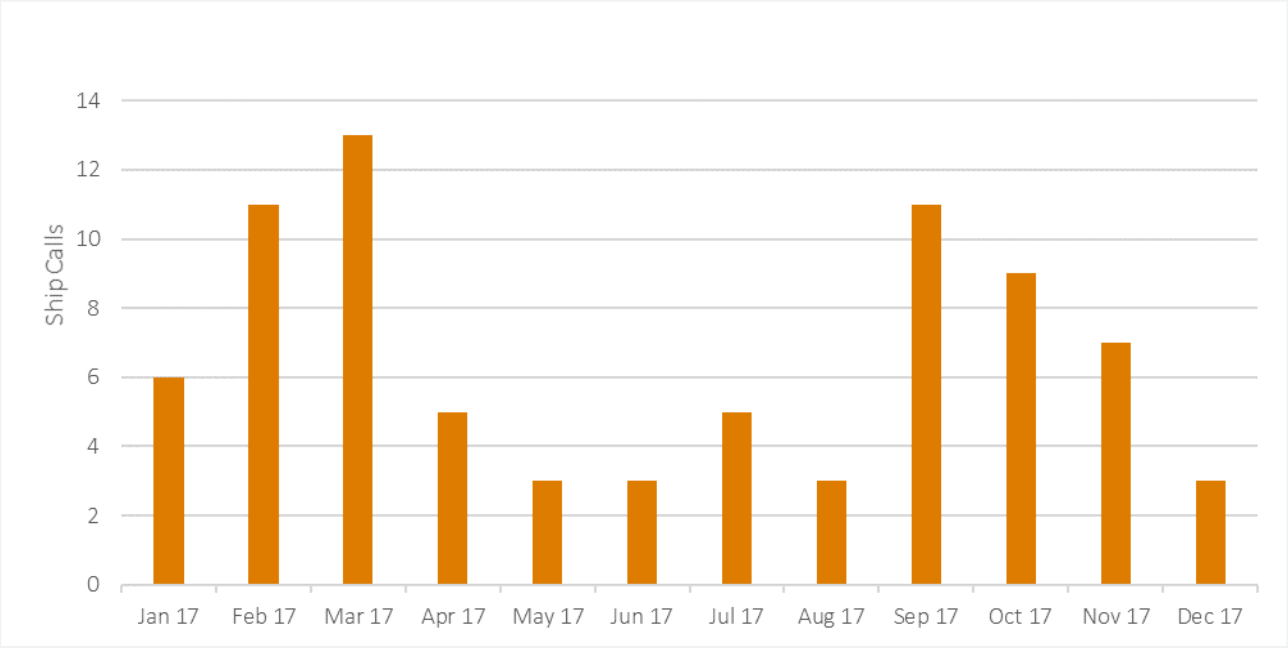


In 2016–17, there were an estimated 52 ships that called into the Port of Cairns and 25 ships that called into Yorkeys Knob (being too large to navigate Trinity Inlet), making a total of 77 ship calls for the region. The number of ship calls into the Port of Cairns increased over the last two years due to the commencement of a

[8] Sourced from Updated EIS, 2016.
[9] Sourced from TMR, 2015.
[10] Sourced from Updated EIS, 2016.

home porting trial by P&O Cruises at Trinity Inlet. However, P&O has now confirmed it will cease its homeporting trial from 2019 onwards, due to the sale of one vessel and the redeployment of the other vessel. The seasonal nature of ship calls to Cairns is evident in Figure 5.3, with the bulk of cruise ships calling over the months of September to March.

Figure 5.3: Ship Calls to the Port of Cairns 2017 Calendar Year



Source: Ports North.

5.2.2 Port Revenue and Operating Expenses at Trinity Inlet

In the Base Case, Trinity Inlet continues with its regular operations and general maintenance expenditure of wharf infrastructure, as well as receiving revenues from cruise ship port calls and other revenues. (This detail is provided in the Chapter 14: Financial and Commercial Analysis).

5.2.3 Regional Economic Context

The tourism industry in Tropical North Queensland (TNQ), in which Cairns is the key tourism hub, permeates the current landscape of the region and is one of the largest employment industries. It is estimated that around 14,600 residents (11.2 per cent of total regional employment) are directly employed in the tourism industry compared to 13,620 residents in healthcare and social assistance and 12,600 in retail based on Deloitte Access Economics Regional Tourism Satellite Accounts. Besides providing employment opportunities within the region, tourism supports economic growth through direct expenditure. Direct expenditure by international visitors to TNQ was almost $1.1 billion for the year ended March 2017, with an average length of stay of 7.6 nights and an average spend of $1,211 per trip.[11] This outperformed domestic visitor expenditure, which averaged 5.1 nights and $1,047 per visit.[12] While Cairns is the major city servicing the TNQ region and acts as the region's primary tourism hub, it is important to recognise that visitors also spend their money outside the city of Cairns. Other popular destinations include Palm Cove, Port Douglas and Kuranda, which have substantial existing tourism infrastructure. In addition, tourism stimulates other industries in TNQ, including accommodation, travel agency and tour operator services, retail, cultural and

[11] Tourism and Events Queensland, Tropical North Qld Visitor Snapshot, March 2017,
[12] Ibid

recreational industries, entertainment, local area transportation and education and training. The cruise shipping industry is a growing niche industry in Cairns and is supported by attractions and tour operator services to the reef, rainforest and other tourist attractions.

5.2.4 Timeframe and Overview of Base Case Demand Forecasts

The Base Case is underpinned by data modelling and consultations with Ports North and cruise industry operators and key industry bodies. The key assumptions for the Base Case demand forecasts, which are modelled to 2045, are summarised in Table 5.1.

Table 5.1: Key Sources for Base Case Demand Forecasts for Cruise Shipping (Financial Years)

KEY DATA SOURCES AND ASSUMPTIONS FOR BASE CASE DEMAND FORECASTS FOR CRUISE SHIP VESSEL CALLS				
DATA	2017 TO 2019	2020 TO 2027	2028 TO 2030	2031 TO 2045
Forward cruise schedule	The total number of cruise ship calls is based on data provided by Ports North for Trinity and Yorkeys Knob from 2017 to 2019.			
Vessel mix	The vessel mix at Trinity inlet is based on the average historical share of vessel arrivals by type. A 'bottom up' adjustment is made so that sub-regal vessel calls to Trinity Inlet grow in line with projected population growth in Queensland after 2030.[13] The vessel mix at Yorkeys Knob is also based on the average of historical shares of vessel arrivals by type. In the absence of the Project, vista class vessels would be unable to access the channel at Trinity Inlet. The global forward order book (that shows 20 per cent of cruise vessels on the book being vista class vessels in 2021), a step-up factor is applied to ship calls by vista vessels into Yorkeys Knob in the Base Case. However, based on advice from Ports North, there will be constraints to the number of vista class vessels that can call into Yorkeys Knob in the absence of the Project as there is a service quality differential between Yorkeys Knob and Trinity Inlet. Therefore, without the Project it will not be possible to capitalise on the forecast growth in the global cruise sector market and global shift to larger cruise ships coming into Cairns. The key service differential compared to Trinity Inlet is that passengers arriving at Yorkeys Knob have to be tendered off the ship once it arrives and anchors. This costs cruise passengers time and disruptions and reduces the quality of their cruise experience.			
Econometric growth rate forecasts for total cruise ship calls		This is determined based on the econometric/regression modelling approach, which is discussed in detail in Section 5.3.1. This growth rate is applied as a 'top down' assumption but further 'bottom up' changes are made to reflect changes to the vessel mix over time at both Trinity Inlet and Yorkeys Knob. Industry consultation highlighted the expectation that smaller vessels (sub-regals) and sun class vessels would likely continue to be a growth market despite a slight reduction in their share of the vessel mix by 2045.		

[13] Queensland Government Population Projections, 2015, Office of the Government Statistician.

KEY DATA SOURCES AND ASSUMPTIONS FOR BASE CASE DEMAND FORECASTS FOR CRUISE SHIP VESSEL CALLS				
DATA	2017 TO 2019	2020 TO 2027	2028 TO 2030	2031 TO 2045
Population growth rate				This is modelled based on applying a steady state population growth rate assumption to the sub-regal vessel class, based on QT population projections for the state.

In developing demand forecasts for the Base Case, the vessel mix at both Trinity Inlet and Yorkeys Knob has been adjusted to reflect the changes in the global cruise market in the future. Consultation with cruise operators indicated an increasing market for boutique cruises (e.g. boutique and adventure cruises) and also confirmed a strong global trend in the cruise industry toward the use of larger cruise ships.

This trend is confirmed by the global forward order book, with orders of larger ships namely vista, grand and voyager class vessels accounting for around 80 per cent of global forward orders in 2021.[14] The market consultation highlighted reduced growth in cruise ship calls of other types of sub-regal vessels outside of the smaller boutique and adventure sub-regal class of vessels. This is in line with an increasing trend towards larger cruise vessels being deployed in the global market. The growth in sub-regal cruise ship calls into Trinity Inlet is assumed to move in line with long-run average projected population growth for Queensland beyond 2030. The assumed compound average growth rate in the Queensland population over this period is 1.7 per cent a year (based on Queensland Government medium series population projections).

The Base Case demand forecasts factor in a global shift towards larger vessels in the cruise market. This is reflected by an increasing number of visits by larger cruise vessels into Yorkeys Knob as vista, grand and voyager vessels cannot currently access the channel at Trinity Inlet. Based on the data in the global forward order book, a step-up factor is applied to vista vessels at Yorkeys Knob in the Base Case. Yorkeys Knob is forecast to see a higher number of cruise ships calls (of larger cruise vessels) in the Base Case, as there are no alternatives in the absence of the Project.

5.3 Demand Forecasts and Economic Assumptions

The development of Base Case economic demand forecasts for cruise shipping in Cairns has been informed by:

- analysis of historical demand trends for cruise ship vessel calls in Cairns including both Trinity Inlet and Yorkeys Knob (Section 5.3.1)
- analysis of trends in vessel type at Cairns port (Section 5.3.2)
- forward cruise schedules at Cairns (Section 5.3.3)
- demand surveys of cruise ship passengers at Cairns (Section 5.3.4)
- analysis of drivers of cruise shipping demand and ship calls (Section 5.3.5)

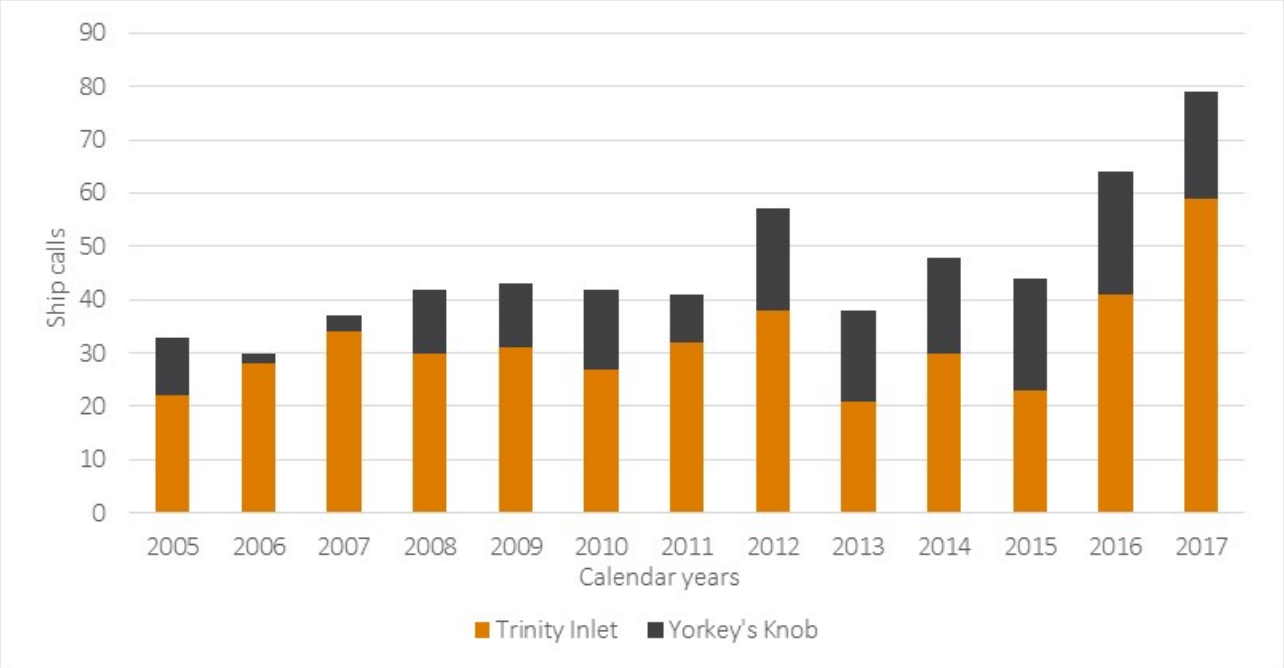
[14] Cruise Industry News, Cruise Ship Order Book.

- development of an econometric methodology to forecast demand over the short, medium and long-term (Section 5.3.7 to Section 5.3.9).

5.3.1 Historical Demand Growth

Over the last 10 years, the number of cruise ship vessel calls to Trinity Inlet has grown by 5.9 per cent in compound annual growth terms (see Figure 5.4). This growth rate is higher for the Port of Cairns as a whole over the last decade, demonstrating strong growth at the port.

Figure 5.4: Cruise Ship Calls to Cairns Broken Down by Port, Trinity Inlet and Yorkeys Knob, 2005 to 2017

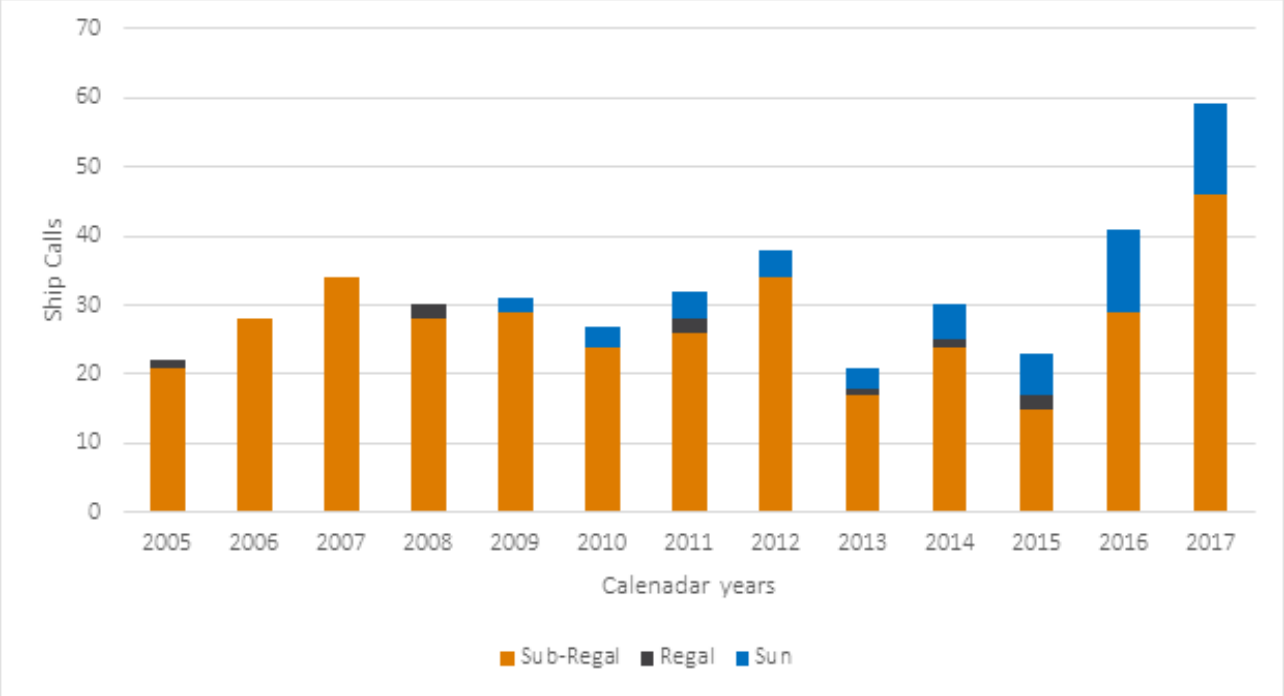


Source: Ports North.

The vessel categories and average passenger capacity for different cruise vessels is included in Chapter 13: Economic Analysis. To summarise, the vessel categories used in the demand forecasts are sub-regal (1,500 passengers); regal (2,000 passengers); sun (2,000 passengers); vista (2,388 passengers); grand (3,100) and voyager (3,300).

There has been a step increase over the past two years in the number of cruise ship calls in Cairns, which has largely been driven by recent home porting of vessels in 2016 and 2017 in Trinity Inlet (see Figure 5.5), including increased growth in the larger sun vessel type as well as growth in sub-regal vessels in 2017. Specifically, there was an overall increase of around 25 cruise ship calls (or almost a 50 per cent increase) comparing the average of the five years to 2015 to the average of the two years to 2017, which saw additional ship calls associated with the trial of home porting at Trinity Inlet. Furthermore, data provided by Ports North highlighted that home porting in 2017 at Trinity Inlet accounted for around 10 per cent of the total number of cruise ship calls into Cairns.

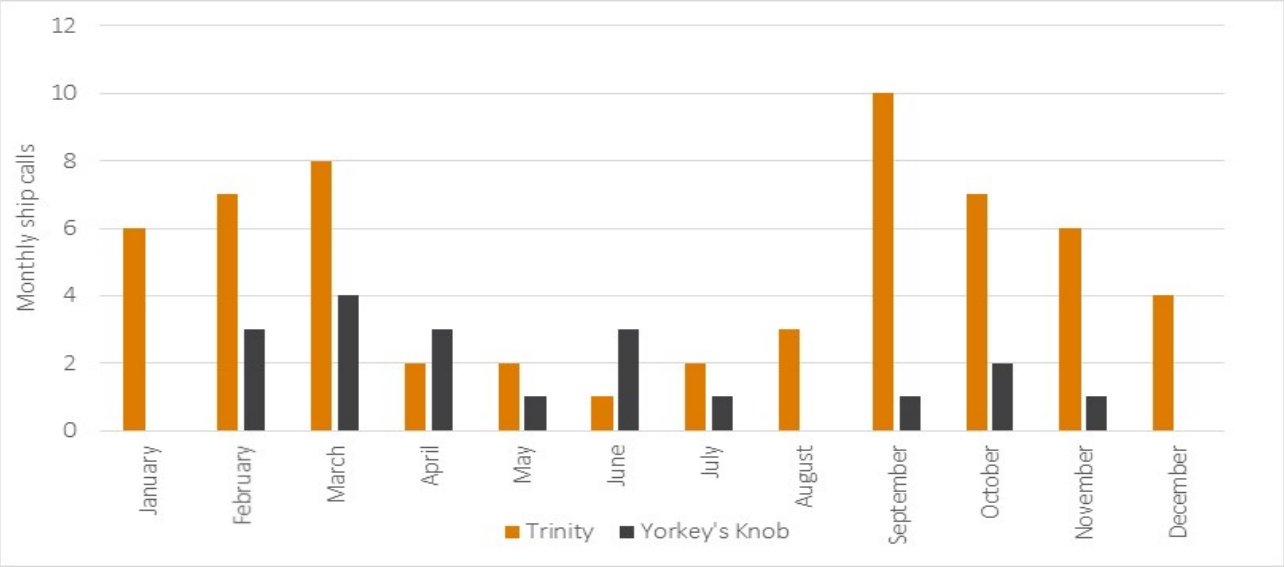
Figure 5.5: Cruise Ship Calls to Cairns Broken Down by Vessel Class, Trinity Inlet and Yorkeys Knob, 2005 to 2017



Source: Ports North.

Analysis of monthly data shows that the majority of ship calls occur between September and March in both Trinity Inlet and Yorkeys Knob in Cairns (see Figure 5.6). This highlights the seasonal nature of cruise shipping demand in Cairns. The demand forecasts have been developed using seasonally adjusted data.

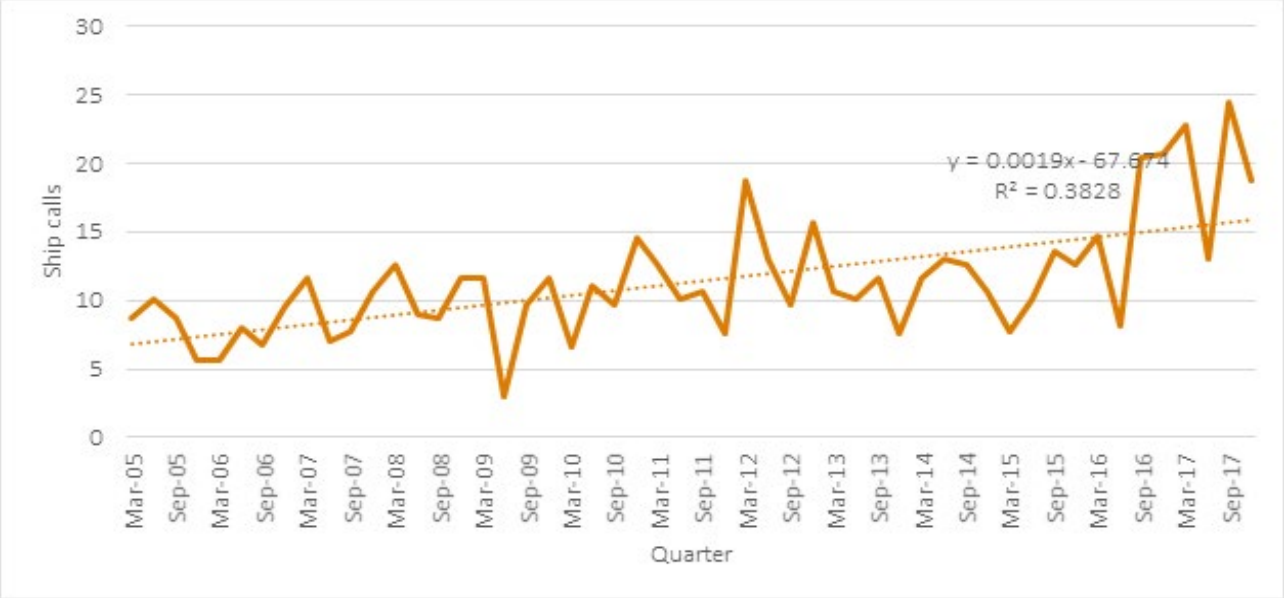
Figure 5.6: Total Cruise Ship Calls to Cairns (Trinity and Yorkeys Knob) by Month in, 2017



Source: Ports North.

Drilling down further, analysis of historical demand on a seasonally adjusted basis, albeit more volatile, demonstrates an overall upward trend in the growth in the number of cruise ship calls in Cairns as a whole, from March quarter 2005 to December quarter 2017 (providing over 50 data points for demand modelling purposes – see Figure 5.7). This analysis informs the development of Base Case demand forecasts, as well as consultation with Ports North and industry.

Figure 5.7: Total Cruise Ship Calls to Cairns (Trinity Inlet and Yorkeys Knob), Seasonally Adjusted, Quarterly



The trend line for total cruise ship calls shows the historical trend fit based purely on the historical trend (seasonally adjusted basis) in cruise ship calls to Cairns (with an R^2 of around 0.38) and underscores the need to develop Base Case forecasts using the econometric/regression approach where drivers such as real GSP per capita (income), international tourist arrivals (key source of cruise demand) and the trade weighted index (TWI) were included. The overall fit of the econometric/regression model that was used to develop the base case forecasts was 0.63 (Adjusted R^2) and provides a good model fit. This is discussed in detail in Section 5.3.5.1.

5.3.2 Forward Cruise Schedules in Cairns

Data supplied by Ports North for cruise schedules provided the expected number of total cruise ship calls over the first part of the demand forecast series, namely 2017 to 2019.

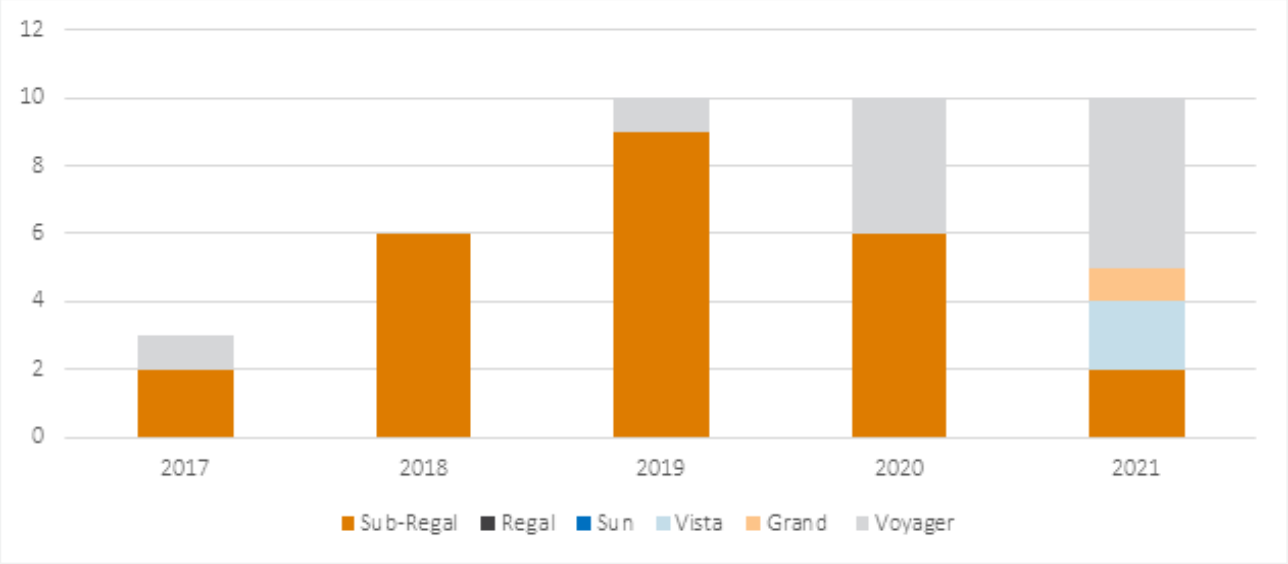
5.3.3 Trends in Vessel Movements

The cruise ship global forward order book was used to analyse forward orders with a focus on cruise ships sailing in the Asian region and around the world. The pattern of forward orders reflects the intentions of cruise shipping operators.

Up to 2020, the largest share of forward orders is for sub-regal cruise vessels, reflecting growth in adventure and boutique-type cruises.

Vista vessels make up 20 per cent of forward orders in 2021. This highlights a considerable forgone market opportunity in the Base Case, due to restrictions on the size of vessels that can enter Trinity Inlet. Widening and deepening the channel at Trinity Inlet to accommodate vista cruise ships (and grands where the dimensions fit) would open up a new market for the Port of Cairns.

Figure 5.8: Cruise Ships on Order – Global Forward Order Book



Source: Cruise Industry News – Cruise Ship Order Book.

5.3.4 Demand Survey and Patronage Profile

A recent demand survey (2017) was conducted at the Port of Cairns.

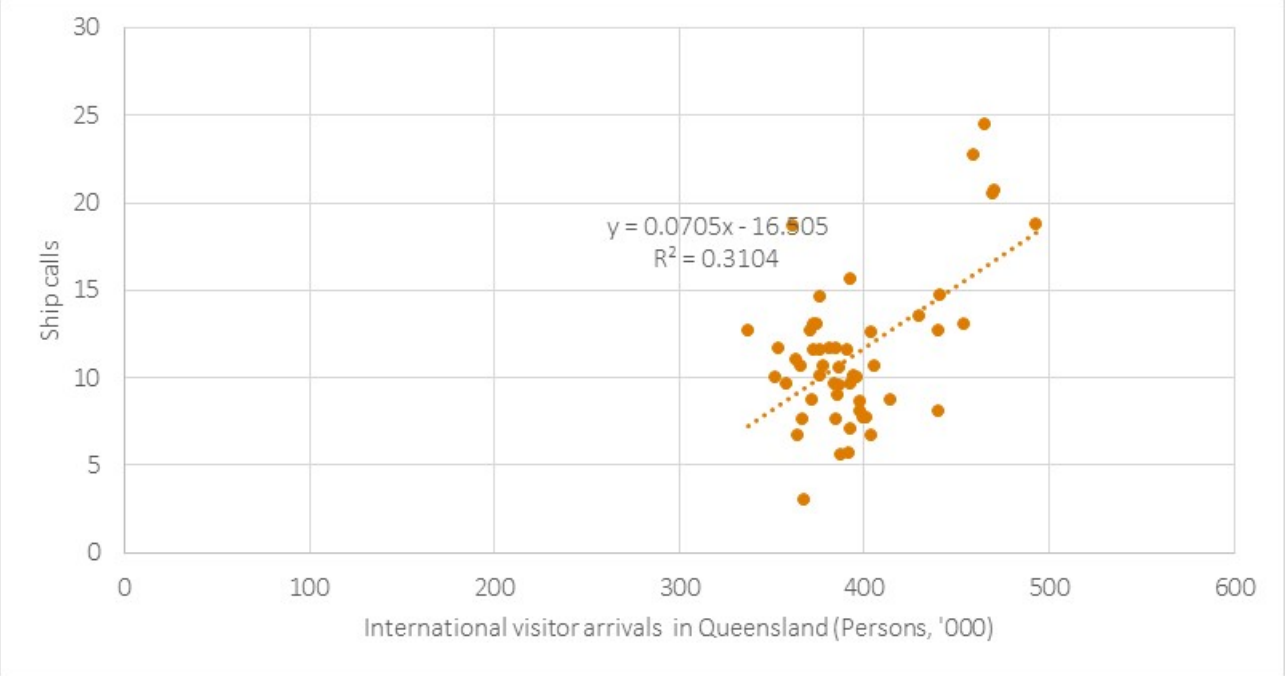
- A total of 407 surveys were undertaken in 2017 with passengers and crew disembarking from eight cruise ships at Cairns (six from Trinity Inlet and two from Yorkeys Knob). This sample mainly included transiting passengers (75 per cent), with crew making up the remaining 25 per cent of the surveyed population. This survey did not include departing passengers.
- The eight survey ships had a total passenger capacity of 12,164 and crew capacity of approximately 5,531 and estimated total capacity of 17,695 at a 95 per cent confidence interval. The sample population surveyed highlighted a significantly higher proportion of international residents (65.8 per cent) compared to domestic residents (34.2 per cent). Of the domestic residents, around six out of every 10 were from Queensland (so around four out of 10 domestic residents are assumed to be interstate).

This information is important for the economic analysis as only international and interstate visitors are assumed to be incremental (i.e. the analysis needs to take into account the potential for expenditure switching of domestic residents). Based on the findings of this demand survey, around 75 per cent of visitors are assumed to be incremental. This analysis also provides context for the Base Case about key source markets and patronage trends.

International visitors to Queensland, economic conditions and domestic factors such as income are key drivers of cruise tourism demand. A positive correlation is observed between ship calls in Cairns and international visitor arrivals (see Figure 5.9) and between ship calls and real GSP per capita (see Figure 5.10) in Queensland, based on analysis of quarterly data over the timeframe 2005 to 2017 (which provides over 50 observations).

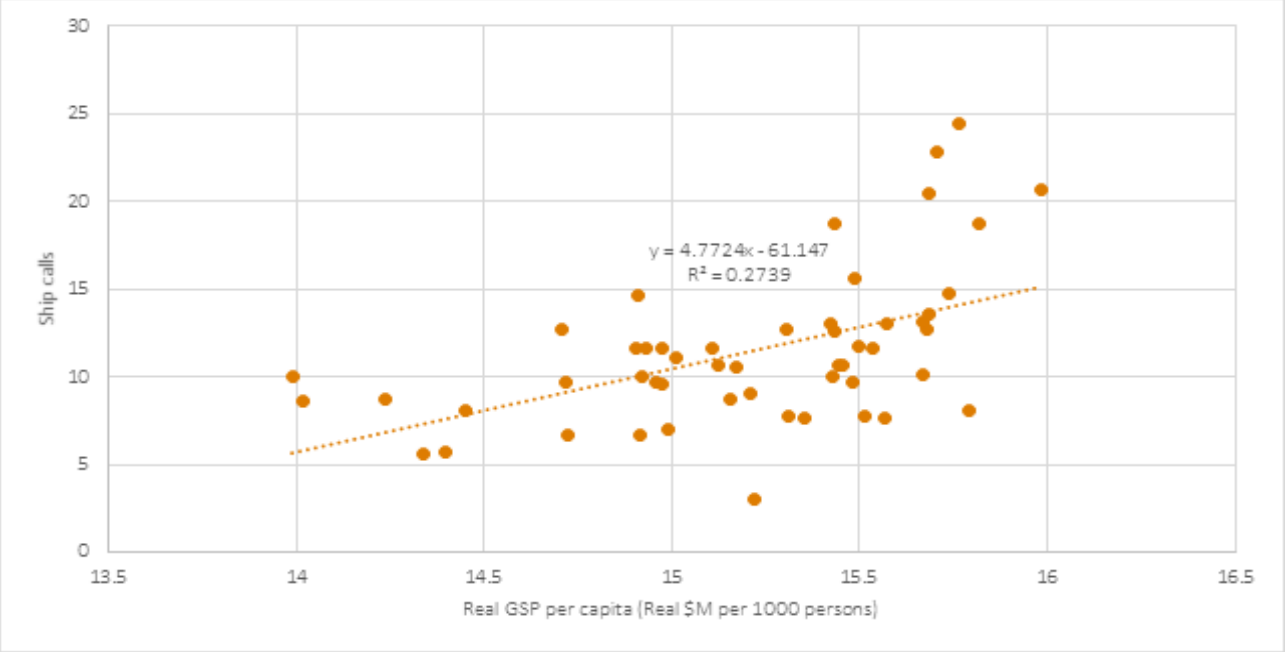
An econometric/regression approach was developed to provide a good fit for forecasting the total number of cruise ship calls in Cairns, based on key demand drivers (or explanatory variables) including income, international tourist arrivals, population, international economic conditions, while also analysing seasonal trends and data movements. These drivers and modelling provide a solid basis (see Section 5.3.7) for demand forecasts for the Base Case, which are discussed in this chapter. This approach also informs demand forecasts for the Reference Project, which is the focus of Chapter 13: Economic Analysis.

Figure 5.9: Cruise Ship Calls to Cairns and International Visitors, Quarterly, March 1995 to December 2017



Source: Analysis based on Ports North data and Deloitte Business Outlook data (December quarter 2017).

Figure 5.10: Cruise Ship Calls to Cairns and Real GSP Per Capita, Quarterly, March 2005 to December 2017



Source: Analysis based on Ports North data and Deloitte Business Outlook data (December quarter 2017).

5.3.5 Drivers of Cruise Shipping Demand

Key drivers of cruise demand have been identified to include (and supported by industry consultations):

Real incomes: Rising incomes are likely to increase demand for cruise shipping as many of these are high-end products, all else being equal. Holidays such as cruises are considered to be more of a luxury good (and relatively more income elastic[15]) so that an increase in real income should result in proportionately higher consumption of cruise products. This has the implication that tourism operators such as cruise shipping operators should experience an increase in demand for cruise products as real incomes rise in expanding economies (e.g. Asia and countries with high per capita gross domestic product (GDP) growth).

Furthermore, based on industry profiling by IBIS world[16], the Global Deep-Sea, Coastal and Inland Water Transportation industry is quite sensitive to changes in overall consumer spending. Increased global consumer spending stimulates demand for consumer products and, in turn, industry transportation services. In addition to increasing demand for shipping-related services, an increase in consumer spending also stimulates demand for cruise activities. IBIS world report that global consumer spending is expected to increase in 2017, representing a potential opportunity for the industry. Continued income growth in the future presents a long-term opportunity for the cruise ship industry and one that Cairns has the potential to tap into in the future. These opportunities will be further expanded by deepening and widening the channel into the Port of Cairns and allowing larger vessels into the Trinity Inlet. Having access to larger vessels at Trinity Inlet (in the Reference Project) will provide economies of scale and flexibility for the cruise industry to provide more competitive pricing for passengers and more comprehensive itineraries.

International tourists: International tourism is an important part of the Far North Queensland economy and international tourists also form a large part of the cruising market. This is highlighted in a recent Demand Survey completed on cruise ship calls to Cairns, which found that around 65 per cent of cruisers were from overseas. The forecast growth for tourism in Cairns and Queensland is strong (with growth in inbound visitor nights forecast to grow on average by 5.9 per cent over the 10-year period to 2026–27). This highlights that there will be opportunities to attract international cruisers into Cairns with strong growth expected in tourism. The enhanced itineraries available through widening the channel will support this growth.

Global economic conditions including exchange rates: Strong growth in the global economy also means there is likely to be strong growth in consumer spending (and this is linked to income growth). As consumer spending increases, part of this expenditure will be channelled toward spending on cruises and will support cruise demand. The econometric analysis found that an increase in the TWI would lead to an increase in cruise ship calls. From a domestic perspective, the increase in the TWI leads to greater purchasing power of the domestic currency and, from an international perspective, the higher TWI is driven by stronger individual currencies that make up the TWI, which is likely to be underpinned by income growth in these countries. Having additional capacity at Trinity Inlet will enable the port to capitalise on positive global economic conditions that encourage additional expenditure on discretionary items of consumption such as recreation including cruising.

[15] Income elasticity of demand measures the responsiveness of demand for a particular good to changes in consumer income.
[16] Global Deep-Sea, Coastal & Inland Water Transportation - Global Market Research Report, IBIS World.

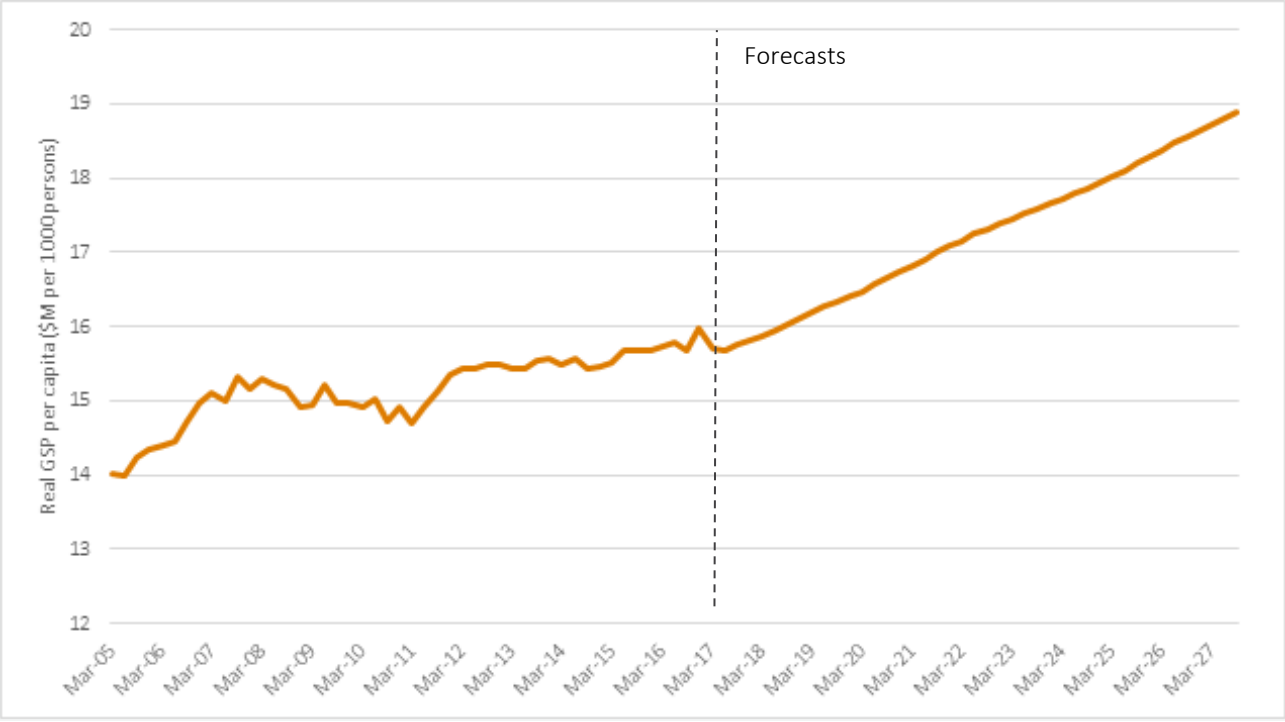
Population and demographics: Local population growth will support the growth of the cruise sector in Cairns and Queensland by increasing the population base of people who will potentially go on cruises. This, coupled with the higher propensity for Australians to go on cruises,[17] supports increased cruise demand over the long-term. While traditionally targeting the elderly market (persons aged over 65 years), the cruise ship market has diversified into other markets, reflecting the broadening of cruise tourism offerings including themed, adventure, high-end and business cruises. Over the 25 years to 2036, Queensland's population is forecast to grow by 1.7 per cent per annum based on medium series projections from QT (2015 edition, medium series). The population for the two SA3 regions that comprise Cairns (Cairns North and Cairns South) are projected to grow by 1.4 per cent and 1.8 per cent per annum respectively.

Using quarterly data, an econometric modelling approach has been developed to establish relationships between demand and identified independent or causal variables and assist with predicting demand forecasts.

5.3.5.1 Real GSP Per Capita Historical and Forecasts

Despite being relatively flat over the past five years in line with slower wages growth, real GSP per capita is forecast to steadily increase over the coming decade,[18] which should support demand from domestic residents in Cairns and Queensland as a whole in the Base Case.

Figure 5.11: Real GSP Per Capita, Historical and Forecast, March Quarter 2005 to December 2027



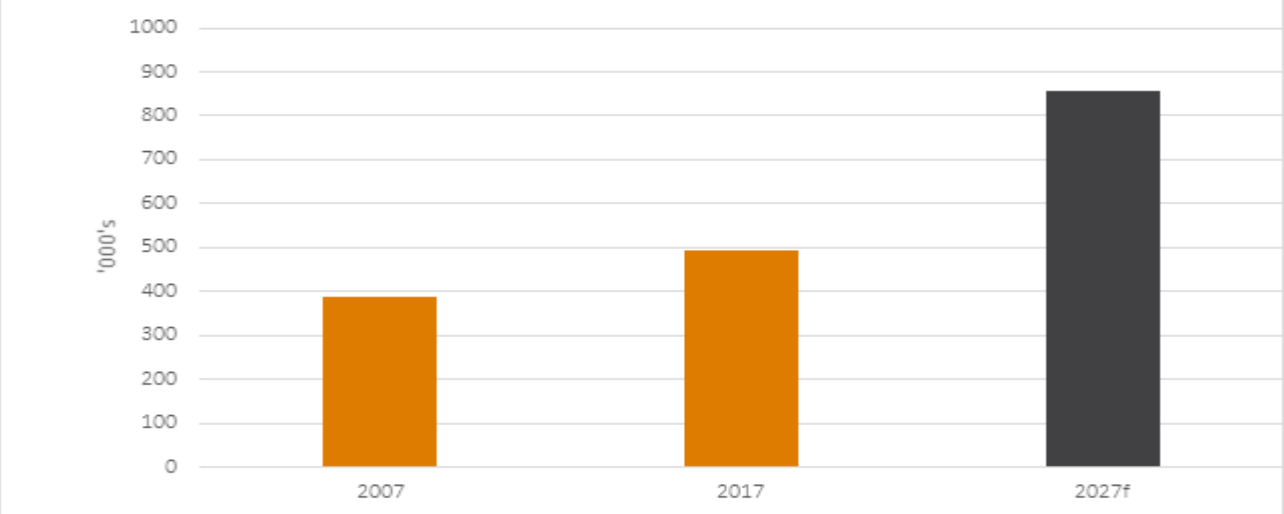
Source: Deloitte Access Economics Business Outlook forecasts, December quarter 2017 forecasts (December quarter 2017).

[17] The market penetration ratio of Australia compared to other countries highlights the growing popularity of cruising in the Australian population. It was 5.3 per cent, based on the Cruise Lines International Association – 2018 Industry Cruise Industry Outlook.
[18] Deloitte Access Economics Business Outlook (December Quarter 2017).

5.3.5.2 International Tourist Arrivals Historical and Forecasts

The outlook for international tourist arrivals in Queensland over the next 10 years[19] is strong, which will support demand for cruise shipping operators in Queensland over the long-term. Rising incomes also support demand for cruise shipping domestically, as well as internationally in key source markets.

Figure 5.12: International Tourist Arrivals, Historical and Forecast, December Quarters 2007, 2017 and 2027

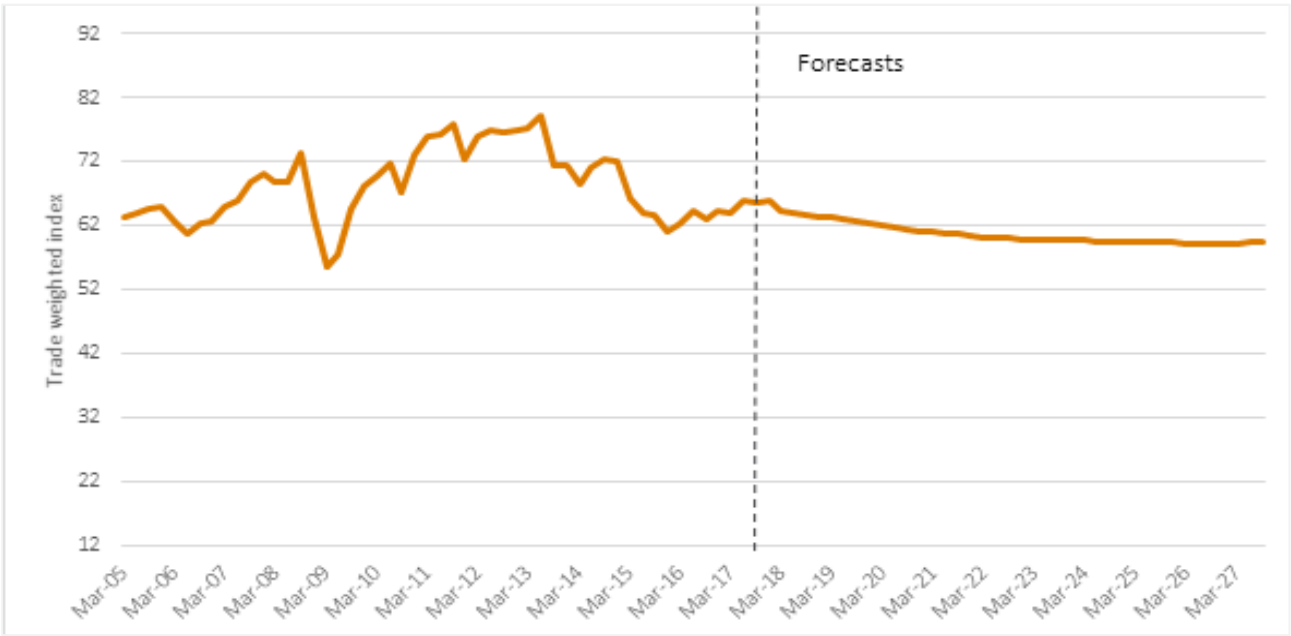


Source: Deloitte Access Economics Business Outlook forecasts, December quarter 2017 forecasts.

5.3.6 Trade Weighted Index Historical and Forecasts

The TWI is forecast to remain at around current levels over the next 10 years.

Figure 5.13: Trade Weighted Index, Historical and Forecast, March Quarter 2005 to December 2027



Source: Deloitte Access Economics Business Outlook forecasts, December quarter 2017 forecasts.

[19] Deloitte Access Economics Business Outlook (December Quarter 2017).

5.3.7 Demand Model Specification

The demand for overall cruise ship forecasts has been estimated using international visitors, TWI, real GSP per capita and also dummy and moving average terms using an auto regressive moving average (ARMA) model (ARMA maximum likelihood model), which was found to have the best overall model fit. A number of different model specifications were tested prior to settling on a ARMA specification.

Ship calls have been modelled as a structural model with ARMA errors. This is because the data that the structural model fails to explain, otherwise known as the error, is a time series which has dependencies in it. Failure to account for these invalidate the usual assumptions underpinning regression analysis and will result in incorrect estimates of the coefficients (and their standard errors).

First, the structural model was estimated using ordinary least squares. The structural model includes the following dependent and independent variables, and historical data covers the period March quarter 2005 to December quarter 2017:

- ship calls (dependent variable)
- D3 (spike dummy variable for home porting)
- real GSP per capita
- TWI
- international visitors.

A moving average (1) and moving average (2) process were incorporated into the model after examination of the correllogram, and the model was estimated using maximum likelihood. The usual residual diagnostics were performed on the resulting model, which was found to be sufficient for forecasting purposes (see Table 5.2 for model diagnostics).

To enable forecasting of the dependent variable (ship calls), forecasts of the independent variables were sourced from the Deloitte Access Economics Business Outlook (December Quarter 2017).

5.3.7.1 Demand Model Equation

The regression equation used to forecast ship calls is presented below

$$\Delta ships\ calls_t = \beta_1 \Delta international\ visitors_t + \beta_2 \Delta Real\ GSP\ per\ capita_t + \beta_3 \Delta TWI_t + \gamma Dummy + e_t$$

$$e_t = \theta_1 e_{t-1} + \theta_2 e_{t-2} + u_t$$

Where:
$\Delta =$ is the first difference operator.

The data used in the regression analysis have all been first differenced as the data was non-stationary at levels.

The $\Delta Real\ GSP\ per\ capita_t$ and ΔTWI_t are statistically significant but not $\Delta international\ visitors_t$ as reported in Table 5.2. There are strong theoretical grounds to keep international visitors in the model given the correlation between international visitors and the number of cruisers who are internationals. Overall, the fit of the model is strong and removing D (international visitors) did not improve the model fit or forecast so it was decided on theoretical grounds to leave it in.

5.3.7.2 Interpretation of Coefficients

6. $\Delta Real\ GSP\ per\ capita_t$– The coefficient is positive giving a direct relationship (and statistically significant) between ship calls and real GSP per capita.

7. $\beta_3 \Delta TWI_t$ – The coefficient is positive shows a direct relationship (and again statistically significant) between the ship calls and TWI. From a domestic perspective the increase in the TWI leads to greater purchasing power of the domestic currency and from an international perspective the higher TWI is driven by stronger individual currencies that make up the TWI, which is likely to be underpinned by income growth in these countries.
8. $\Delta international\ visitors_t$ – The coefficient is positive but not statistically significant but has been left in the model on theoretical grounds.

Moving average terms are included in the model to use the relationship in the errors terms (for the first and second period in history) to help explain ship calls. The use of moving average terms improves the forecast power in the very short-term and the structural variables come into play after this time in explaining ship calls. The demand model specification and diagnostics are provided in Table 5.2.

Table 5.2: Demand Model Specification and Diagnostics

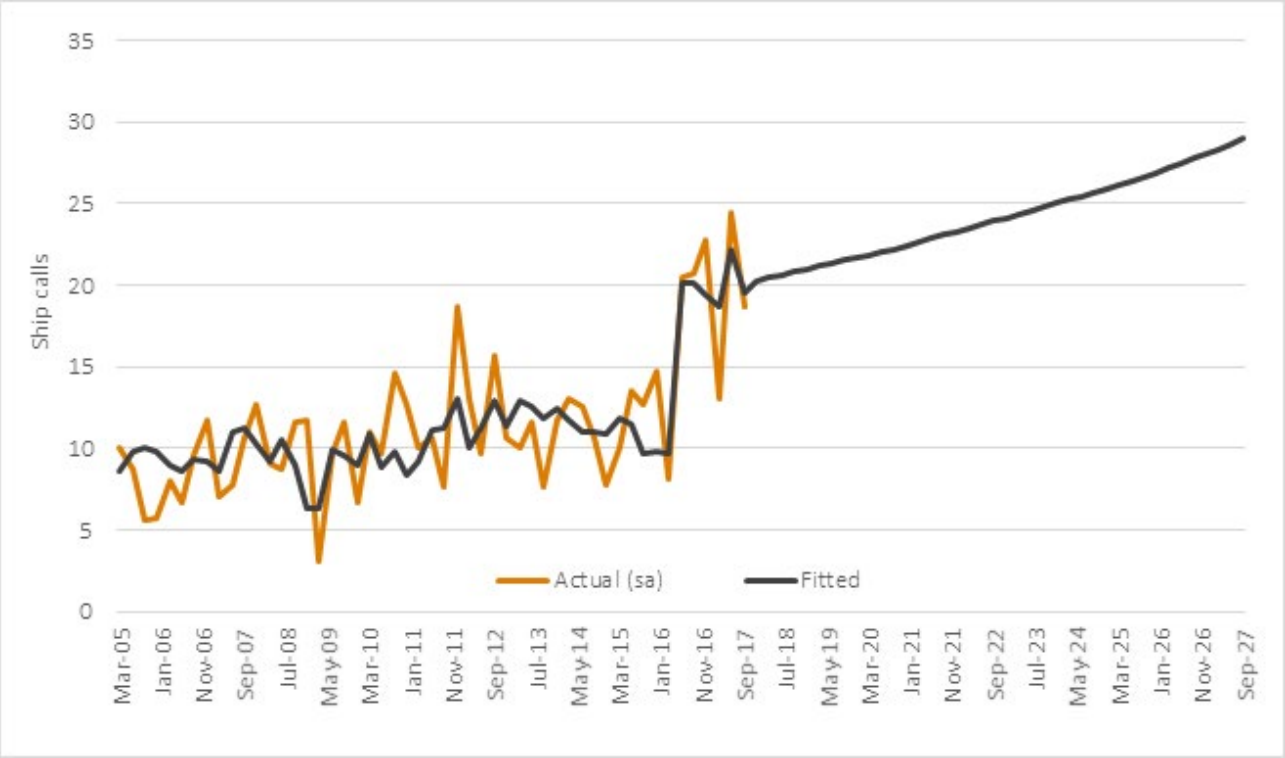
DEPENDEANT VARIABLE: D(SHIP CALLS), METHOD: ARMA MAXIMUM LIKELIHOOD, 51 OBSERVATIONS				
VARIABLE	COEFFICIENTS	STANDARD ERROR	T – STATISTIC	PROBABILITY
D3	8.2255	1.2995	6.3297	0
D(INTVISITORS)	0.0104	0.0144	0.7210	0.4748
D(REALGSP/POP)	1.8806	0.8610	2.1841	0.0343
D(TWI)	0.1631	0.0732	2.2287	0.031
MA(1)	-1.3825	149.7143	-0.0092	0.9927
MA(2)	0.3825	73.2583	0.0052	0.9959
SIGMASQ	6.7221	373.8569	0.0180	0.9857
MODELLING DIAGNOSTICS				
R-squared	0.675285	Mean dependent variable	0.197679	
Adjusted R-squared	0.631006	S.D. dependent variable	4.595167	
S.E. of regression	2.791329	Akaike info criterion	5.116793	
Sum squared residuals	342.8268	Schwarz criterion	5.381946	
Log likelihood	-123.4782	Hannan-Quinn criterion.	5.218116	

Source: Deloitte analysis and modelling.

5.3.8 Demand Model Outputs – Forecast Base Case Growth Rates

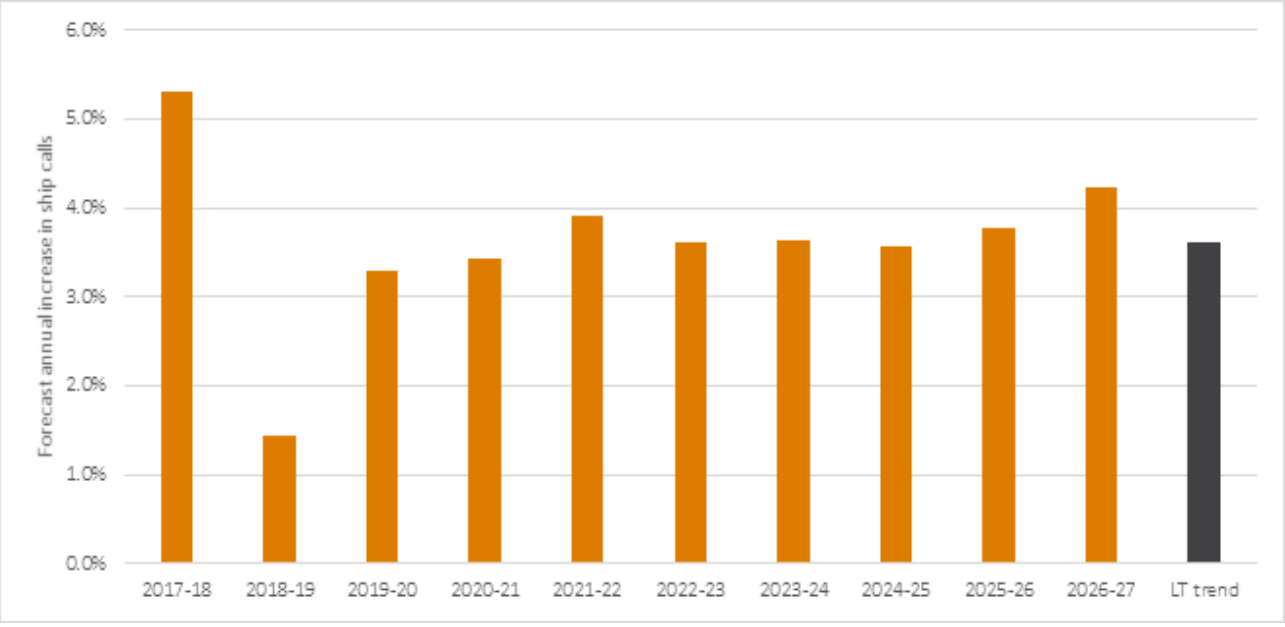
The econometric model displays a good fit when analysing actual and model-fitted data (see Figure 5.14).

Figure 5.14: Cruise Shipping Demand Forecasts in Cairns (number of shipping calls), Actual and Fitted, Quarterly



The model projects forecast annual growth rates in the base case to average slightly below four per cent over the first 10 years with the long-term trend average of 3.6 per cent per annum (see Figure 5.15).

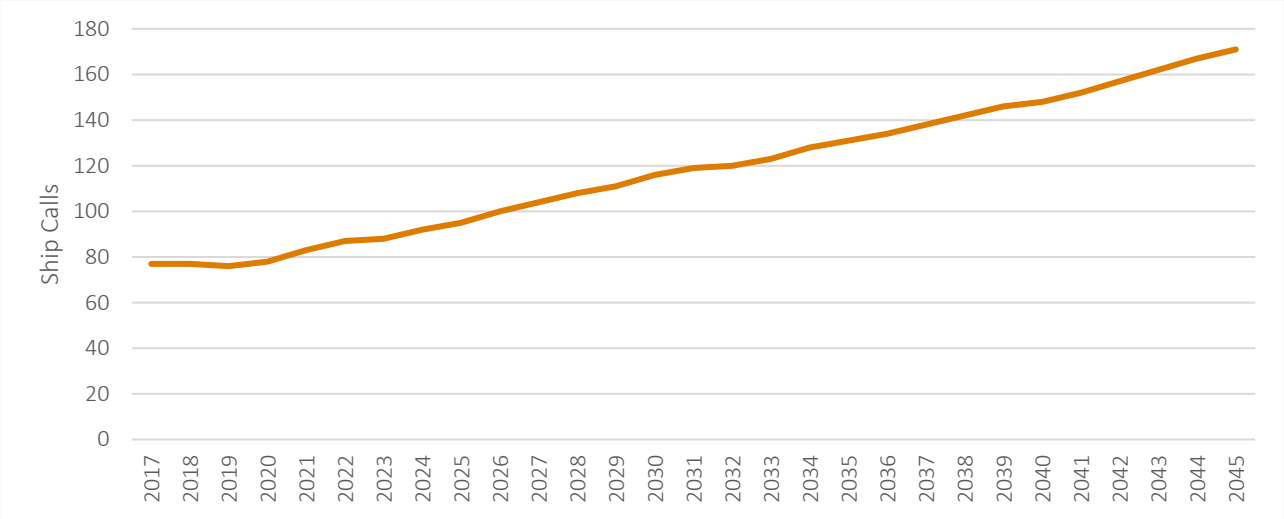
Figure 5.15: Actual and Fitted, 10-year Cruise Shipping Demand Forecasts (Number of Shipping Calls)



5.3.9 Demand Model Forecasts for the Base Case

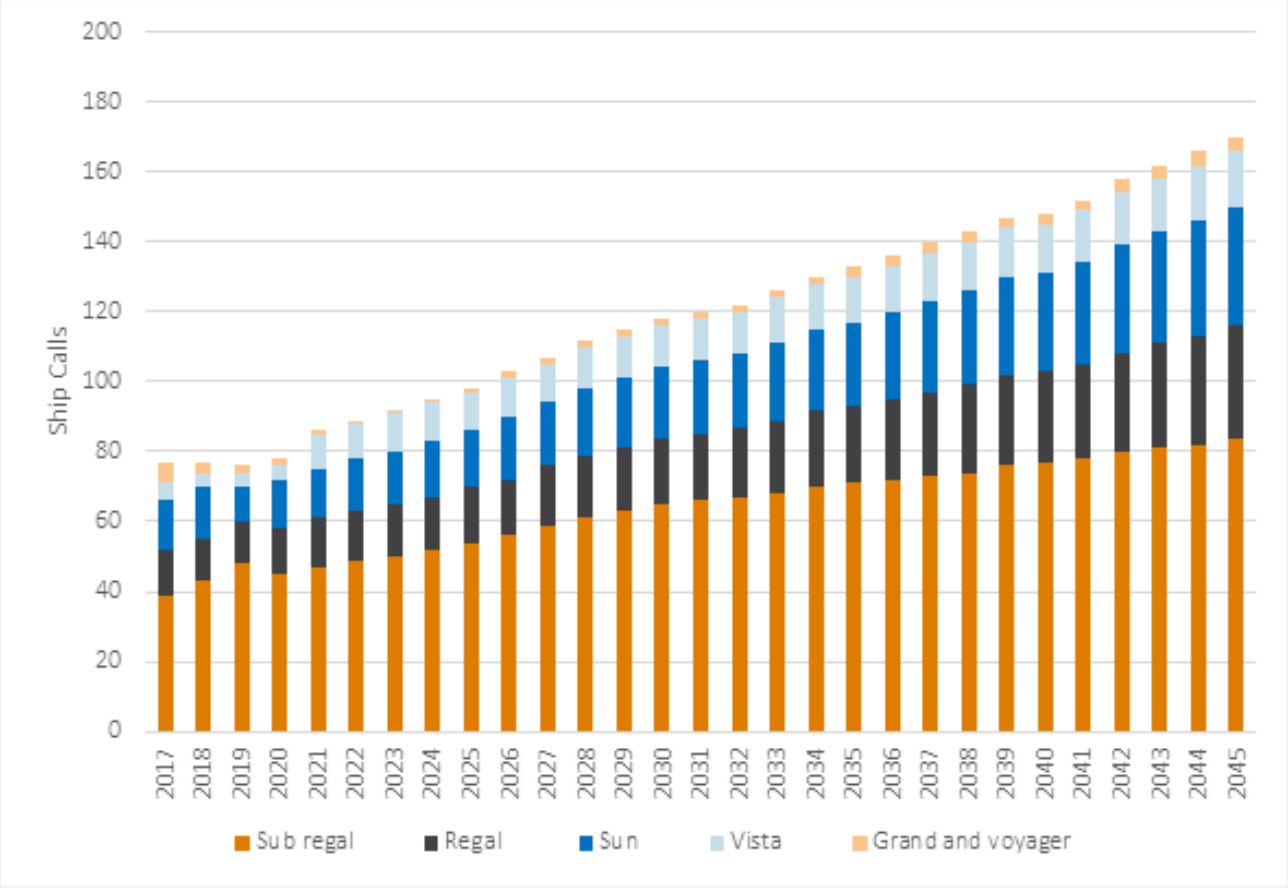
This section presents the demand model forecasts using the outputs of the econometric model for the Base Case and informed by consultations with Ports North and industry. This shows that the number of total cruise ship calls into Cairns is forecast to increase from 77 in 2017 to 171 in 2045 (CAGR of 2.9 per cent).

Figure 5.16: Forecast Total Cruise Ship Calls in the Base Case, 2017 to 2045



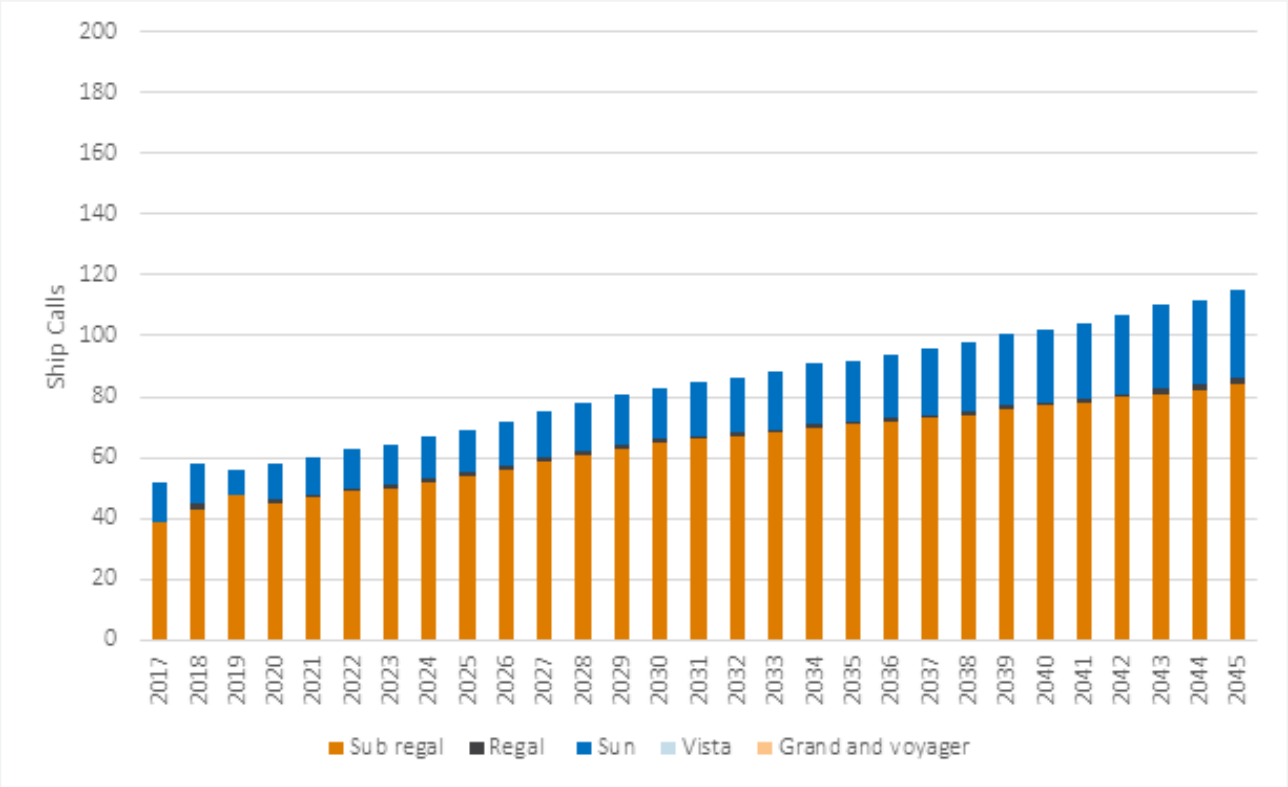
The demand forecasts by vessel type for the Base Case are provided in Figure 5.17. This shows that the main vessel types are forecast to be sub-regal, regal and sun vessels. The demand forecasts factor in a shift globally toward larger vessels in the future. This is reflected by stronger growth in the number of larger vessels calling into Yorkeys Knob (e.g. vista class vessels) in the Base Case as Trinity Inlet is not able to accommodate cruise ship calls of vessels larger than sun class.

Figure 5.17: Forecast Total Cruise Ship Calls in Cairns by Vessel Type in the Base Case, 2017 to 2045



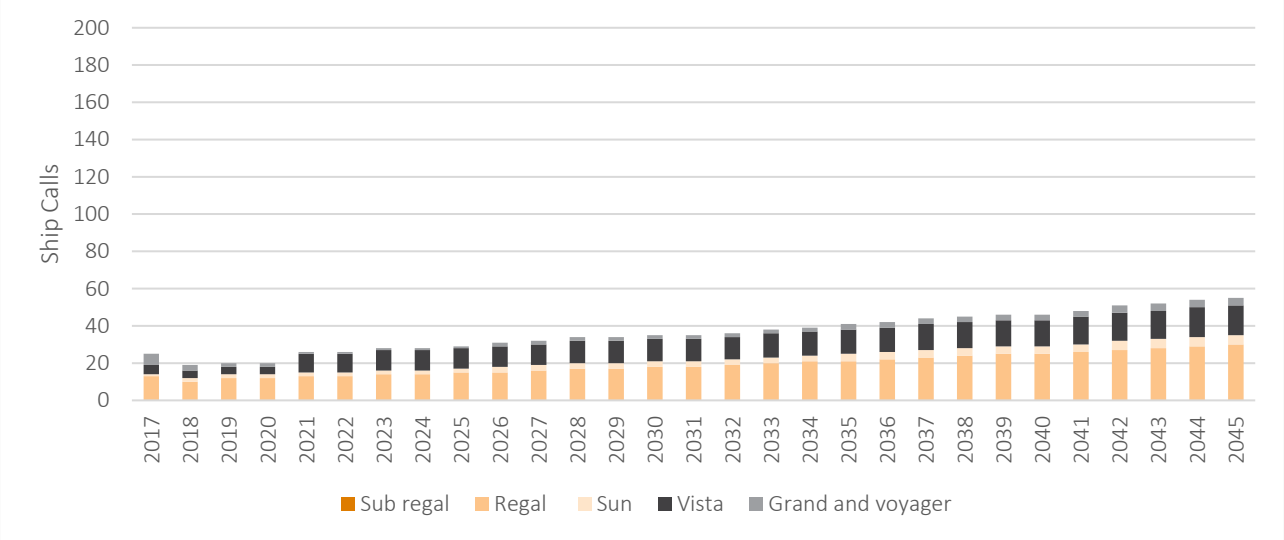
The vessels mix assumptions used in the Base Case demand forecasts reflect the characteristics of the Trinity Inlet and Yorkeys Knob currently and how this is projected to evolve in the future. This is informed by consultation with cruise operators and industry intelligence such as the global forward order book and other drivers of cruise demand. This information has been used in the development of total cruise ship calls and determining the vessel mix assumptions for Trinity Inlet and Yorkeys Knob. Total cruise ship calls and the vessel mix for Trinity Inlet is shown in Figure 5.18.

Figure 5.18: Forecast Cruise Ship Calls by Vessel Type into Trinity Inlet the Base Case, 2017 to 2045



The vessel mix has been adjusted in Yorkeys Knob to cater for increases in larger cruise ships over time (see Figure 5.19). This highlights an increasing share of vista vessels, as well as grand and voyager (to a lesser extent) over time, in line with the overall trend towards larger vessels in the global cruise shipping industry.

Figure 5.19: Forecast Cruise Ship Calls by Vessel Type into Yorkeys Knob in the Base Case, 2017 to 2045



The demand forecasts presented in this chapter demonstrate the future potential for growth in cruise ship calls into the Trinity Inlet and the Yorkeys Knob, which together comprise Cairns in the Base Case. The Base Case demand forecasts are underpinned by empirical evidence and industry consultation, which has been informed by econometric analysis to determine future growth in forecast ship calls. This is based on the historical data provided by Ports Norths and takes into account economic factors likely to influence ship calls.

It is acknowledged that the future is inherently uncertain and these latest demand forecasts for Trinity Inlet and Yorkeys Knob are based on the best information available to forecast future cruise ship calls into the Port of Cairns. The demand forecasts also draw upon previous work undertaken by AEC, which forecasts demand for future ship calls for the Port of Cairns including Trinity Inlet and Yorkeys Knob (2016 Demand Study).

CHAPTER 6
REFERENCE PROJECT

CHAPTER SUMMARY AND CONCLUSIONS:

- The key components of the Reference Project, as assessed by the RDEIS, include:
  - dredging a wider and deeper entrance channel and cruise ship swing basin to allow port access for larger cruise ships
  - relocation of the cargo ship swing basin to allow future navy base expansion
  - upgrading berth infrastructure within Trinity Inlet.
- Approximately four kilometres of the 13-kilometre channel will be widened between 10 and 20 metres, with some additional localised widening of the channel bend and transits to maintain safe navigation of ships. The channel's declared depth will be increased by 0.5 metres from - 8.3 metres to - 8.8 metres.
- The upgraded channel and swing basins of the Trinity Inlet will increase access for general domestic and international trade, and together with the upgraded wharfs and facilities, will enable servicing of larger cruise ships up to 300 metres.
- Other key benefits include access for larger navy vessels (both Australian and foreign) into the Port of Cairns and improved resilience of the channel during severe weather events.

6.1 Purpose

This chapter summarises objectives, outcomes and benefits of the Reference Project, and its key technical and design features. It also presents an overview of the project delivery program.

6.2 Objectives, Outcomes and Benefits

The objectives of the Project are to:

- grow Cairns as a cruise shipping hub catering for both transit and homeporting operations to deliver economic benefits to both Cairns and other Queensland cruise destinations
- provide additional channel and wharf infrastructure capacity to enable access for larger cruise ships up to 300 metres
- improve operational efficiency for bulk cargo ships
- enable the future expansion of HMAS Cairns' navy base
- improve channel safety and resilience to reduce disruption during severe weather events.

The expected outcomes of the Reference Project are:

- a stronger cruise shipping industry in Cairns and Queensland through the capture of a share of the larger size vessel market
- tourism growth for FNQ and Queensland through increased tourism opportunities, bringing stability and diversity to the Cairns tourism sector
- a strengthened regional economy in FNQ, due to increased cruise-shipping returns
- enhanced safety for vessels using the deeper, wider channel featuring new navigational aids
- improved efficiency in freight and cargo movements through reduced tidal and loading restrictions

- increased resilience for the Port of Cairns against extreme weather events as a result of the deeper, wider channel
- an improved cruise passenger experience due to wharf upgrades and less offshore anchoring and tendering of passengers
- additional employment during both construction and operational phases of the Project
- potential to expand HMAS Cairns through the relocation of the cargo shipping swing basin
- improved access for existing navy vessels and the capacity for larger Australian and foreign navy vessels to enter the port, increasing navy-related expenditure in the region
- capacity for more visitors to come ashore, increasing cruise-shipping revenues.

The Project will have a significant positive impact on the Cairns cruise shipping market. Assuming the existing cruise ship facilities plus the impact of the Brisbane International Cruise Terminal and homeporting in Cairns, the overall number of ship visits is projected to more than double to 151 by 2031, with 69 at Yorkeys Knob and 82 at Trinity Wharf. With construction of a revised channel and bunker availability, the overall number of ship visits is projected to increase a further 32 to 183. This represents almost a tripling of ship visits by 2031 on 2016 figures.

The Project will improve cargo shipping efficiencies by giving vessels a larger window of entry and egress to the port and improving the port's resilience to extreme weather. In turn, this could be expected to improve the competitiveness of the Port of Cairns for imports and exports and allow Cairns to capitalise on future trade opportunities.

The Project will also generate significant non-cruise shipping benefits by:

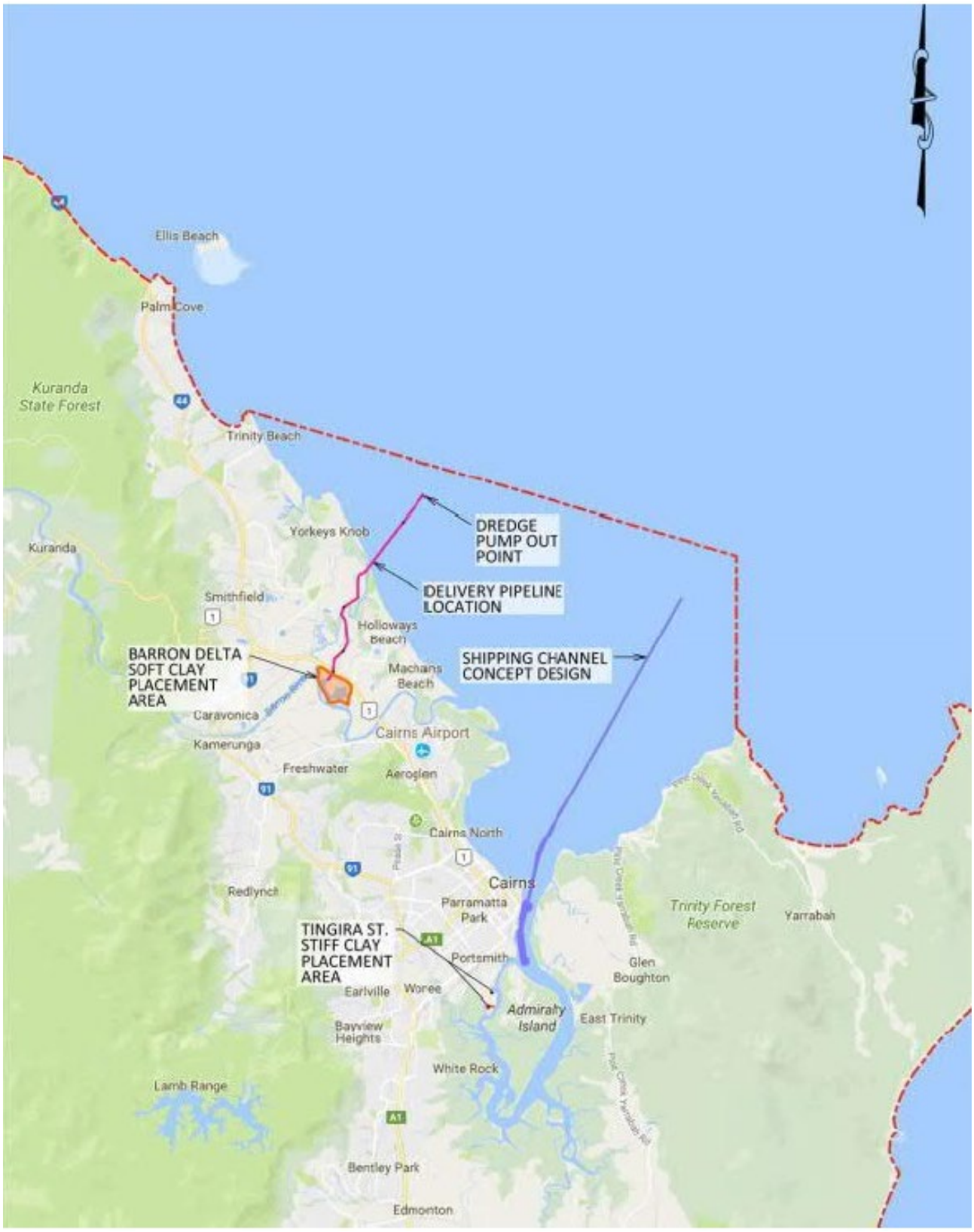
- strengthening the Australian Defence Force capability in Northern Australia
- delivering more resilient state infrastructure
- coordinating infrastructure to support critical domestic and international supply chains to key market sectors and high-growth areas
- surcharging industrial land at Tingira Street, Portsmith through the placement of hard clay dredged material
- contributing to the future rehabilitation of the Northern Sands mining facility through the placement of soft dredged material in an existing void.

6.3 Scope

The key components of the Reference Project, as assessed by the RDEIS, include (refer Figure 6.1):

- dredging a wider and deeper entrance channel and cruise ship swing basin to allow port access for larger cruise ships
- relocation of the cargo ship swing basin to allow future navy base expansion
- upgrading berth infrastructure within Trinity Inlet.

Figure 6.1: Key Components of the Reference Project



The dredging operations involve removing in situ sediment material from within and adjacent to the existing shipping channel and placement at suitable land placement sites. Ongoing annual maintenance dredging (via existing approvals) will continue to be required to maintain the full functionality and safety of the port and entrance channel. The Project also includes associated upgrades to landside port infrastructure required to accommodate larger cruise ships.

6.3.1 Revisions to the Project

Following the recalibration of the Project, noted in Chapter 3: Proposal Background, the Project was revised to include the following elements:

- widening and deepening the shipping channel and Crystal Swing Basin and establishing a new shipping swing basin (Smiths Creek Swing Basin), including:
  - widening approximately four kilometres of the 13-kilometre channel between 10 and 20 metres, with some additional localised widening of the channel bend and transits to maintain safe navigation of ships, specifically:
    - increasing the outer channel width to 90–100 metres
    - increasing the inner channel width generally to 110 metres (outer bend to 180 metres)
  - increasing the channel's declared depth by 0.5 metres from - 8.3 metres to - 8.8 metres
  - deepening the existing Crystal Swing Basin
  - establishing the Smiths Creek Swing Basin with a 310-metre diameter
  - removing up to 1,000,000 cubic metres of total dredge material
  - establishing DMPAs on the Barron Delta for soft clays and Tingira Street for stiff clays following the introduction of the SPD Act.

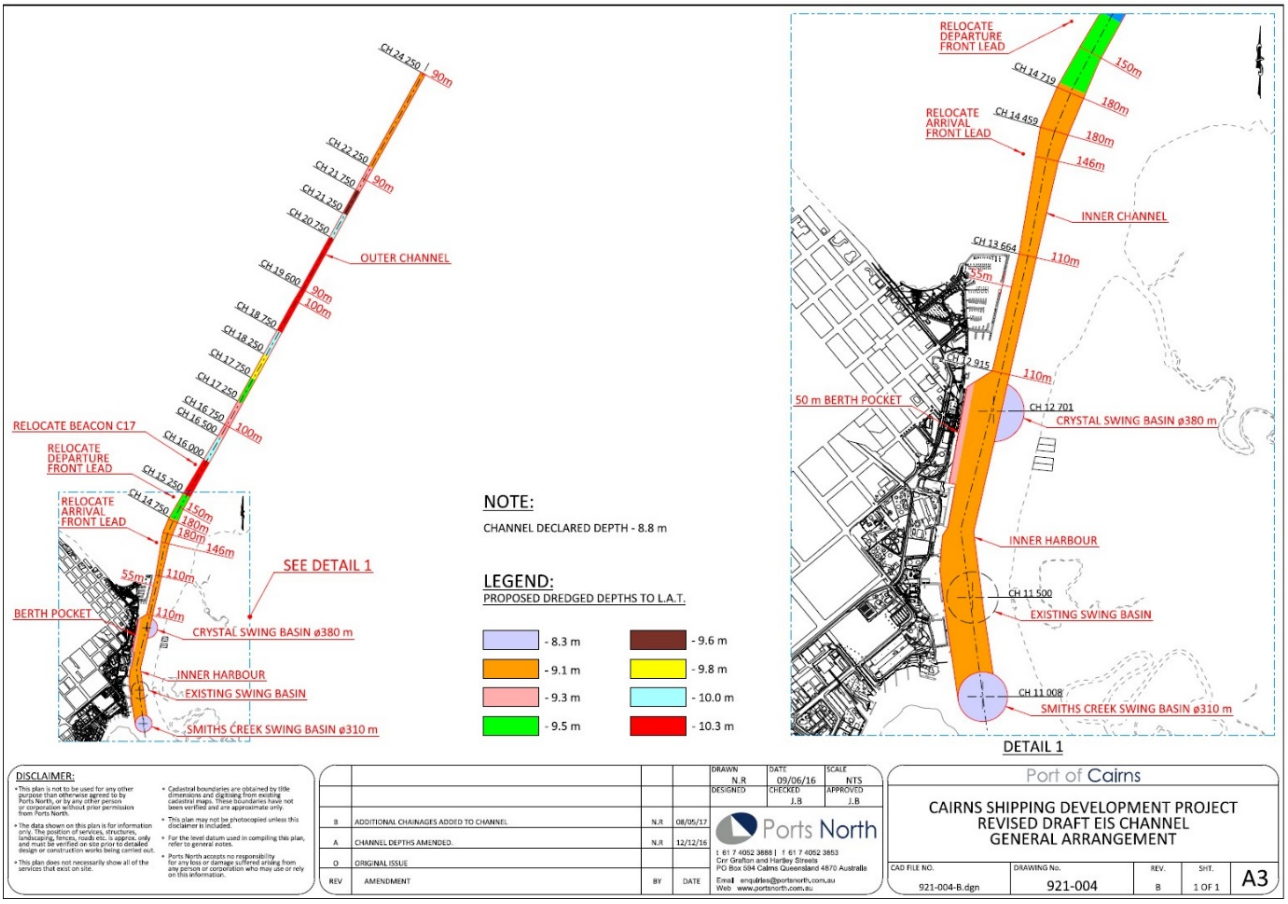
Further detail on revisions is provided in Section 6.3.3.

6.3.2 Technical Features

The key technical features of the Reference Project include:

- marine works to widen and deepen the shipping channel and Crystal Swing Basin, and establishment of a new shipping swing basin (Smiths Creek Swing Basin) upstream of the existing Main Swing Basin involving:
  - capital dredging works involving removal of up to 1,000,000 cubic meters of dredge material, consisting of up to 900,000 cubic metres of soft clays to be removed by a TSHD and up to 100,000 cubic meters of stiff clays to be removed by a BHD
  - construction of a temporary pump-out facility located approximately three kilometres offshore from Yorkeys Knob

Figure 6.2: Proposed Upgraded Channel and Swing Basins



- **delivery and placement of dredged material** to land-based DMPAs including:
  - construction of a temporary dredge material delivery pipeline from the pump-out facility to the soft clay DMPA on the Barron Delta and construction of a pipeline to deliver tailwater to the Barron River
  - placement of soft clay dredge material at the Barron Delta DMPA located on Lot 2/RP712954 and Lot 5 on SP245573
  - placement of stiff clay dredge material at the Tingira Street DMPA established on Port Land (Lot 27/SP 218291) located at Tingira Street, Portsmith

Figure 6.3: Proposed Delivery Pipeline from the Pump-out Facility to the Soft Clay DMPA on the Barron Delta

Figure 6.4: Location of Tingira Street DMPA Sites

- **wharf infrastructure and services upgrade** including:
  - relocation of existing and installation of new navigational aids
  - upgrade to the existing cruise shipping Wharves 1 to 5 to accommodate larger and heavier cruise ships
  - decommissioning and (partial) demolition of Wharf 6 and construction of new section of Wharf 6
  - upgrade of ship services to the cruise shipping wharves, including IFO, potable water and fire-fighting services.

6.3.3 Design Features

The Reference Project will increase the channel footprint by 19 per cent, however as large areas of the inner port and channel are self-cleaning, the Reference Project will only increase maintenance dredging by two to six per cent (based on long-term average maintenance volumes). This increase is within the order of annual variations currently experienced due to seasonal variability and frequency of extreme weather events.

A design for the channel upgrade and associated infrastructure has been prepared. The design minimises the extent of dredging while still maintaining safe navigation standards for cruise ships. Originally, the outer and inner channels were proposed to be up to 130 metres and 180 metres wide respectively to accommodate vessel sizes up to voyager class. These channel widths have been reduced through design iterations to generally between 90 and 110 metres, with the design now catering for lesser vessel sizes of up to 300 metres (vista class and some grand class vessels). This change significantly reduced the amount of dredge material requiring onshore placement.

The channel design has been developed with input from experienced maritime and port engineers, mariners, hydrographic surveyors and cruise ship masters from Ports North, Arup, MSQ and cruise ship companies. The navigation design for the channel upgrade has been tested using a real-time full bridge simulator, which included participation by key MSQ personnel. Participation by the RHM and senior port pilots validates the acceptability of the channel and the basin designs.

The selected design vessels are restricted by the extent of the dredging work dictated by regulatory constraints and cost. The design vessels used for the navigation simulation will experience some access constraints while navigating the channel and swing basin, as detailed below:

- Queen Victoria (vista class) cruise ship of draft 8.0 metres will require a water level of greater than mean high low water (MHLW). This would require scheduling of ship arrivals and departures to avoid the depth constraint. It is understood such scheduling already occurs and may be acceptable for cruise ship operations in the future.
- Emerald Princess (grand class) cruise ship of draft 8.5 metres will require a water level of at least mean sea level (MSL). If suitable tide levels are not available for transit vessels of this draft at the required times, they may need to consider offshore mooring at Yorkeys Knob.

There are no tidal constraints alongside berth for water levels at lowest astronomical tide (LAT) level.

In developing the design, a key consideration was to provide safe access for the reduced targeted range of mega class cruise ships (up to 300 metres), while minimising the overall dredge volumes to limit both project cost and environmental impacts. This iterative design process resulted in a reduction of channel dredge volumes, initially predicted to be 10M cubic metres, to 4.4M cubic metres. Further investigations have enabled a greater reduction of channel dredge volumes to 1M cubic metres (the Reference Project). This significant reduction was achieved by optimising the channel width, and more critically, by establishing an

optimum workable channel depth, while introducing some tidal constraints for access by the largest ships in the targeted range of cruise ship classes.

Relocation of the Main Swing Basin to a new location adjacent to Senrab Point and the Tropical Reef Shipyard (designated as the Smiths Creek Swing Basin) through the Reference Project will enable the future expansion of HMAS Cairns and provide a wider and deeper inner channel for the full length of the inner port. It has been positioned to utilise an existing, self-cleaning, deep area of water with minimal additional capital dredging required.

All cruise ships will manoeuvre at the larger 380-metre diameter Crystal Swing Basin, while navy ships and general cargo ships will swing at the new Smiths Creek Swing Basin.

The expansion includes the following components:

- The design extends the existing 90-metre-wide inner harbour channel to the proposed Smiths Creek Swing Basin to 110 metres (providing an 80-metre clearance between the channel and the existing navy infrastructure as advised by the RHM).
- The inner part of the channel will widen to 180 metres wide, and 240 metres adjacent to the main wharf area to provide access to the various adjacent berth positions, ending in the new Smiths Creek Swing Basin, which will have a diameter of 310 metres.
- The extended inner channel and outer channel design declared depth will be consistent at -8.8 metres LAT.

In order to allow larger cruise ships to berth and also to provide long-term protection of the culturally important wharves, additional independent structures will be incorporated into the wharves. The wharf upgrade has been designed so that landside work is minimised to limit disturbance of the heritage-listed wharf.

6.4 Stakeholders

The Project has been planned and developed over a relatively long period of time. Diverse options have been considered, which have been progressively developed and refined as outlined in Chapter 4: Service Need.

Rigorous environmental impact assessment has informed the Project, which included multiple rounds of community consultation and extensive engagement with stakeholders and regulators. Refer to Chapter 2: Methodology for a comprehensive stakeholder list and additional information on engagement activities.

6.5 Activities

An overview of the project delivery program is presented in Table 6.1.

Table 6.1: Detail of Delivery Program

ACTIVITY	DETAILS	DEPENDENCIES	DURATION
WIDEN AND DEEPEN CHANNEL (INCLUDES SWING BASIN)			
Construction works for the temporary offshore pump-out facility and the dredge material delivery pipeline	▪ Pump-out facility construction and pipeline delivery, fabrication and installation ▪ Demobilisation of the temporary facilities	▪ Must be in place to enable commencement of the dredging campaign	**6 weeks** **4-6 weeks** following completion of dredging campaign
Soft clay dredging	▪ Undertaken by a TSHD with a hopper capacity of 5,600 cubic metres when full, steaming to a temporary pump-out facility off Yorkeys Knob	▪ Conducted concurrently with stiff clay dredging ▪ Subject to receipt of necessary approvals and funding ▪ Dependent on weather conditions and dredging plant capability and availability	**May – September 2019** 12 weeks (excludes dredge vessel mobilisation and demobilisation)
Stiff clay dredging	▪ Undertaken by a BHD and the dredge material transported by barge to the Stiff Clay DMPA at Tingira Street, Portsmith	▪ Conducted concurrently with soft clay dredging ▪ Subject to receipt of necessary approvals and funding ▪ Dependent on weather conditions and dredging plant capability and availability	**May – September 2019** Five weeks (excludes dredge vessel mobilisation and demobilisation)
Wharf upgrades	▪ Will commence following receipt of project approvals and funding confirmation	▪ Likely to precede the dredging campaign and be timed to ensure completion and commissioning is coincident with the availability of expanded channel capacity for larger cruise ships	**12 weeks**
Bund construction at the Barron Delta DMPA	▪ Will commence immediately following achievement of Project approvals and funding confirmation to ensure that the DMPA is available to receive soft clay dredge material at the start of the dredging campaign		

CHAPTER 7
STRATEGIC CONSIDERATIONS

CHAPTER SUMMARY AND CONCLUSIONS:

- Analysis shows that the Reference Project aligns with, and contributes to, the strategic objectives, programs and policies of all three tiers of government, specifically the objectives to:
  - build a more competitive and efficient shipping industry in Australia, particularly through deregulation of coastal shipping
  - support economic development in North Queensland, particularly through infrastructure, investment and tourism
  - support the Queensland economy's transition from reliance on the resources sector to tourism-related industries by maximising existing tourism infrastructure and opening up new tourism and business opportunities
  - deliver more resilient state infrastructure and strengthen regionally significant transport infrastructure
  - strengthen the Australian Defence Force capability in Northern Australia
  - preserve the Great Barrier Reef.
- The Project was recalibrated following the release of the Australian Government's Reef 2050 Long-Term Sustainability Plan (Reef 2050 Plan), ensuring compliance with its preservation blueprint for the Great Barrier Reef and ban on disposing capital dredging material in the GBRMP.

7.1 Purpose

This chapter outlines how the identified service need and Reference Project align with, or contribute to, strategic government objectives. It focuses on the strategic alignment with federal, state and local government plans and outlines the impact, if any, of the Reference Project on existing policies and standards.

7.2 Australian Government

7.2.1 Reef 2050 Long-Term Sustainability Plan

The Reef 2050 Plan was released by the Australian and Queensland governments in March 2015 and is the overarching framework for protecting and managing the Great Barrier Reef until 2050.

The Reef 2050 Plan was developed by the World Heritage Committee in response to concerns about the management of the Great Barrier Reef. The Reef 2050 Plan aims to strengthen Australia's management of the Great Barrier Reef and provides a blueprint to guide ongoing preservation efforts.

The Reef 2050 Plan was not in place when the terms of reference (TOR) for the original EIS for the Project was developed in 2012. Following the release of the Reef 2050 Plan, the Project was recalibrated and the design updated to ensure adherence with the Reef 2050 Plan.

The Reef 2050 Plan places a permanent ban on disposing capital dredging material from the Port of Cairns in the GBRMP. Ports North will continue to work with the Queensland Government to ensure future maintenance dredging is based upon a long-term maintenance dredging plan that aligns with the Reef 2050 Plan's preservation blueprint. The long-term maintenance dredging plan will consider operational needs, environmental risk and catalogues monitoring and adaptive actions to ensure the protection of the Great Barrier Reef.

7.2.2 Our North, Our Future: White Paper on Developing Northern Australia

Our North, Our Future: White Paper on Developing Northern Australia (Northern Australia White Paper) outlines the Australian Government's vision to unlock the potential and opportunities of Northern Australia.

The Northern Australia White Paper states that the Australian Government is working to build a more competitive and efficient shipping industry and is committed to reforming the coastal shipping sector. It acknowledges the expedition cruise industry as a sector of particular relevance to Northern Queensland. It indicates that the industry is hindered by provisions of current legislation, which sometimes result in cruise operators making detours to international destinations in order to avoid the restrictions imposed by legislation.

The Australian Government proposes deregulating the current coastal shipping framework to promote more efficient and reliable coastal shipping. The Reference Project will support these efforts by accommodating the berthing of international cruise ship at the Port of Cairns that previously may have avoided the region due to legislative impositions.

It also aligns with broader efforts to boost tourism in Northern Australia and the specific recommendations of the Pivot North Inquiry into the Development of Northern Australia (Pivot North Inquiry), as shown in Figure 7.1.

Figure 7.1: Key Tourism-related Recommendation of Pivot North Inquiry

Tourism

Recommendation 11

5.45 **The Committee recommends that the Australian Government, in conjunction with the Northern Australia Strategic Partnership, develop a tourism strategy for promoting Northern Australia domestically and internationally, highlighting natural assets and Aboriginal and Torres Strait Islander culture.**

Source: Pivot North – Inquiry into the Development of Northern Australia: Final Report.

7.2.3 2016 Defence White Paper

The Department of Defence's 2016 Defence White Paper and 2016 Integrated Investment Program signalled the Australian Government's intention to invest in new navy vessels and the offshore patrol boat fleet. Section 4.76 of the 2016 Defence White Paper also stated the following:

> *"As Navy's fleet becomes larger over the years, both in the number and size of ships, Navy bases in Northern Australia will require significant upgrades. This includes upgrades to support the introduction of the larger and more capable offshore patrol vessels."*

This strategic direction reflected the Australian Defence Force Posture Review of 2012, which recommended upgraded or expanded bases at Cairns and Darwin to accommodate future offshore combatant vessels and replacement heavy landing craft.

The Australian Government recently announced a $635 million upgrade for HMAS Cairns over 12 years, which is $215 million more than the $420 million first committed in the 2016 Defence White Paper. The expansion of HMAS Cairns was identified in the 2016 Defence White Paper as a strategic shift to move military assets north and facilitate HMAS Cairns becoming a ship maintenance and sustainment hub for Northern Australia. The upgrade of the naval base is considered a key part of delivering greater capacity and

capability for a range of operations, particularly border security and offshore resource protection and comes on top of the Australian Government's investment in the Cairns Maritime Precinct. In addition, the Australian Government confirmed in November 2017 that it will home base four new offshore patrol vessels to be built under German shipbuilder Lurssen at HMAS Cairns.

The Reference Project will facilitate the planned upgrade of the naval base, which would otherwise not be able to accommodate additional visiting large naval vessels. A wider and deeper channel provided for cruise shipping will also provide safer access for the landing helicopter dock class ships, with reduced operational restrictions. The larger United States Navy carriers that cannot currently berth at the Port of Cairns could also be accommodated by the proposed channel upgrade.

The Reference Project also aligns with broader Australian Defence Force plans to expand the Defence presence in Northern Australia, and the specific recommendations of the Pivot North Inquiry, as shown in Figure 7.2.

Figure 7.2: Key Defence-related Recommendation of Pivot North Inquiry

Recommendation 19

5.61 **The Committee recommends that the Australian Government consider relocating additional defence assets to Northern Australia in accordance with the recommendations of the Defence White Paper.**

5.62 The evidence received by the Committee indicates that there is considerable scope to significantly increase the Defence presence in Northern Australia. Naval assets in particular could be better located in Northern Australia closer to the locations where they might be required to promote national security or provide humanitarian aid. For example, the Committee notes the location of, and existing and potential capabilities of, Exmouth as a base for air and sea operations. The Committee believes that a long-term northern focus for the defence force is both appropriate to national defence and beneficial for northern development.

Source: Pivot North – Inquiry into the Development of Northern Australia: Final Report.

7.3 Queensland Government

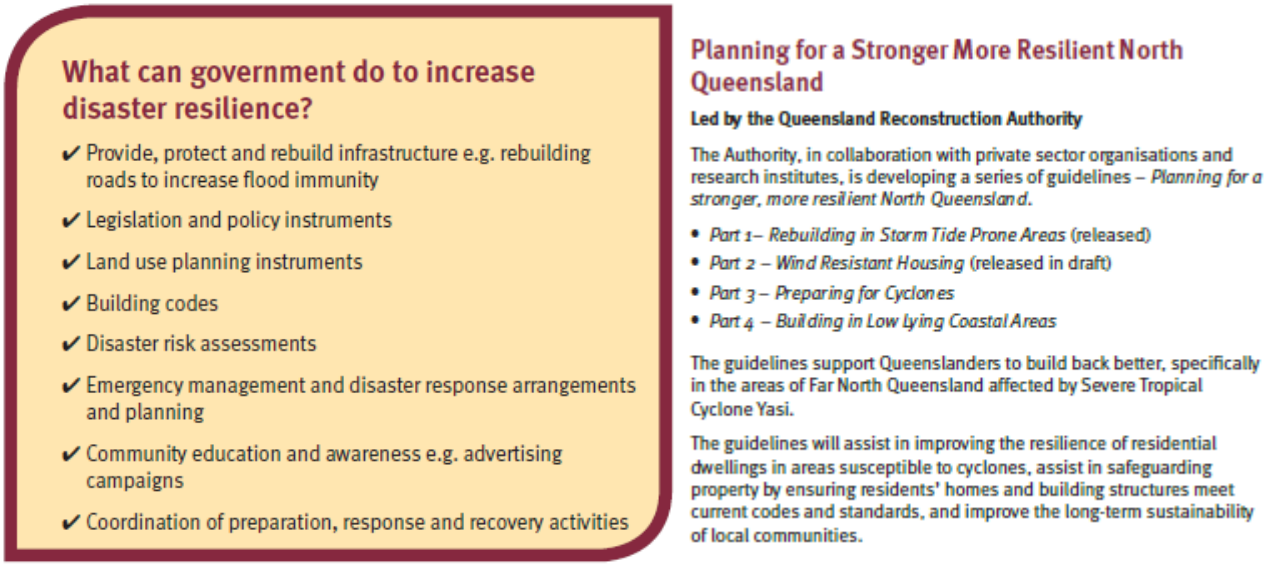
7.3.1 Queensland Government's Objectives for the Community

In 2015, the Queensland Government published four key objectives for the community. Relevant objectives to the Project are:

- Delivering quality frontline services: The Project supports the provision of responsive and integrated government services.
- Building safe, caring and connected communities: The Project will contribute to providing an integrated and reliable transport network and encourage safer and inclusive communities.
- Creating jobs and a diverse economy: The Project will deliver jobs for the local community during the construction period. In the long-term, it will also contribute to the economy by boosting the tourism sector.

A key Queensland Government objective being delivered through the Queensland Reconstruction Authority is 'Rebuilding a stronger, more resilient Queensland'. The Project will assist the related Queensland strategy for disaster resilience by supporting the coordination of preparation, response and recovery activities, particularly in storm tide-prone Cairns.

Figure 7.3: Queensland Strategy for Disaster Resilience



Source: Rebuilding a stronger, more resilient Queensland.

7.3.2 The Queensland Government Maintenance Dredging Strategy

The Maintenance Dredging Strategy for Great Barrier Reef World Heritage Area Ports (Maintenance Dredging Strategy) was released on 30 November 2016. It addresses the requirements of the Reef 2050 Plan and reflects its strategies and preservation blueprint.

The Maintenance Dredging Strategy aims to provide certainty to the ports industry and the community that the economic and social contribution of ports will be maintained, while ensuring the continued protection of Queensland's environmental assets.

The Maintenance Dredging Strategy was considered when the Project was recalibrated, ensuring proposed dredging operations to manage the Great Barrier Reef's health and resilience. The Reference Project's long-term maintenance dredging plan will also be developed in accordance with the strategy.

7.3.3 Far North Queensland Regional Plan

The Far North Queensland Regional Plan 2009–2031 (FNQRP) provides the strategic planning framework for the FNQ region. The FNQRP identifies a number of policy outcomes, strategies and actions to guide development and activities around the Cairns CBD. It recognises the Port of Cairns as key regionally significant transport infrastructure.

The FNQRP includes the following land use policies and strategies to support the ongoing operation of the port, minimise conflict with surrounding land uses and encourage sustainable cruise shipping:

- Sea ports and their access road and operation at Cairns (and Mourilyan) are protected from encroachment of noise sensitive uses except where permitted in LUPs for strategic port land.

- Adequate strategic port land at Cairns (and Mourilyan) is made available for coastal uses, such as commercial fishing, other land-based marine activities and logistics (including bulk sugar terminal, live cattle or forestry cargo handling facilities).
- The development of sustainable cruise shipping infrastructure and services is facilitated.

In seeking to facilitate greater economic activity at the port, the Reference Project is consistent with the aims and economic development policies of the FNQRP.

7.3.4 Advancing North Queensland Policy

The Advancing North Queensland Policy (ANQP) was released in June 2016. It highlights five priority areas to accelerate efforts to develop and diversify the North Queensland economy.

One priority area is infrastructure and investment, acknowledging that infrastructure and development are critical to the success of the North Queensland economy.

The ANQP recognises ports in North Queensland as critical gateways to international markets and highlights the efforts of government, government-owned corporations, industry and key stakeholders to improve supply chain efficiency and port infrastructure to support economic development.

The Reference Project offers an opportunity to grow Cairns as a cruise shipping hub, catering for both transit and homeporting operations and delivering economic benefits to both Cairns and Queensland. It will support infrastructure and investment for North Queensland by providing:

- additional channel and wharf infrastructure that provides access for modern mega class cruise ships and large navy ships, and that improves channel safety and resilience and bulk cargo ship efficiency
- a relocated cargo swing basin to enable future expansion of the HMAS Cairns navy base.

7.3.5 State Infrastructure Plan

The State Infrastructure Plan (SIP) outlines the Queensland Government's strategic direction for the planning, investment and delivery of infrastructure in Queensland. It sets out the government's infrastructure objectives and how they are to be achieved.

According to the SIP, the Queensland economy is undergoing structural change as it transitions away from traditional economic drivers such as resources investment to more broad-based drivers such as health, education and tourism-related industries.

Regional areas will play a key role in creating new economic opportunities, particularly regions with significant tourist attractions such as Cairns. The SIP states that regions with tourism advantages require marine and aviation infrastructure to support and deliver productivity benefits to the state.

The Project directly supports the Queensland economy's transition from dependence on the resource sector to tourism-related industries. It offers an opportunity to establish a more viable and sustainable cruise shipping industry in Cairns to boost local tourism and open up local business opportunities.

7.4 Local Government

7.4.1 CairnsPlan 2016

CairnsPlan 2016, the planning scheme for the Cairns local government area, guides all local development, with the exception of land identified as strategic port land. CairnsPlan 2016 sets out the CRC's intention for future development for the next 20 years.

Strategic port land is not subject to CairnsPlan 2016. However, downstream approvals that may be required for the Reference Project within the Cairns local government area will be subject to the provisions of CairnsPlan 2016.

7.5 Ports North Policies and Plans

The Ports North Land Use Plan (LUP) controls land use and development on strategic port land, and specifies the current and future uses of the land. The LUP sets out the main local area plans (LAPs) applicable to the Reference Project, which include the Seaport and Cityport LAPs. The Seaport LAP recognises that expansion of the port is required to meet the demand for passenger-related facilities.

The Reference Project also aligns with Ports North's Statement of Corporate Intent 2017–18 and Corporate Plan.

7.6 Summary of Policy Review

The review of relevant government plans and policies concluded that the identified service need and Reference Project align with, and contribute to, the strategic objectives of federal, state and local government. Table 7.1 summarises the results of this review.

Table 7.1: Reference Project Alignment with Key Government Plans and Policies

DOCUMENT	ALIGNMENT
AUSTRALIAN GOVERNMENT	
Reef 2050 Plan	Following the release of the Reef 2050 Plan, the Project was recalibrated and the design updated to ensure adherence with the Reef 2050 Plan.
White Paper on Developing Northern Australia	The Reference Project supports the government's intention to deregulate coastal shipping by providing a North Queensland port that is more accessible to the cruise shipping industry, as well as the cargo and defence industries.
2016 Defence White Paper	The Reference Project will facilitate the planned $635 million upgrade of the naval base (recommended in the Defence White Paper), which would otherwise not be able to accommodate large Australian and foreign naval vessels. It will also provide safer access for existing vessels, with reduced operational restrictions.
QUEENSLAND GOVERNMENT	
Queensland Government's Objectives for the Community	The Reference Project supports the achievement of three of the four objectives, specifically: ▪ delivering quality frontline services ▪ building safe, caring and connected communities ▪ creating jobs and a diverse economy.
Maintenance Dredging Strategy	The Reference Project was recalibrated taking into account the Maintenance Dredging Strategy. The Maintenance Dredging Strategy provides Ports North with certainty that the Port will remain sustainable. The Reference Project's dredging operations will

DOCUMENT	ALIGNMENT
	manage the reef's health and resilience, in line with the aims of the Maintenance Dredging Strategy.
FNQRP	The Reference Project seeks to facilitate economic activities at the port consistent with the economic development policies outlined in the FNQRP.
ANQP	The Reference Project offers an opportunity to grow Cairns as a cruise shipping hub, catering for both transit and homeporting operations and delivering economic benefits to Cairns and Queensland. It will support infrastructure and investment for North Queensland.
SIP	The Reference Project offers an opportunity to establish a more viable and sustainable cruise shipping industry in Cairns, fostering tourism and business growth. It supports the Queensland Government's strategic aim to transition the Queensland economy from reliance on the resource sector to tourism-related industries.
LOCAL GOVERNMENT	
CairnsPlan 2016	Strategic port land is not subject to CairnsPlan 2016. However, downstream approvals that may be required for the Reference Project within the Cairns local government area will be subject to the provisions of CairnsPlan 2016.
PROPONENT POLICIES	
Ports North LUP	The Seaport LAP recognises that expansion of the port is required to meet the demand for passenger-related facilities. The Ports North Statement of Corporate Intent 2017-18 and Corporate Plan align with the Reference Project.

CHAPTER 8
LEGAL AND REGULATORY CONSIDERATIONS

CHAPTER SUMMARY AND CONCLUSIONS:

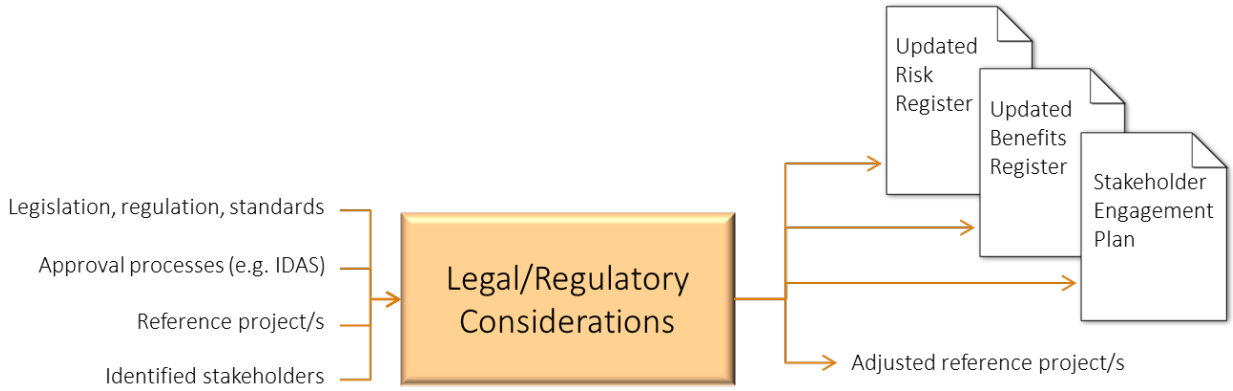
- Multiple laws and regulations must be addressed by the Project, requiring proactive management and significant documentation.
- Ports North's legislative and regulatory obligations are extensive, covering issues such as land tenure, native title, cultural heritage, environmental management, marine safety, conservation, land use planning and protection and transport infrastructure.
- The SPD Act restricts capital dredging to priority Queensland ports, however, there is a special exemption for the Port of Cairns, and the Project, as its EIS process started before the Act commenced. However, the SPD Act limits the extent of capital dredging permitted and prohibits disposing of dredge material in the GBRWHA.
- Changes are required to the existing legal and regulatory framework to deliver the Project, specifically, legislative change to revoke, or amend the boundaries of, the Trinity Inlet FHA to permit dredging, which is currently not allowed under the *Fisheries Act 1994* (Fisheries Act).
- Diverse permits, approvals, Environmental Authorities and licenses will be required for the Project to proceed. Some must be obtained before works can commence.
- A CHMP will also be required prior to construction under the ATSIHP Act and ACH Act in order to protect and preserve the cultural heritage of Aboriginal and Torres Strait Islander people. The Project will be required to address native title issues.
- The Project has already been deemed a controlled action by the Australian Government under the EPBC Act as it impacts on seven MNES. Environmental offsets may be required under the EO Act to account for unavoidable ecological impacts.

8.1 Purpose

This chapter summarises the key legal and regulatory considerations for the Project. It examines all relevant legislation, regulations, policies, plans and strategies at federal, state and local government levels, and outlines the permits, approvals or licenses that may be required for the Project to proceed.

Figure 8.1 illustrates the inputs and resulting outputs of the legal and regulatory analysis conducted for the Project.

Figure 8.1: Inputs and Outputs of the Legal and Regulatory Analysis



8.2 Legislative Issues

The RDEIS for the Project required relevant federal, state and local government legislation, regulations, policies and planning frameworks to be identified, together with the approvals required.

The Project covers areas under the jurisdiction of the Australian Government, Queensland Government, CRC and Ports North. Approvals for various project components are required under the laws relevant to each jurisdiction. Approvals will be required from Ports North for certain proposed project activities such as land-based development in the Cityport or Seaport areas.

The means Ports North is both the project proponent, port authority and, potentially, the development assessment manager.

8.2.1 International Conventions

Increasing use of, and development in and adjacent to, the Great Barrier Reef Marine Park (GBRMP) and Great Barrier Reef World Heritage Area (GBRWHA) demands special attention and strong policies to protect the values of the marine park. Ports North has committed to operating cooperatively and closely with the Great Barrier Reef Marine Park Authority (GBRMPA) and Queensland Government agencies to ensure relevant international conventions are at the forefront of decision-making.

International conventions relevant to the Great Barrier Reef and the Project include the following:

- *Convention Concerning the Protection of the World Cultural and Natural Heritage*, 1972 (the World Heritage Convention)
- *Convention on Biological Diversity,* 1992 (the Biodiversity Convention)
- *Convention on International Trade in Endangered Species of Wild Fauna and Flora*, 1973
- *Convention on the Conservation of Migratory Species of Wild Animals*, 1979 (the Bonn Convention)
- *Convention on Wetlands of International Importance especially as Waterfowl Habitats*, 1971 (the Ramsar Convention)
- *International Convention for the Prevention of Pollution from Ships*, 1973 (the MARPOL Convention)
- *London Convention and Protocol* (previously known at the *Protocol to the Convention on the Prevention of Marine Pollution by Dumping Wastes and Other Matters*, 1972)
- *United Nations Convention on the Law of the Sea*, 1982 (the Law of the Sea Convention or UNCLOS)
- *United Nations Framework Convention on Climate Change*, 1992 (the FCCC)
- *Convention on the Protection of the Underwater Cultural Heritage 2001*.

8.2.2 Commonwealth Legislation

Commonwealth legislation relevant to the Project includes:

- *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* (ATSIHP Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- *Historic Shipwrecks Act 1976* (Shipwrecks Act)
- *Marine Safety (Domestic Commercial Vessel) National Law Act 2012* (Marine Safety Act)
- *Maritime Transport and Offshore Facilities Security Act 2003* (Maritime Transport Act)
- *Native Title Act 1993* (NT Act)
- *Navigation Act 2012.*

8.2.2.1 Aboriginal and Torres Strait Islander Heritage Protection Act 1984

Overview

The ATSIHP Act provides for the preservation and protection from injury or desecration of areas and objects of significance to Aboriginal or Torres Strait Islander people in Australia and its waters, in accordance with culture and tradition. It enables the Australian Government to respond to requests by an Aboriginal or Torres Strait Islander person (or a person representing them) to protect traditionally important areas and objects that are under threat, if it appears that relevant State or Territory laws have not provided effective protection.

Relevance to the Project

A cultural heritage management plan (CHMP) will be necessary to meet the requirements of the ATSIHP Act. The CHMP will also apply to the capital dredging and land placement of the dredge material at the Barron Delta Dredge Material Placement Area (DMPA) site and the Tingira Street DMPA site. The proposed construction and operation of the pumped dredge material pipeline will also be subject to the terms of the CHMP during project works.

8.2.2.2 Environmental Protection and Biodiversity Conservation Act 1999

Overview

The EPBC Act seeks to protect the environment, particularly matters of national environmental significance (MNES). It streamlines national environmental assessment and approval processes, and protects and manages nationally and internationally important flora, ecological communities and heritage places.

Under the EPBC Act, proponents must refer a proposed action to the Australian Government for assessment of impacts against MNES if the proponent believes such matters would be significantly affected. If the proposal is deemed to have a significant impact on MNES, an environmental assessment process is triggered.

The nine MNES protected under the EPBC Act are:

1. world heritage properties
2. national heritage places
3. wetlands of international importance (listed under the Ramsar Convention)
4. nationally threatened species and ecological communities
5. migratory species protected under international agreements
6. Commonwealth marine areas
7. GBRMP
8. nuclear actions (including uranium mines)
9. a water resource, in relation to coal seam gas development and large coal mining development.

Relevance to the Project

The original Cairns Shipping Development Project (2012) was referred under the EPBC Act to the Minister for Sustainability, Environment, Water, Population and Communities. A delegate of the Minister determined on 4 October 2012 that approval is required, as the action has the potential to significantly impact the Commonwealth environment and the following MNES protected under Part 3 of the EPBC Act:

a. world heritage properties (Sections 12 and 15A)
b. national heritage places (Sections 15B and 15C)

c. listed threatened species and communities (Sections 18 and 18A)

d. listed migratory species (Sections 20 and 20A)

e. Commonwealth marine areas (Sections 23 and 24A)

f. GBRMP (Sections 24B and 24C)

g. Commonwealth land (Sections 26 and 27A).

8.2.2.3 Historic Shipwrecks Act 1976

Overview

The Shipwrecks Act protects historic wrecks and associated relics, more than 75 years old and in Commonwealth waters, extending from below the low water mark to the edge of the continental shelf. It aims to ensure that historic shipwrecks are protected for their heritage values and maintained for recreational, scientific and educational purposes. In 2009, the UNESCO *Covenant on the Protection of the Underwater Cultural Heritage* 2001 came into force and set a new international standard for managing underwater cultural heritage. The Shipwrecks Act is currently under review regarding the impact of the covenant.

Relevance to the Project

The Project must comply with all relevant provisions of the Shipwrecks Act and covenants about underwater cultural heritage. The Project will seek to avoid disturbing historic wrecks and associated relics and zones during construction and operation.

8.2.2.4 Marine Safety (Domestic Commercial Vessel) National Law Act 2012

Overview

The Marine Safety Act:

- forms part of a cooperative scheme between the Australian Government and state and territory governments that provides a single national framework for ensuring the safe operation, design, construction and equipping of domestic commercial vessels
- implements Australia's international obligations in relation to the safety of domestic commercial vessels
- facilitates the development of a safety culture to prevent, or mitigate the effects of, marine incidents
- provides a framework for the development and application of consistent national standards relating to the operation, design, construction and equipping of domestic commercial vessels
- enhances the efficient and orderly operation of domestic commercial vessels
- provides an effective enforcement framework.

Relevance to the Project

The Project recognises that shipping controls and regulations for the Great Barrier Reef are comprehensive, tailored management tools to ensure shipping occurs in a highly regulated and controlled manner. Ports North will provide advice regarding the requirements of the Marine Safety Act and the Australian Maritime Safety Authority (AMSA), the national regulator for the safety of domestic commercial vessels in Australian waters, to the Project.

8.2.2.5 Maritime Transport and Offshore Facilities Security Act 2003

Overview

The Maritime Transport Act safeguards against unlawful interference with maritime transport or offshore facilities. It establishes a regulatory framework centred on the development of security plans for ships, other maritime transport operations, and offshore facilities.

Relevance to the Project

The Project recognises that shipping controls and regulations for the GBRMP are comprehensive, tailored management tools to ensure shipping occurs in a highly regulated and controlled manner. Ports North will guide the Project on its obligations under the Maritime Transport Act.

8.2.2.6 Native Title Act 1993

Overview

The NT Act establishes a framework through which native title can be recognised, and protects native title rights. Proposed activities or developments that may affect native title are classed as 'future acts' under the NT Act. The NT Act provides for the determination of native title claims, the treatment of future acts, and the requirement for consultation and/or notification of relevant native title claimants where future acts are involved. Under the NT Act, any past grants of freehold or certain leasehold interests are recognised as having extinguished native title if they occurred prior to certain dates. The NT Act operates in conjunction with associated state legislation, such as the *Native Title (Queensland) Act 1993* (Qld).

Relevance to the Project

One native title determination only has been made on the Trinity Inlet area, for the Mundingalbay Yidinji People. Dredging for the future channel widening, new swing basin and material transfer pipeline and placement areas will be clear of the determination area.

A native title claim for part of Trinity Inlet and the landside area of the western side of Trinity Inlet has been made by the Gimuy Walubara Yidinji People. Dredging and infrastructure works will impact this area and consequently, a CHMP will be developed with the Gimuy Walubara Yidinji People for the works within their native title claim area.

The proposed dredge material delivery pipeline will be constructed on reserve land, lease lands and in or over Thomatis Creek. Native title has been extinguished on freehold land associated with the pipeline and dredge placement facility, and native title compliance is not required for these parcels. However, the pipeline's route and placement area are within the Cairns Regional Claim Group claim area, which has been recently registered, and will trigger relevant native title actions.

Pipeline works will also extend across the creek bed and mouth of Richters Creek, and the pipeline's construction and operation will affect native title rights and interests. As native title may continue to exist in these areas, compliance will be required under the NT Act's future acts regime. However, until the precise permits required to construct and maintain the pipeline are determined, it is not possible to definitively determine native title compliance requirements for undertaking pipeline works for the temporary 'occupation' of the Richters Creek mouth or crossing of Richters Creek.

However, a development permit/authority for tidal works granted under the *Planning Act 2016* (Planning Act) or the *Coastal Protection and Management Act 1995* (Coastal Protection Act) is likely to be required for the pipeline works. This would be the appropriate point in the process to address native title compliance.

8.2.2.7 Navigation Act 2012

Overview

This Act is the primary legislative means for the Australian Government to regulate international ship and seafarer safety. The purpose of this Act is to:

- promote the safety of life at sea
- promote safe navigation
- prevent pollution of the marine environment
- enforce national and international standards.

Relevance to the Project

Ports North recognises that shipping controls and regulations for the Great Barrier Reef are comprehensive, tailored management tools to ensure that international shipping through the region occurs in a highly regulated and controlled manner. Ports North will guide the Project on the requirements of AMSA about internal ship safety requisites, requirements and prerequisites.

8.2.3 Queensland Legislation

8.2.3.1 Relevant Legislation

State legislation relevant to the Project includes :

- *Aboriginal Cultural Heritage Act 2003* (ACH Act)
- *Biosecurity Act 2014*
- *Building Act 1975*
- Coastal Protection Act
- *Environmental Offsets Act 2014* (EO Act)
- *Environmental Protection Act 1994* (EP Act)
- Fisheries Act
- *Land Act 1994*
- *Marine Parks Act 2004* (Marine Parks Act)
- *Native Title (Queensland) Act 1993*
- *Nature Conservation Act 1992* (NC Act)
- Planning Act
- *Queensland Heritage Act 1992*
- *State Development and Public Works Organisation Act 1971* (SDPWO Act)
- *Sustainable Ports Development Act 2015* (SPD Act)
- *Transport Infrastructure Act 1994* (TI Act)
- *Transport Operations (Marine Pollution) Act 1995*
- *Transport Operations (Marine Safety) Act 1994*
- *Transport Operations (Road Use Management) Act 1995*

- *Transport Security (Counter-Terrorism) Act 2008*
- *Vegetation Management Act 1999* (VM Act)
- *Waste Reduction and Recycling Act 2011.*

8.2.3.2 Aboriginal Cultural Heritage Act 2003

Overview

The ACH Act requires all persons to take reasonable and practical measures to avoid harming Aboriginal cultural heritage. A guideline, gazetted under the Act, sets out reasonable and practical measures for ensuring that this 'duty of care' is met.

The ACH Act:

- provides blanket protection of areas and objects of traditional and customary significance, as well as areas of archaeological significance
- recognises the key role of traditional owners in cultural heritage matters
- establishes practical and flexible processes to address cultural heritage in a timely and cost-efficient manner
- establishes cultural heritage permitting arrangements with the duty of care, cultural heritage management planning process and other agreement-based mechanisms
- outlines penalties for harming Aboriginal and Torres Strait Islander cultural heritage
- in accordance with Section 87, 88 and 89 of the ACH Act, requires development of a CHMP if:
  - an EIS is required
  - an Environmental Authority is required under a different Act.

Relevance to the Project

Under Section 87 of the ACH Act, a CHMP must be approved for the site by the DEHP prior to commencing any works. An approved CHMP is also be required for any aspect of development associated with the Barron Delta DMPA and delivery pipeline, and the Tingira Street DMPA. Works associated with these facilities will need to be undertaken in accordance with the terms of the CHMP.

8.2.3.3 Biosecurity Act 2014

Overview

The *Biosecurity Act 2014* provides comprehensive biosecurity measures to safeguard the economy, agricultural and tourism industries, environment, and way of life, from:

- pests (e.g. wild dogs and weeds)
- diseases (e.g. foot-and-mouth disease)
- contaminants (e.g. lead on grazing land).

It ensures a consistent, modern, risk-based and less prescriptive approach to biosecurity in Queensland.

Relevance to the Project

Under Section 23, all people have a general biosecurity obligation (GBO). This means that everyone is responsible for managing biosecurity risks that:

- are under their control

- they know about or should reasonably be expected to know about

Under the GBO, individuals and organisations whose activities pose a biosecurity risk must:

- take all reasonable and practical steps to prevent or minimise each biosecurity risk
- minimise the likelihood of causing a 'biosecurity event' and limit the consequences if such an event is caused
- prevent or minimise the harmful effects a risk could have and not do anything that might make any harmful effects worse.

Unlike the previous *Land Protection [Pest and Stock Route Management] Act 2002* superseded by the *Biosecurity Act 2014* on 1 July 2016, the new Act classifies species as 'restricted matters' and places them in categories rather than classes. In accordance with the Act, Ports North has a responsibility to manage various plants and animals on land that it owns or manages, in accordance with the relevant category.

8.2.3.4 Building Act 1975

Overview

The *Building Act 1975* governs all building work in Queensland, empowering the regulation of certain aspects of buildings and structures. It articulates that buildings must be constructed in accordance with Australian Standards and national and state building codes that regulate items such as structural design and fire and safety considerations.

Relevance to the Project

Building approval will be required for proposed building and infrastructure works. Once the detailed design has been finalised, referral requirements will be identified.

8.2.3.5 Coastal Protection and Management Act 1995

Overview

This Coastal Protection Act provides for the protection, conservation, rehabilitation and management of the Queensland coastal zone, including its resources and biological diversity. The Act has regard to the goal, core objectives and guiding principles of the National Strategy for Ecologically Sustainable Development in the coastal zone. This is achieved through the preparation of coastal management plans, declaring control districts in the coastal zone with special development controls, management practices and integration with other relevant legislation.

Relevance to the Project

The Project, including the construction and operation of the delivery pipeline and pump-out facility, is located within a coastal management district. Capital dredging will require approval under the Coastal Protection Act before any relevant marine works begin.

Operational work in a coastal management district including prescribed tidal works will require approval pursuant to Schedule 8, Table and Schedule 10, Part 26 of the Planning Regulation 2017.

Under Chapter 2, Part 5 of the Coastal Protection Act, an allocation of quarry material will be required prior to the issue of any approval for the removal of dredged material from State land under tidal water.

8.2.3.6 Environmental Offsets Act 2014

Overview

The EO Act coordinates the delivery of environmental offsets in Queensland. Its purpose is to counterbalance the significant residual impacts of activities on prescribed environmental matters through environmental offsets.

Relevance to the Project

A number of state government plans and policies require the use of offsets where impacts on areas of high ecological significance are unavoidable. As the Project proposes works (dredging and placement) requiring development permits, offsets may be required due to residual ecological impacts in the dredging, pipeline access route and placement areas.

8.2.3.7 Environmental Protection Act 1994

Overview

The EP Act, in particular Section 36 and 37, creates a general duty for all people, companies and government bodies to take all reasonable and practicable steps to avoid harm to the environment. The EP Act outlines the scope and content for preparing environmental protection policies to protect Queensland's environment.

The EP Act also provides for the regulation and approval of prescribed Environmentally Relevant Activities (ERAs) that have potential to cause environmental harm. An Environmental Authority issued under the EP Act is required, and the operator of an ERA is required to be a Suitable Operator for the conduct of the activity that is subject of the development approval issued under the applicable Planning Act.

Relevance to the Project

Development permits and Environmental Authorities to carry out the following main ERAs are likely to be required:

- ERA 16 – Extractive and Screening Activities (Dredging)
- ERA 8 – Chemical Storage.

These will be obtained by approved contractors prior to the commencement of works.

If works for the upgrade of the wharf involve removing soil from a site listed on the environmental management register or contaminated land register, a permit for the removal and disposal of contaminated soils will be required under the EP Act.

8.2.3.8 Fisheries Act 1994

Overview

The Fisheries Act provides a framework for the management, use, development and protection of fisheries resources and fish habitats, the management of aquaculture activities and helping to prevent shark attacks. It aims to manage the use, conservation and enhancement of the community's fisheries resources and fish habitats in a way that seeks to apply balance and promote the principles of ecologically sustainable development.

Through various operational policies, declared under the Fisheries Act, the DAF is responsible for development assessment, along with the conservation and management of fisheries important to the State. DAF adopts a strategic approach to managing Queensland's fish habitats to ensure the continued use of

fisheries resources (including fish, marine plants and other fish habitats) occurs in a sustainable manner. This Act prohibits work in a declared Fish Habitat Area (FHA) without approval.

Relevance to the Project

Marine-based works in any areas containing marine plants have the potential to damage marine plants, so approval for the Project is required pursuant to Schedule 10, Part 8 of the Planning Regulation 2017 and the Fisheries Act.

As the Trinity Inlet FHA and Yorkeys Creek FHA are located within the project area, a development permit for operational works that are completely or partly within a FHA will be required. Widening of the channel through dredging is proposed within the Trinity Inlet FHA, while construction and operation of the delivery pipeline will traverse portions of the Yorkeys Creek FHA. Aspects of development involving the removal, destruction and damage of a marine plant or waterway barrier works may occur in these FHAs.

The assessment process for such approvals will be facilitated under the Development Assessment Rules and will require assessment by DAF against the State Development Assessment Provisions – Module 5: Fisheries resources.

In addition, as the Fisheries Act does not support dredging within a FHA (declared by regulation under Section 120), there is a legislative need to amend or revoke the declared FHA. Approval of State Cabinet and the Governor in Council is required for any declaration that involves the amendment of the Fisheries Regulation 2008.

8.2.3.9 Land Act 1994

Overview

This Act provides for the administration and management of land for the benefit of the people of Queensland through the creation of different forms of land ownership.

Relevance to the Project

During operational works for the proposed pump-out facility and pipeline, permits to occupy or create easements may be required for the use or occupation of unallocated State land, reserves or lease lands.

8.2.3.10 Marine Parks Act 2004

Overview

The Marine Parks Act supports the conservation of the marine environment and provides for the declaration and establishment of marine parks and associated zoning and management plans. It further recognises cultural, economic, environmental and social relationships within marine parks and surrounding areas.

The Marine Parks Regulations 2006 and the Great Barrier Reef Coast Marine Park (GBRCMP) Zoning Plan, in accordance with the Act, includes provisions relating to the zoning and objectives for those areas within marine parks, regulations associated with entry, use and the type of activities permitted within marine parks and review rights. Specifically, the regulation declares the zoning and protection of the GBRCMP.

Relevance to the Project

The proposed dredging at Trinity Inlet and Bay is situated within the GBRCMP (General Use Zone) and will require the issue of a Marine Park Permit in accordance with the Act. A number of policies and guidelines will be addressed in applying for a permit and will include recognition of the GBRMPA Dredging and Dredge Spoil Material Disposal Policy 2016, Environment and Heritage Protection – Disposing of material in tidal waters – and the Memorandum of Understanding between GBRMPA and Queensland Ports Association 2009.

Subject to outcomes of the detailed design and selection of dredging contractor and equipment, the scope of the mooring for the dredge pump-out location within the marine park may trigger the requirement for a Marine Park Permit for a temporary structure or mooring and such will be progressed through the GBRMPA and Queensland Marine Parks.

8.2.3.11 Native Title (Queensland) Act 1993

Overview

This Act, in association with the NT Act, provides a mechanism to validate past Acts, and intermediate period Acts invalidated because of the existence of native title, to confirm certain rights and to ensure that Queensland law is consistent with standards set by the NT Act for future dealings affecting native title.

Relevance to the Project

See Section 8.2.2.6.

8.2.3.12 Nature Conservation Act 1992

Overview

A framework is created under the NC Act for the dedication, declaration and management of protected areas, protection of wildlife and its habitat. A complex system of regulations has been created under the NC Act.

The Nature Conservation (Wildlife) Regulation 2006, in accordance with the NC Act, catalogues the flora and fauna recognised as extinct, endangered, vulnerable, rare, near threatened, least concern, international and prohibited that may be impacted by the Project. The regulation further addresses the significance and declared management intent for each class.

The Nature Conservation (Whales and Dolphins) Conservation Plan 1997, in accordance with the NC Act, is designed to protect and conserve whales and dolphins in Queensland waters. The plan outlines management strategies to minimise harm and distress caused by anthropogenic activities such as pollution, noise disturbance and direct contact that may result from the construction and operation of the Project.

The Nature Conservation (Protected Areas) Regulation 1994, in accordance with the NC Act, provides a list of former and current descriptions for protected areas as declared by the State of Queensland. Specific to the Project, the regulation identifies national parks, conservation parks, resource reserves and nature refuges that are of particular importance to marine and estuarine ecology in and adjacent to Cairns Port.

Relevance to the Project

During operational works and construction phases of the Project, permits for clearing or damage mitigation under the NC Act may be required.

8.2.3.13 Planning Act 2016

Overview

The Planning Act and the associated Planning Regulation 2017 replaced the *Sustainable Planning Act 2009* (and the associated Sustainable Planning Regulation 2009) in July 2017. Its purpose is to establish an efficient, effective, transparent, integrated, coordinated and accountable system of land use planning, development assessment and related matters to achieve ecological sustainability.

Port authorities are the assessment managers for all proposed development undertaken wholly on strategic port land in accordance with Schedule 8 of the Planning Regulation 2017. Schedule 10 of the Planning Regulation 2017 states that development on strategic port land is assessable development if:

- either the land use plan (LUP) for the strategic port land states the development is assessable development or the development is a material change of use that is inconsistent with the LUP
- for premises in a port's master planned area – the port overlay for the master planned area does not state a different category of development for the development.

Development on strategic port land can also constitute assessable development under the provisions of Schedule 8 of the Planning Regulation 2017 if the proposed development is making a material chance of use of premises for an ERA under the EP Act.

CRC acts at the assessment manager for all development applications undertaken with the Cairns local government area as detailed in the CairnsPlan 2016. The Planning Regulation 2017 states that:

- any aspect of development is assessable under a local categorising instrument or
- is for building work, that under the *Building Act 1975* is assessable against the building assessment provisions or
- is for reconfiguring a lot or
- is prescribed tidal works completely in a single local government tidal area.

Relevance to the Project

Ports North has the responsibilities of the assessment manager under the Planning Regulation 2017 for development on strategic port land and administers the responsibilities for land use planning through the Development Assessment Rules. A number of aspects of the Project involve development listed under Schedule 10 of the Planning Regulation 2017 and as such will trigger the requirement for approval under the Planning Act and associated legislation.

CRC has the responsibilities of the assessment manager under the Planning Act for development within the Cairns local government area as detailed in the CairnsPlan 2016. The delivery pipeline and the Barron Delta dredge placement facility will trigger the requirement for approval under the Planning Act and associated legislation.

8.2.3.14 Queensland Heritage Act 1992

Overview

This Act operates in tandem with the ACH Act to protect Queensland's cultural heritage for the benefit of the community and future generations by:

- establishing the Queensland Heritage Council
- maintaining the Queensland Heritage Register
- providing for the establishment of local heritage registers
- regulating, in conjunction with other legislation, development affecting the cultural heritage significance of registered places
- providing for heritage agreements to encourage appropriate management of registered places
- providing for appropriate enforcement powers to help protect Queensland's cultural heritage.

Under the Act, it is an offence to knowingly destroy or otherwise interfere with registered places or heritage items. The Act also sets out the assessment requirements for any proposed development in or on a heritage place and is administrated by the Queensland Heritage Council and the DEHP.

Relevance to the Project

The Cairns Wharf Complex is listed on the Queensland Heritage Register (QHR 601790) and therefore approval for the development within, or adjacent to a heritage-listed place under the *Queensland Heritage Act 1992* will be required in accordance with Schedule 3 of the Sustainable Planning Regulation 2009.

The recommended concept for the wharf includes the provision of new dolphin structures placed between existing bents. The proposed updates will have minimal impact on the existing heritage-listed structure and will require a development permit demonstrating consistency with Module 9 of the State Development Assessment Provisions (SDAP).

8.2.3.15 State Development and Public Works Organisation Act 1971

Overview

The SDPWO Act establishes the framework for environmental assessment of declared significant projects in Queensland, identifying an environmental impact assessment process and its relationship with other Queensland legislation. The approvals framework applicable to the Project is set by the Planning Act and the EP Act.

Relevance to the Project

On 24 September 2012, the Coordinator-General declared the Project to be a significant project (now 'coordinated project') requiring an EIS under Section 26(1) (a) of the Act. This declaration initiated the statutory EIS process of Part 4 of the Act, which required the proponent (Ports North) to prepare an EIS for the Project.

8.2.3.16 Sustainable Ports Development Act 2015

Overview

The SPD Act is the legislative framework developed by the Queensland Government to implement the main port-related actions of the Reef 2050 Long-Term Sustainability Plan. The legislation restricts new port development to areas within current port limits (or outside Commonwealth and State marine parks), restricts capital dredging for new or expanded port facilities to priority ports only (Gladstone, Hay Point/Mackay, Abbot Point and Townsville) (however there is a special exemption for the Port of Cairns, and the Port of Cairns Shipping Development Project as outlined below), and prohibits sea-based disposal of material generated by port-related capital dredging into the GBRWHA.

Capital dredging relates to dredging for creating or enlarging channels, basins, ports, new port foundations, or laying pipe, cable or tubing, rather than for maintenance of existing channels, basins and ports (or protecting human life or property).

However, the Act prohibits capital dredging where dredge material is deposited or disposed of in a restricted area including the GBRWHA, unless used for land reclamation, beach nourishment or environmental restoration. There are no exemptions to this requirement.

Relevance to the Project

As well as allowing capital dredging in priority port areas, the legislation permits limited capital dredging within the Port of Cairns' inner harbour to a total of no more than 50 000 cubic metres per approval and a total limit of 150 000 cubic metres in a four-year period. There is a further exemption of this provision for projects that are the subject of an ongoing EIS process started before the commencement of the Act, which includes the CSD Project.

8.2.3.17 Transport Infrastructure Act 1994

Overview

The TI Act provides a framework for integrated planning and management of an efficient transport infrastructure network. It sets out the provisions for creating port authorities and identifying strategic port land to be regulated by a port authority.

Section 285 of the TI Act requires each port authority to prepare LUPs for approval by the Minister of Transport. Under the TI Act and the Planning Regulation 2017, port authorities are considered the assessment manager for development undertaken wholly on strategic port land. Integration of assessable development on strategic port land into the Development Assessment Rules is achieved by the Planning Act 2016.

It also outlines the requirements for anyone wishing to undertake work in, or interfering with, a State-controlled road.

Relevance to the Project

Ports North is a port authority under the provisions of the TI Act. Development of strategic port land declared under the TI Act is regulated by Ports North in accordance with its LUP adopted in accordance with Section 285 of the Act.

In accordance with Section 50 of the TI Act, a road corridor permit may be required for any ancillary works and encroachments in a State-controlled road. Further, it is possible that approval may be required under the following sections of the Act:

- Section 33 – approval of the chief executive for carrying out road works on a State-controlled road
- Section 62 – approval of an access between a particular property and a State-controlled road.

These provisions will be relevant to the pipeline route.

8.2.3.18 Transport Operations (Marine Pollution) Act 1995

Overview

The overall purpose of this Act is to protect Queensland's marine and coastal environment by minimising deliberate and negligent discharges of ship-sourced pollutants into coastal waters.

Relevance to the Project

The dredging contractor will be responsible for ensuring that the operation of its vessel in Queensland waters is consistent with the purpose of the Act and does not willingly discharge any pollutants into the waters, which are an offence under the Act.

8.2.3.19 Transport Operations (Marine Safety) Act 1994

Overview

This Act establishes a system under which Maritime Safety Queensland can effectively plan and manage marine safety and related marine operational issues.

Relevance to the Project

The Project seeks to comply with all relevant provisions outlined in this Act and ensure the safe operation of its marine vessels utilised for the operational works phase.

8.2.3.20 Transport Operations (Road Use Management) Act 1995

Overview

The overall purpose of the Act is to:

- provide for the effective and efficient management of road use in the state
- provide a scheme for managing the use of the state's roads
- provide for the effective and efficient management of vehicle use in a public place.

Relevance to the Project

Movement of vehicles on public roads during the construction and operation phase of this Project will be required to meet the provisions of this Act.

8.2.3.21 Transport Security (Counter-Terrorism) Act 2008

Overview

The main purpose of this Act is to provide for planning for the protection of particular surface transport operations and their users against significant adverse impacts associated with terrorist acts involving surface transport operations.

Relevance to the Project

Under the Act, a surface transport operation is an activity or system for:

- transporting passengers by high occupancy vehicles (which carry 10 or more seated adults)
- transporting goods by high payload vehicles (carrying more than 20 tonnes).

In the event that a surface transport operation as part of project is declared as a security-identified surface transport operation under Section 11 of the Act, it will be necessary for a risk management plan to be prepared for the approval of the chief executive and the approved plan then implemented in accordance with the Act.

8.2.3.22 Vegetation Management Act 1999

Overview

This Act regulates the clearing of remnant and regulated regrowth vegetation, with exemption under the NC Act, the *Land Act 1994*, and the *Forestry Act 1959*.

Relevance to the Project

Clearing of any relevant remnant or regulated regrowth vegetation will constitute operational works under Schedule 10 of the Planning Regulation 2017, which will require development approval. Any application for clearing is required to be assessed against the SDAP Module 8: Clearing native vegetation.

Prior to obtaining development approval, there is a requirement under Section 22A of the VM Act that the chief executive is satisfied that the proposed clearing is for a relevant purpose to enable an application for clearing to be assessed.

Operational works activity for the establishment of the temporary pipeline route will trigger consideration of the VM Act.

8.2.3.23 Waste Reduction and Recycling Act 2011

Overview

This Act establishes a framework to modernise waste management and resource recovery practices in Queensland, promote waste avoidance and reduction and encourage resource recovery and efficiency.

Relevance to the Project

Section 13 of the EP Act defines waste as 'anything that is a left over, surplus, or an unwanted by-product, from an industrial, commercial, domestic or other activity. Waste can be a gas, liquid, solid or energy, or a combination of any of these'. Under Section 319 of the EP Act, waste generators are bound by the general environmental duty. This means that an activity undertaken by Ports North, cruise ship operators, or contractors must not release waste that is likely to cause environmental harm, unless all reasonable and practical measures are taken to prevent or minimise the harm.

The waste generator must follow this general environmental duty and ensure that waste is transported by a licensed transporter and that it is delivered to a licensed facility.

The transportation of some wastes is also regulated. These are referred to as 'trackable wastes' and a substance is considered trackable waste if it is regulated waste as defined in Part 2, Section 6 of the Waste Reduction and Recycling Regulation 2011 and listed in Schedule 2E of the Environmental Protection Regulation 2018. If transporting trackable waste commercially or transporting more than 250 kilograms non-commercially, an environmental permit is required.

If wastes are considered trackable, then waste handlers must submit waste tracking information in the approved forms when transporting regulated waste or waste residues. The waste generator, waste transporter and waste receiver all have certain obligations that are set out under the Environmental Protection Regulation 2008 and on the prescribed forms.

8.3 Plans and Policies

8.3.1 Federal, State and Local Government Plans and Policies

Relevant federal, state and local government plans and policies include:

- Australian Maritime Safety Authority Marine Orders
- CairnsPlan 2016
- Ports North LUP
- EPBC Act Environmental Offsets Policy 2013
- environmental protection policies
- ERAs
- Far North Queensland Regional Plan 2009–31 (FNQRP)
- fish habitat policies
- Cruise Shipping Policy for the Great Barrier Reef Marine Park 1999
- Maritime Safety Queensland Regulation 2002
- National Assessment Guidelines for Dredging (2009)
- National Strategy for Ecologically Sustainable Development (1992)

- Queensland Biosecurity Strategy 2009–14
- Queensland Coastal Plan
- Queensland Coastal Contingency Action Plan (QCCAP)
- Queensland Ports Strategy 2014
- Standards for Hydrographic Surveys within Queensland Waters
- SDAPs
- State Planning Policy 2016 (SPP)
- State planning regulatory provisions
- Transport Operations (Marine Pollution) Regulation 2008.

8.3.1.1 Australian Maritime Safety Authority Marine Orders

Overview

Marine Orders are a form of delegated legislation under Commonwealth laws. They provide an efficient means of implementing Australia's international maritime obligations by giving effect to international conventions in Australian law. The legislation provides the substantive powers for AMSA to perform certain functions and operational activities, including monitoring and enforcement.

AMSA has two series of Marine Orders:

- Marine Orders 1-98, primarily reflecting international obligations and standards that apply to certain Australian flagged vessels and foreign vessels
- Marine Orders 500-507, containing the national law requirements applying to domestic commercial vessels.

Relevance to the Project

The dredging contractor will be responsible for ensuring that the operation of its vessel is consistent with the purpose of the Marine Orders.

8.3.1.2 CairnsPlan 2016

Overview

CairnsPlan 2016, the planning scheme for the Cairns local government area, guides all local development, with the exception of land identified as strategic port land pursuant to the TI Act. CairnsPlan 2016 sets out the CRC's intention for future development for the next 20 years.

Relevance to the Project

The TI Act stipulates that strategic port land is not subject to a local government planning scheme. Instead, development is regulated under Schedule 10 of the Planning Regulation 2017 and requires assessment against the port authority's LUP. This document is the key planning tool for the strategic port land within the study area.

Ports North has control over development within the Cairns strategic port land and acts as the assessment manager for development applications. Development within the Cairns local government area is regulated under Schedule 10 of the Planning Regulation 2017 and requires assessment against the CairnsPlan 2016 by CRC. As such, the CairnsPlan 2016 is the key planning document for the pipeline and land placement of dredge material at the Barron Delta DMPA.

8.3.1.3 Ports North Land Use Plan

Overview

Land use and development on strategic port land is controlled by the LUP prepared by Ports North in accordance with Section 285 of the TI Act. The LUP specifies strategic port land and its current and future uses. The LUP sets out the main local area plans (LAPs) applicable to the Project, which include the Seaport and Cityport LAPs, both of which are within strategic port land. The Seaport LAP recognises that expansion of the port is required to meet the demand for passenger-related facilities.

Relevance to the Project

Some of the land-based infrastructure required to service proposed cruise ship operations (for example, fuel supply storage and distribution pipeline) will potentially be located within the Seaport LAP area and may trigger the requirement for approval in accordance with the requirements of the LUP.

Such approvals will be assessed by Ports North and may require referral to state agencies depending on the final siting arrangements.

8.3.1.4 EPBC Act Environmental Offsets Policy 2013

Overview

The Environmental Offsets Policy outlines the Australian Government's approach to the use of environmental offsets under the EPBC Act and their role in environmental impact assessments. Offsets are measures proposed to compensate for the residual impacts of an action on the environment after avoidance and mitigation measures are taken. Where appropriate, offsets are considered during the assessment phase of the EIS, and their suitability is considered as part of the decision to approve or not approve a proposed action under the EPBC Act. The Environmental Offsets Policy includes an offset assessment guide and balance sheet to quantify impacts and offsets and is applicable where an impacted protected matter is a threatened species or ecological community.

In summary, offsets will be required if, after avoidance and mitigation measures are taken, the magnitude of the residual impact on a protected matter is significant and likely. If required, an offset package will be developed, considering the types of activities appropriate as offsets for the impact and the specific size and scope of an offsets package.

Relevance to the Project

The significance of any residual impacts and requirements for offsets will be determined during detailed design phases for the Project. If required, Ports North will discuss offset options with the DoEE and submit an offset proposal that describes the offset and demonstrates how it provides an appropriate benefit to compensate for any residential impact on the protected matter.

If approval for the proposed action is granted, and it incorporates offsets as a condition, Ports North will be responsible for ensuring that the offsets are provided in accordance with the conditions.

8.3.1.5 Environmental Protection Policies

Overview

The EP Act sets out a number of regulations and policies to protect against activities causing environmental harm. The following regulations and policies are relevant to the Project:

- Environmental Protection Regulation 2008
- Environmental Protection (Air) Policy 2008

- Environmental Protection (Noise) Policy 2008
- Environmental Protection (Water) Policy 2009
- Environmental Protection (Waste Management) Policy 2000
- Environmental Protection (Waste Management) Regulation 2000.

Relevance to the Project

The Project will seek to comply with all policies and guidelines outlined under the EP Act.

8.3.1.6 Far North Queensland Regional Plan 2009–31

Overview

The FNQRP provides the strategic planning framework for the FNQ region. It recognises the Port of Cairns as regionally significant transport infrastructure. Refer to Chapter 7: Strategic Considerations for additional detail.

The land-based works associated with the Project are located within the Urban Footprint area and dredging within the inner shipping channel situated within the Regional Landscape and Rural Production Area.

The Barron Delta dredge placement facility and the delivery pipeline are situated within the Regional Landscape and Rural Production Area.

Relevance to the Project

The FNQRP identifies policies that deal with a range of regional matters. Of key relevance to the Project are the policies relating to the natural environment, economic development and water management. The relevant policies are summarised below.

Natural Environment

To protect, manage and enhance the region's natural assets, urban development is to be located outside of areas of high ecological significance, or operated to avoid impacts on ecological impacts, and if unavoidable, to minimise impacts and offset the residual impacts so there is a net gain of the impacted values.

Offsets requiring revegetation that cannot be achieved on the development site should be focussed within strategic rehabilitation areas (identified by the FNQRP), where appropriate.

To protect and manage the region's coastal resources, development is to be located, designed, and managed to firstly avoid, then minimise and offset impacts on coastal resources and ecologically significant coastal areas, including FHAs. Impacts on FHAs are to be offset in accordance with the relevant fisheries management policies and guidelines. Development does not occur within erosion-prone or storm tide inundation hazard areas, except in accordance with relevant policies of the state and regional coastal management plans.

Economic Development

The economic development policies in the FNQRP seek to support a diverse regional economy that minimises the cause of climate change and promote and expand regional activity, including export and imports. Land use policies are concerned with strategically locating business and industry uses and protecting them from incompatible development, providing adequate strategic port land at Cairns for coastal industries, and providing an adequate supply of land to accommodate future growth in operations at air and sea ports.

The Project seeks to facilitate additional economic activities at the port and is consistent with the economic development policies outlined in the FNQRP.

Water Management

To protect and improve the physical condition, ecological health, environmental values and water quality of the region's surface and groundwater systems, development must be planned, designed, constructed and managed in accordance with best practice environmental management and meet the objectives of the Environmental Protection Policy (Water) 1997. Urban development, other than for required community infrastructure, is to be set back from wetlands and waterways through the adoption of appropriate buffer zones.

The location of the Project in the wetland and waterway area is unavoidable due to its coastal dependant nature.

8.3.1.7 Fish Habitat Policies

Overview

The Fisheries Act outlines a number of fish habitat policies, with management objectives for assessing development proposals that impact on the values and functions of fish habitats. The purpose of these policies is to ensure the long-term protection and enhancement of marine plants and fish habitats along Queensland's coast. Policies include:

- Management and protection of marine plants and other tidal fish habitats (FHMOP 001)
- Management of declared fish habitat areas (FHMOP 002)
- Departmental procedures for permit applications assessment and approvals for insect pest control in coastal wetlands (FHMOP 003)
- Dredging, extraction and spoil disposal activities: Departmental procedures for provision of fisheries comments (FHMOP 004)
- Marine fish habitat offset policy (FHMOP 005.2)
- Fish habitat area selection and assessment (FHMOP007)
- Waterway barrier works approvals and fishway assessments: Departmental procedures (FHMOP 008)
- Restoration notices for fish habitats – formulation and implementation: Departmental procedures (FHMOP 009)
- Tidal fish habitats, erosion control and beach replenishment (FHMOP 010).

Relevance to the Project

The Project involves the disturbance of marine plants. FHMOP 001 guides the assessment of applications for the disturbance of marine plants and fish habitats. It identifies works that may be approved and works not supported. The policy identifies 'significant (coordinated) projects' under the SDPWO Act as works that may be approved and recognises the role of the Coordinator-General in the assessment and decision-making process.

The Project will involve dredging within the Trinity Inlet FHA and operational works in the Yorkeys Creek FHA in association with the delivery pipeline. FHMOP 004 does not support dredging within a declared FHA. Therefore, approval from the Queensland Government is required and a legislative process of amending or revoking the declared FHA will need be undertaken.

The removal, destruction or damage to marine plants or waterway barrier works associated with the pipeline route will require approval from the Queensland Government.

8.3.1.8 Cruise Shipping Policy for the Great Barrier Reef Marine Park 1999

Overview

This policy provides guidance for cruise shipping activities within the GBRMP. It outlines the procedures and protocols for marine park access, suitable anchorages and permission requirements for cruise shipping-related activities. Attachment 1 of the policy outlines interim cruise shipping strategies, addressing permits, access, bookings, and activities. Attachment 2 identifies designated locations with the GBRMP suitable for cruise ship anchorages. This policy is presently under review by the GBRMPA.

Relevance to the Project

The Project considers, and will be consistent with, the cruise shipping policy for the GBRMP. The proposed works are not envisaged to affect existing designated anchorages.

8.3.1.9 Maritime Safety Queensland Regulation

Overview

Maritime Safety Queensland is responsible for:

- improving maritime safety for shipping and small craft through regulation and education
- minimising vessel-sourced waste and responding to marine pollution
- providing essential maritime services such as pilotage for regional ports and aids to navigation
- encouraging and supporting innovation in the maritime industry.

Relevance to the Project

The Project will need to comply with the regulation, guidelines and policies administered by Maritime Safety Queensland for the capital dredging works, maintenance dredging, ship navigation and safety during operation.

8.3.1.10 National Assessment Guidelines for Dredging

Overview

These guidelines set out the framework for the environmental impact assessment and permitting of the ocean disposal of dredged material. The framework includes:

- evaluating alternatives to ocean disposal
- assessing loading and disposal sites
- assessing potential impacts on the marine environment and other users
- determining management and monitoring requirements.

For material to be disposed of within a marine environment, the characteristics of the material and potential impacts at the disposal site must be reported as required under the guidelines.

Relevance to the Project

The RDEIS and the approvals process undertaken for this Project demonstrate compliance with the National Assessment Guidelines for Dredging.

8.3.1.11 National Strategy for Ecologically Sustainable Development

Overview

Ecologically sustainable development (ESD) is development that aims to meet the needs of people today while conserving ecosystems for the benefit of future generations. The National Strategy for ESD has evolved over several years through extensive consultation with all levels of government, business, industry, academia, conservation organisations, community groups and individuals. In December 1992, the Council of Commonwealth Governments endorsed the National Strategy for ESD. The document is intended to play a critical role in setting the scene for broad changes in direction and approach for governments to take to try to achieve ESD. The Council encouraged businesses, unions and community groups to use the strategy as a basis for actions which contribute to the pursuit of Australia's goal for ESD.

The strategy encourages environmental and economic land use decision-making that takes full account of all relevant land and resource values, and supports the creation of systems of land use decision-making and dispute resolutions. An objective identified by the strategy is to continue to develop cooperative and consultative arrangements between jurisdictions modelled on approaches such as the GBRMPA.

Relevance to the Project

Since 1992, the principles of ESD have been incorporated into many Acts of parliament including the EPBC Act and the EP Act. The Project will continue to be reviewed in accordance with the bilateral agreement between the Australian and Queensland governments that enshrine both pieces of legislation.

8.3.1.12 Queensland Biosecurity Strategy 2009–14

Overview

The Queensland Biosecurity Strategy:

- sets out the strategic direction for Queensland's biosecurity
- articulates a shared vision for Queensland's biosecurity system
- sets out the high-level goals and strategies for biosecurity in Queensland
- identifies the key strategies that will be pursued to achieve these goals
- positions Queensland within the changing national and international biosecurity environment.

Relevance to the Project

The strategy places a duty of care on anyone conducting an activity that has biosecurity implications to take all reasonable measures to mitigate the biosecurity risks associated with that activity.

8.3.1.13 Queensland Coastal Management Plan 2014

Overview

The Coastal Management Plan is prepared under the Coastal Protection Act and identifies how the coastal zone of Queensland is to be managed. The plan provides non-regulatory policy guidance to coastal land managers. The plan identifies various approaches to managing coastal land, including the preservation of coastal land forms and coastal processes, conservation of matters of state environmental significance, maintaining and enhancing Indigenous peoples' connections to coastal and marine resources, maintaining public access to the coast, and planning and monitoring coastal land uses. The plan is applied to guide planning, activities and works that are not assessable development under the Planning Act.

Relevance to the Project

Ports North will consider this plan in its decision-making and role as assessment manager for the Project. It will also guide the Project in meeting the requirements of the Coastal Management Plan.

In considering development of the Barron Delta dredge placement facility, and the location of the delivery pipeline route, the Cairns Regional Council and the Queensland Government will have regard to the Queensland Coastal Management Plan 2014 in its decision-making role and assessment manager role of the Project.

8.3.1.14 Queensland Coastal Contingency Action Plan

Overview

The QCCAP, supported by Maritime Safety Queensland, outlines Australia's national arrangements for oil and chemical spills under the Intergovernmental Agreement on the National Plan to Combat Pollution of the Sea by Oil and other Noxious and Hazardous Substances. QCCAP also links to Queensland's revised disaster management arrangements and supports Queensland's recently revised State Disaster Management Plan.

Relevance to the Project

The Project will have procedures and protocols in place to meet the objectives of the QCCAP.

8.3.1.15 Standards for Hydrographic Surveys within Queensland Waters

Overview

Maritime Safety Queensland has developed standards for hydrographic surveys within Queensland waters in consultation with all Queensland Port Authorities. These standards are based on the national Principles for Gathering and Processing Hydrographic Information in Australian Ports prepared by the Association of Australian Port and Marine Authorities. They supplement the International Hydrographic Organisation's Special Publication S44, which provides the minimum international standards for hydrographic surveys.

The Audit Plan for Hydrographic Surveys within Queensland Waters sets out the procedure for selecting, conducting and reporting of survey audits.

Relevance to the Project

The dredging work associated with the Project will seek to comply with, and monitor for compliance with, the standards for hydrographic surveys within Queensland waters as provided by Maritime Safety Queensland.

8.3.1.16 State Development Assessment Provisions

Overview

The SDAP sets out matters of interest to the state government for development assessment, where the chief executive administrating the Planning Act is responsible for assessing or deciding development applications. The SDAP is prescribed in the Planning Regulation 2017.

Relevance to the Project

The SDAP identifies the following matters of State interest potentially applicable to the Project:

- ERAs
- fisheries resources (development in a declared FHA)
- coastal protection (tidal works or development in a coastal management district)
- native vegetation clearing (regional ecosystems of least concern)

- Queensland heritage places
- state transport network functionality (access to state government-controlled roads)
- water resources.

Development approvals required for the Project that involve the above matters will require assessment against the corresponding modules of the SDAP.

8.3.1.17 State Planning Policy 2016

Overview

The SPP establishes the Queensland Government's position on planning matters of State significance. It provides a comprehensive set of principles that underpin Queensland's planning system to guide land use planning and development assessment. The State interests addressed in the SPP are:

- liveable communities and housing
- economic growth
- environment and heritage
- hazards and safety
- infrastructure.

Relevance to the Project

The Project is generally consistent with the outcomes sought by the SPP and, in particular, its potential to promote economic growth.

8.3.1.18 Transport Operations (Marine Pollution) Regulation 2008

Overview

This regulation sets out to protect Queensland's marine and coastal environment by managing and regulating deliberate and negligent discharges of ship-sourced pollutants into coastal waters.

Relevance to the Project

The dredging contractor will be responsible for ensuring that the operation of its vessel in Queensland waters complies with requirements set out the *Transport Operations (Marine Pollution) Regulation 2008*.

8.4 Regulatory Issues

The RDEIS for the Project was subject to the regulatory framework established under the SDPWO Act. The original 2012 project was declared a 'coordinated project' under Section 26(1)(a) of the SDPWO Act in September 2012. This declaration initiated the statutory environmental impact evaluation procedure of Part 4 of the SDPWO Act, which required the proponent to prepare an EIS for the project.

8.5 Approvals

The CGER clearly documents the approvals required by federal, state and local government for the Project to proceed. Table 8.1 summarises these approvals, along with those required to construct the delivery pipeline for dredge spoil and the DMPAs along with a description, relevant legislation and the assessment manager.

Legislation and policy requirements will be reviewed following completion of the DBC, and the final suite of approvals, permits and licenses shown may change.

Capital dredging required for widening and deepening the outer and inner channel and swing basin will require extensive approvals before works commence.

Table 8.1: Key Approvals Required for the Project before works commence

PROJECT COMPONENT	PERMIT / APPROVALS	LEGISLATION	ASSESSMENT MANAGER
COMMONWEALTH APPROVALS			
Whole of project	Controlled action	EPBC Act	DoEE
STATE APPROVALS			
Capital dredging to widen and deepen the Port of Cairns access channel (dredging, delivery, placement and tailwater management for soft and stiff clay in the DMPAs)	Environmental Authority for an environmentally relevant activity (ERA 16(1)(d) – dredging more than 1 000 000 t in a year)	EP Act Environmental Protection Regulation 2008	Department of Environment and Science (DES)
	Development permit for material change of use – ERA 16(1)(d) – dredging more than 1 000 000 t in a year	Planning Act Planning Regulation 2017 EP Act	CRC Port Authority Department of State Development, Manufacturing, Infrastructure and Planning (DSDMIP) – State Assessment Referral Agency (SARA)
	Quarry material allocation notice – removing material from State coastal land under tidal waters	Coastal Protection Act	DSDMIP/SARA
	State marine parks – permit to carry out works for dredging within the Trinity Inlet Segment of the GBRCMP to enlarge the shipping channel	Marine Parks Act	DES
STATE APPROVALS			
	Development permit for operational works – works completely within or partly within a declared FHA	Planning Act Planning Regulation 2017 Fisheries Act	DSDMIP/SARA
	Disturbance to marine plants (seagrass in dredge footprint)		
	Resource Allocation Authority	Fisheries Act	DAF

PROJECT COMPONENT	PERMIT / APPROVALS	LEGISLATION	ASSESSMENT MANAGER
Dredge material delivery pipeline and pump-out facility	Development permit for operational works – tidal works within a coastal management district	Planning Act Planning Regulation 2017 Coastal Protection Act	DSDMIP/SARA
	Development permit for operational works – clearing native vegetation	Planning Act Planning Regulation 2017 VM ACT	DSDMIP/SARA
	Development permit for operational works – works involving constructing or raising waterway barrier works	Planning Act Planning Regulation 2017 Fisheries Act	
	State marine parks permit to ▪ carry out works for sand scraping at the mouth of Richters Creek ▪ install and decommission, and to operate a temporary pipeline facility, the pump-out facility/dredge mooring facility and a temporary discharge pipe for waste within the Marlin Coast Segment of the GBRCMP	Marine Parks Act	DES
Tailwater discharge pipeline (Northern Sands)	Development permit for operational works for tidal works	Planning Act Planning Regulation 2017 Coastal Protection Act	DSDMIP/SARA
Whole of project	Approval of CHMP	ACH Act	DATSIP
Works on heritage place including demolition of Wharf 6	Development permit for building works	Planning Act Planning Regulation 2017 *Queensland Heritage Act 1992*	DSDMIP/SARA
State transport corridors (infrastructure-related referrals)	Works within state government-controlled road corridor	TI Act	DSDMIP/SARA DTMR
Assessable development within strategic port land	Advice/assessment against the TI Act and Ports North LUP	TI Act LUP	DSDMIP/SARA Ports North
LOCAL GOVERNMENT			
Barron Delta (Northern Sands DMPA)	Development permit for material change of use approval (for an Undefined Use under the CairnsPlan 2016) for placement of the dredge material	CairnsPlan 2016	CRC

PROJECT COMPONENT	PERMIT / APPROVALS	LEGISLATION	ASSESSMENT MANAGER
	Development permit for operational works – construction of pipeline and temporary bunds	CairnsPlan 2016	CRC
	Development permit for operational works – prescribed tidal works	CairnsPlan 2016	CRC

8.6 Other Legal Matters

8.6.1 Power to Impose Charges

Ports North may impose charges in accordance with the TI Act, Chapter 8 Port Infrastructure and other matters, Part 3A, Section 279 – Port authority may impose a charge. A port authority's proposed charges are subject to governmental review and approval.

8.6.2 Third Party Access Agreements and Regulations

Ports North is currently negotiating to enter into a commercial agreement with the owner of the Barron Delta DMPA (Northern Sands). The agreement will enable Ports North to:

- establish the DMPA
- operate the DMPA and place the dredge material in the quarry void
- manage the DMPA until the material has settled to levels which allow the removal of the temporary bunds and the return of the site to the owner or operator.

All affected land owners have provided their in-principle consent to Ports North to locate the dredge delivery pipeline through their private land.

CHAPTER 9
PUBLIC INTEREST CONSIDERATIONS

CHAPTER SUMMARY AND CONCLUSIONS:

- All public interest matters and associated mitigation measures identified in this chapter have previously been identified by Ports North. The key impacts relate to land access and social impacts.
- Public interest issues identified include:
  - perceptions of insufficient or biased stakeholder engagement processes
  - potential impacts to water quality during dredging, and consequent impacts to the livelihoods of personnel in the tourism, fishing and aquaculture sectors
  - potential impacts to local amenity values including accessibility, environmental quality and recreational amenity as a result of onshore works
  - potential impacts to community health and safety from air and noise emissions, improper management of contaminated marine sediments, increased transmission of infectious diseases, increased exposure to road safety risks and increased flooding hazards
  - general impacts such as groundwater impacts, cumulative impacts and soil quality and geotechnical quality.
- Mitigation measures have been proposed and committed to by Ports North.
- The Reference Project is expected to increase local employment and visitor expenditure, grow the tourism sector, improve cargo shipping efficiencies and embed greater resilience to extreme weather events in the port. It will also support the future expansion of the HMAS Cairns.

9.1 Purpose

This chapter documents the public interest considerations of the Project including:

- how the Reference Project will provide (perceived or real) equitable outcomes for all stakeholders
- how any potential negative impacts will be managed and, where possible, adjusted to mitigate risks or realise opportunities.

9.2 Community Consultation and Stakeholder Engagement

Stakeholder engagement allows potential impacts and opportunities to be identified, including public interest issues. Ports North engaged with stakeholders and community members during the preparation of the Draft EIS (from October 2012 to September 2014) and the RDEIS (from March 2016 to May 2017). Engagement focused on the people and groups with the greatest potential to be impacted by dredging to expand the shipping channel, as this is the major component of the Project. This included government departments and agencies, private sector operators, tourism bodies and non-government organisations with an interest in the marine environment and economic development.

Engagement activities were proposed for the Project at the outset of the EIS process and these continued throughout the development of the RDEIS. Key objectives for these activities were to:

- provide information about the EIS to relevant stakeholders and community members during the preparation of the EIS
- provide opportunities for interested people and groups to learn about the EIS as it progressed so they could make informed comments during the public notification period

- provide opportunities for Ports North to engage with people and groups to better understand the real and perceived impacts of the Project
- address consultation requirements of the Queensland Government's EIS terms of reference and the Australian Government's EIS guidelines.

9.2.1 Key Stakeholders Engaged

Key stakeholders engaged during the Project fell within one or more of the following categories:

- port users and tenants – those who currently use the Port of Cairns and will continue to do so during construction and operation of the expanded port
- local and regional communities – people who live and work within Cairns and the surrounding area
- Indigenous groups – groups with native title claims or expressions of interest in cultural heritage matters
- community and special interest groups – those who have a specific interest in an aspect associated with the Project such as environmental groups
- business and industry groups – groups who promote economic development and employment or operate businesses within the region
- decision-makers and influencers – those with the decision-making power or the ability to influence decisions such as Ports North, the Queensland Coordinator-General and other government departments and agencies.

Key stakeholders and other community and interest group were informed and engaged through the following:

- Approximately 60 meetings, briefings and workshops were held between March 2016 and May 2017 with stakeholders including federal, state and local government agencies, representatives from potentially impacted industries (such as fishing and tourism), Aboriginal and Torres Strait Islander organisations, non-government organisations and Ports North advisory groups and committees. Information was provided to, and sought from, participants about the Project.
- Individual meetings and discussions were held with interested parties who owned or leased land that may be affected during project works.
- Fact sheets about the Project and planning for the future of the Port of Cairns were distributed to stakeholders and made available on the Ports North website.
- The Queensland Treasurer released a media statement on 21 June 2016 announcing the Project.
- The Ports North website has included information for the community about the Project since June 2016, which is still available.
- A project display was staffed at the Cairns show for the distribution of fact sheets and interviews, with 250 attendees.
- An independent phone survey was undertaken with 300 people within the Cairns local government area.
- Project updates were disseminated via a dedicated website and media announcements.
- Ports North provided an email address and dedicated phone number for stakeholders to contact Ports North about the Project.

9.2.2 Social Licence Status

The stakeholder and community engagement conducted by Ports North resulted in overall positive attitude to the Project. Most stakeholders and the local community are keen to see the Project progress due to the economic benefits it will bring the region however, they acknowledge the importance of environmental protection. The recalibrated size of the Project, combined with the land placement of dredged material, was well received. Ports North believes the positive impact of the Project and positive reception by the community has provided a social licence to proceed with the Reference Project.

9.3 Impact on Stakeholders

The potential impacts on identified stakeholders, including individuals and communities, have been summarised in Table 2.

Table 2: Summary of Stakeholders and Impacts

STAKEHOLDERS	IMPACT
Wharf Street residents/tenants and moored boats	During wharf construction and dredging, Wharf Street residents and moored boats will potentially experience increased noise during standard operating hours and air quality impacts. The Project will increase cruise ship visits and visits by larger cruise ships to the Port of Cairns, which may also impact noise and air quality.
Tourism operators	Tourism operators will be provided with improved amenities and increased onshore visitors with a higher individual spend.
Aboriginal and Torres Strait Islander groups	The RDEIS identified negligible impacts from the proposed Tingira Street site capital dredging disposal. No other cultural heritage concerns have been identified.
Northern Sands	The quarry operators will receive the dredge material and will be compensated for providing an appropriate location. The dredge material will be used in the future by the quarry operator.
Cruise operators/passengers	Being able to access Trinity Inlet rather than having to tender at Yorkeys Knob will give cruise operators and passengers an improved experience. This will also improve passenger safety.
Commercial fishers/charter	Nil impact
Yorkeys Knob residents	Residents will benefit from less traffic due to decreased tendering, coaches and passenger transfers between Yorkeys Knob and Cairns.
Holloways Beach residents	Residents will experience some disruption during the duration of the placement of the pipeline and increased traffic during this time.
Recreation fishers	Access to the Holloways Beach boat ramp will be impacted for a number of days either side of the placement of the pipeline.

9.3.1 Social and Economic Impacts

The Reference Project is expected to increase local employment and visitor expenditure, grow the tourism sector, improve cargo shipping efficiencies and embed greater resilience to extreme weather events in the port. It will also support the future expansion of the HMAS Cairns.

The Project will be implemented in keeping with the requirements of the Queensland Procurement Policy 2017, ensuring the majority of employees will be sourced from within the regional area. A small proportion of highly specialised workers will be sourced from elsewhere in Queensland or internationally, as required.

The Project will deliver social benefits including less coaches on the road between Yorkeys Knob and Cairns, an increase in potential customers for tourism operators and local businesses and easier access for some residents to their properties.

Issues raised during stakeholder engagement and submissions received on the EIS documents identified the following key issues relating to social matters:

- potential impacts to water quality during dredging, and consequent impacts to the livelihoods of personnel in the tourism, fishing and aquaculture sectors
- potential impacts to local amenity values including accessibility, environmental quality and recreational amenity as a result of onshore works
- potential impacts to community health and safety from air and noise emissions, improper management of contaminated marine sediments, increased transmission of infectious diseases, increased exposure to road safety risks and increased flooding hazards
- general impacts such as groundwater impacts, cumulative impacts and soil quality and geotechnical quality.

The CGER considered the engagement for the EIS to be adequate, however noted the concern regarding the Project with various groups including some potentially affected stakeholders in the local community and other special interest group. Two conditions imposed by the Coordinator-General to ensure future engagement activities are effective and responsive to stakeholder concerns are outlined below.

Ports North has committed to providing timely notification to directly impacted stakeholders regarding forthcoming project activities, particularly those that may impede access to or utilisation of public or private land (for example due to establishment of the dredge pipeline and pumping stations).

Ports North has received in-principle approval from landowners whose properties cross the six parcels of land that may be impacted by the temporary dredge delivery pipeline. Ports North has also committed to consulting with the Holloways Beach Environmental Education Centre to develop strategies to reduce potential impacts on centre operations during peak usage times. Ports North also has in-principle approval for the pipeline corridor accessing land owned by the CRC and for access to the Captain Cook Highway.

Ports North has committed to receiving feedback on mitigation strategies through engagement with existing advisory groups and committees, including the TACC, ports advisory group and local marine advisory committee (the latter is chaired by GBRMPA). It will also establish an expert advisory panel, a project management committee and a regulatory oversight committee to support the delivery of the Project.

The Coordinator-General has imposed two conditions regarding social impacts:

- Condition One – Ports North must submit, at least three months prior to construction, a community and stakeholder engagement plan to the Coordinator-General for approval. This condition will ensure that community and stakeholder interests in the Project are clearly identified and effectively managed and that impact mitigation strategies are updated and adapted in response to stakeholder feedback.
- Condition Two – Ports North must provide a social impact management report to the Coordinator-General for approval annually, for a period of three years starting from the commencement of construction. The purpose of this condition is to report on the implementation of measures to mitigate social impacts during the construction of the Project.

9.3.2 Access or Use Changes

As noted in Chapter 6: Reference Project, the Project will improve port resilience to severe weather events. Access to the Trinity Inlet channel will not be impacted during dredging as the dredge operators will work around any vessel arrivals or departures. Access at the DMPA pipeline locations will not cause any access issues. Approval for a material change of use will need to be sought by the Northern Sands quarry operator for the period of the spoil pumping. After the pumping is completed, the quarry operator will revert to operating under an updated EMP, which the operator will need to complete. Refer to Chapter 11: Social Impact Evaluation for further detail.

9.4 Public Access and Equity

Public access and equity is about ensuring that all groups within society can effectively realise the expected benefits of the investment.

Port charges are established through the port pricing review process, which is then subject to review and approval by the shareholding Ministers.

As the major goal of the Project is to encourage and facilitate growth in the cruise ship industry and visitation to Cairns, the major benefits will flow to community members, and the broader state, through increased visitor expenditure and servicing of the visiting ships (such as provisioning and fuel). Expanding the port's berthing for cruise ships will improve access and equity for all passengers. As an example, transfer by tender can be problematic for mobility and vision-impaired patrons.

9.5 Consumer Rights

There are no consumer rights issues (right to safety and right to be informed) associated with the Reference Project that have been identified.

9.6 Safety and Security

The Port of Cairns is a regulated port under the *Maritime Transport Safety and Offshore Facilities Security Act 2003*.

A security plan for the regulated port is in place and there are specific requirements for all users of the port to comply under this plan. Regulated ship security requires all regulated vessels to be berthed at wharves secured by maritime security zones. Access is restricted to persons having business on board or bona fide visitors.

There are no anticipated changes to this arrangement as a result of the Reference Project.

The proposed widening and deepening of the existing channel will enhance navigational safety for vessels already visiting the Port of Cairns by providing additional safety margins while manoeuvring, additional under keel clearance and reduced operational restrictions based on tidal fluctuations.

In addition, the proposed wharf upgrade will improve fender performance (equipment used to prevent ships colliding against the dock), further reducing the potential for berthing mishaps to cause damage to the infrastructure or the berthing ship.

The Reference Project will also improve safety for cruise passengers and crew who no longer require tendering and bus transfers.

No issues have been identified in relation to the privacy of individuals in relation to Project.

CHAPTER 10
SUSTAINABILITY ASSESSMENT

CHAPTER SUMMARY AND CONCLUSIONS:

- An assessment was undertaken to identify the sustainability considerations relevant to the Reference Project to understand and, where possible, avoid or mitigate immediate and long-term impacts. It drew on analysis undertaken for this DBC including, but not limited to, the economic analysis, environmental assessment and social impact evaluation.
- The sustainability assessment considered the Reference Project against sustainability principles identified in Building Queensland's BCDF that cover the themes of governance, environment, social and economic. Each sustainability principle was rated according to the five-scale rating criteria set out in the BCDF, with nine outcomes receiving a Moderate rating and eight receiving a basic rating.
- The environmental principles of ecology and water management were rated as Basic, meaning the Project avoids harm and that solutions adopted in these areas create project efficiencies. The principle of leadership, knowledge sharing and innovation was also rated as Basic, along with the principle of procurement and supply chain.

PRINCIPLE	RATING	COMMENTS
Context	Moderate	While the main purpose of the Reference Project is to take advantage of cruise shipping opportunities, it also offers significant other benefits to non-cruise forms of shipping including existing cargo, freight and navy activities. It has potential to benefit the local, regional and broader Queensland economies through increased tourism and business opportunities.
Strategic planning	Moderate	In the context of the strategic goals and objectives and the longer-term service need, an options analysis was conducted to determine the Reference Project for the DBC. The original options analysis was conducted for the Draft EIS in 2014 and was refined further for the RDEIS and this DBC
Leadership, knowledge sharing and innovation	Basic	Ports North has a history of sound environmental practice, with policies, processes and frameworks to minimise potential environmental impacts of operations. Ports North also encourages good practice by port users, tenants and other stakeholders.
Procurement and supply chain	Basic	Ports North's existing procurement processes require environmental protection to be considered during design, implementation and management of project works. Similarly, Ports North requires ecologically sustainable development to be embraced at all stages of project development, from concept design through design and construction and ultimately to long-term operations.
Material use	Basic	Ports North's existing procurement processes require environmental protection to be considered during design, implementation and management of project works. Similarly, Ports North also requires ecologically sustainable development to be embraced at all project stages. However, the location of the site and the specialist skills required of suppliers, together with financial feasibility, will also dictate procurement strategies.
Climate-change mitigation	Basic	Ports North's existing procurement processes also require environmental protection to be considered during design, implementation and management of project works. Similarly, Ports North also requires ecologically sustainable development to be embraced at all project stages. However, the location of the site and the specialist skills required of suppliers, together with financial feasibility, will also dictate procurement strategies.
Water management	Basic	The Reference Project is not a highly intensive water use project. Water use will be limited during construction and negligible during operations

PRINCIPLE	RATING	COMMENTS
Resource recovery	Basic	The EIS identified potential impacts and mitigation measures associated with the type, quantity and nature of waste that may be generated by the Reference Project during both construction and operation. The soft dredge material will be placed in an existing sand quarry, which will reduce future remediation costs of the site for the existing owner. The hard dredge material will be used to surcharge an existing Ports North land holding in Tingira Street
Land selection	Moderate	The Reference Project is essentially the upgrading of existing infrastructure including the existing shipping channel.
Ecology	Basic	Based on the findings of the impact assessment and given implementation of the EMP and offsets proposals, it is considered by the Coordinator-General that the Reference Project can be undertaken without unacceptable environmental impacts.
Employees	Moderate	The CGER includes a commitment by Ports North to work with its contractors to encourage local employment and supply opportunities. Ports North recognises it has a role to play in developing employment, training and supply opportunities for local people.
Social return	Advanced	Social outcomes will be improved through direct employment opportunities during construction and operation, increased demand for local businesses through project procurement, increased cruise liner vessels through a better port experience and access, improved opportunity for local tourism businesses and a reduction in road traffic between Yorkeys Knob and Cairns will provide increased safety, reduced travel time for cruise passengers and reduced stress for passengers and tourist bus drivers.
Community and Stakeholders	Moderate	Ports North (PN) engages with its stakeholders on an ongoing basis through a number of different fora. Project Specific consultation and engagement has been ongoing throughout the original and revised EIS processes and PN engaged with a wide range of stakeholders and community members during this time.
Heritage	Moderate	Locations within, and near, the Reference Project contain values that constitute cultural heritage as defined in the ACH Act. Ports North has extensive experience in the long-term maintenance and adaptive re-use of heritage structures such as the multi-award-winning Cairns Cruise Liner Terminal.
Equity	Moderate	The charging of published pricing for use of the new port facilities will ensure equity across users. This enables cruise liner operators to plan in to the future itineraries that would utilise the new facilities and is a user-pays system. Improved access for people with mobility issues resulting from reduced tender usage. Changes to Port charges are subject to government approval.
Whole-of-life impacts	Moderate	The Reference Project has been designed and planned considering environmental and socio-economic protections for future generations, as shown through the management and mitigation measures provided in the RDEIS. These measures seek to ensure the Reference Project will not reduce or degrade the health, diversity and productivity of the environment or adversely affect current and future generations.
Valuing Externalities	Moderate	Material externalities considered include short-term environmental impacts such as the quality of water being discharged into the Barron River and ultimately into the GBRWHA, due to placement of dredged material on land, improvements in regional connectivity through the development of integrated cruise itineraries as a result of improved infrastructure delivered by the Reference Project, wider flow-on benefits to the tourism industry regionally, benefits to regional and international trade and jobs growth locally and regionally, a social externality of safety (less coaches travelling from Yorkeys Knob to Cairns city) and air pollution from increased cruise liners.

10.1 Purpose

The Infrastructure Sustainability Council of Australia (ISCA) defines infrastructure sustainability as 'Infrastructure that is designed, constructed and operated to optimise environmental, social and economic outcomes in the long term'.

Sustainability assessment supports an understanding of the economic, social and environmental impacts of a project, providing an overall assessment of its sustainability impact. Building Queensland's assessment tool was developed by ISCA and is based on ISCA's Infrastructure Sustainability Rating Scheme themes and categories.

Outcomes of the sustainability assessment conducted for this DBC are incorporated into the Reference Project's implementation strategy, and economic, social impact and financial analyses.

10.2 Approach

A sustainability assessment should be considered up-front and undertaken in conjunction with the risk assessment as it will influence the understanding and assessment of project risk.

The sustainability assessment for the Reference Project was undertaken using Building Queensland's sustainability assessment tool. The tool considers 19 principles across the areas of governance, environment, social and economic set out in Table 10.1. Each principle is then rated using the rating scale set out in Table 10.2. An assessment guideline provides a description of the principles and guiding questions that assisted with determining the rating.

The sustainability assessment approach was based on the RDEIS published in August 2017.

Table 10.1: Sustainability Assessment Principles

PRINCIPLES FOR SUSTAINABILITY ASSESSMENTS			
GOVERNANCE	ENVIRONMENT	SOCIAL	ECONOMIC
Context Leadership Sustainable procurement Resilience Innovation	Energy and carbon Natural hazards Green infrastructure Pollution Resource recovery Water Materials Ecology	Stakeholder engagement Cultural consideration Heritage Workforce	Business case Benefits realisation

Table 10.2: Sustainability Assessment Rating

SUSTAINABILITY ASSESSMENT RATING	
LEVEL	**CRITERIA**
Advanced	▪ Generates significant additional value and new opportunities not previously evident, such as changing a liability into an asset ▪ 'Designs out' the problem up-front rather than relying on managing impacts later ▪ Solutions generate flow-on benefits outside the project boundary
Moderate	▪ Solutions to significant issues result in multiple benefits through economic, social and/or environmental outcomes ▪ Meets immediate community and user needs and will be resilient and efficient into the future ▪ Significant innovation and leading practice incorporated into the project
Basic	▪ Avoids harm and negative effects ▪ Solutions create project efficiencies ▪ Solutions have an immediate or short-term focus
Compliant	▪ Meets legislative and regulatory requirements
Poor	▪ Fails to meet legislative and regulatory standards ▪ Solutions may result in disbenefits and negative effects

It is assumed that all projects will meet this level. Sustainable solutions are therefore expected to go beyond legislative and regulatory compliance.

10.3 Sustainability Assessment Results

The outcomes of the sustainability assessment for the Reference Project are shown in Table 10.3.

Table 10.3: Sustainability Assessment

SUSTAINABILITY ASSESSMENT	
DEMONSTRATE HOW THE PROJECT FULFILS THE FOLLOWING SUSTAINABILITY PRINCIPLES	ACHIEVEMENT LEVEL OF THE PRINCIPLE: Advanced, moderate, basic, compliant or poor
GOVERNANCE	
1. Context All infrastructure projects sit within a broader context and should be planned, designed and operated to connect with the wider system (including other infrastructure, economic activity, landscapes, population hubs and movements, flows of resources, materials, goods and people). This could occur at neighbourhood, town, city, region or state scales.	Moderate
While the main purpose of the Reference Project is to take advantage of cruise shipping opportunities, it also offers significant other benefits to non-cruise forms of shipping including existing cargo, freight and navy activities. It has potential to benefit the local, regional and broader Queensland economies through increased tourism and business opportunities. ▪ Expanding Cairns' cruise ship facilities is an important step in growing FNQ's tourism sector and cruise shipping operations in Queensland. The Project will enable Cairns to capture a larger share of the growing cruise shipping market, particularly the emerging mega class market, and secure associated economic benefits. More cruise vessels, and larger cruise vessels visiting the Port of Cairns will lead to more onshore visitors and higher incremental spends per visitor. This would support the general expansion of FNQ's cruise industry and open up opportunities for itinerary development with other ports, bringing growth, stability and diversity to the Cairns tourism market sector. ▪ Cruise shipping is the fastest growing tourism market worldwide. Globally, cruise ship operators are moving towards larger sized ships, which are generally unable to access the Port of Cairns. With existing channel constraints, the region will be unable to take full advantage of the growth potential and economic value of the cruise shipping industry. It is anticipated that without the Project, future cruise shipping industry growth will be constrained due to the inability of existing infrastructure to cater for mega class vessels. This will not only impact Cairns but other destinations on the Queensland cruise itinerary. ▪ The Reference Project will support the planned $635 million expansion of HMAS Cairns by relocating the existing cargo swing basin used by navy vessels. A wider, deeper channel will also enable the navy's largest ships to berth in Cairns and the navy base to host larger foreign navy ships. ▪ The wider and deeper channel will reduce current tidal and loading restrictions on bulk cargo ships accessing the Port of Cairns, thereby improving port efficiency. It will increase the port's resilience to extreme weather events.	

SUSTAINABILITY ASSESSMENT	
DEMONSTRATE HOW THE PROJECT FULFILS THE FOLLOWING SUSTAINABILITY PRINCIPLES	ACHIEVEMENT LEVEL OF THE PRINCIPLE: Advanced, moderate, basic, compliant or poor
2. Strategic Planning Design infrastructure as the solution to the identified service need, taking into consideration the strategic goals and objectives. Focus on longer term use and outcomes so that the infrastructure leaves a positive legacy. Consider adaptability to respond to future changes, challenges and trends.	Moderate

- In the context of the strategic goals and objectives and the longer-term service need, an options analysis was conducted to determine the Reference Project for the DBC. The original options analysis was conducted for the Draft EIS in 2014 and was refined further for the RDEIS and this DBC.
- Following completion of the Draft EIS, a number of circumstances changed and the Project was recalibrated to include:
  - alterations to the dimensions of the proposed widening and deepening of the shipping channel and Crystal Swing Basin
  - relocation of the cargo shipping swing basin upstream of the existing Main Swing Basin
  - land-based rather than marine disposal of dredged material
  - reduced quantities of anticipated dredged material.
- Recalibration of the Project was also undertaken to align it more closely to federal and state government goals and strategic objectives, including:
  - Reef 2050 Plan
  - Northern Australia White Paper
  - Defence White Paper
  - Queensland Government objectives for the community
  - Maintenance Dredging Strategy
  - Queensland Government plans including the FNQRP, ANQP and SIP
  - CairnsPlan 2016.
- Recalibration of the Project was particularly critical to ensure compliance with the Reef 2050 Plan's preservation blueprint for the Great Barrier Reef and ban on disposing capital dredging material in the GBRMP.
- The Reference Project supports the future, long-term use of the Port of Cairns by enabling it to adapt and be more flexible to the growing demand of larger cruise ships.

SUSTAINABILITY ASSESSMENT	
DEMONSTRATE HOW THE PROJECT FULFILS THE FOLLOWING SUSTAINABILITY PRINCIPLES	ACHIEVEMENT LEVEL OF THE PRINCIPLE: Advanced, moderate, basic, compliant or poor
3. Leadership, Knowledge Sharing and Innovation The leadership team is responsible for implementing, measuring and reporting on the sustainability performance as well as creation of a culture of innovation and knowledge sharing.	Basic
▪ Ports North has a history of sound environmental practice, with policies, processes and frameworks to minimise potential environmental impacts of operations. Ports North also encourages good practice by port users, tenants and other stakeholders. ▪ Ports North's approach to environmental management ensures regulatory compliance and effective community and stakeholder engagement. Ports North maintains compliance with all environmental approvals applicable to the port's operations, including deliverables required under conditions of such permits and licences. ▪ Ports North works closely with state and national port environmental working groups, and various government agencies including the GRMPA. ▪ Ports North was a founding partner of the first Wet Tropics Healthy Waterways Report Card released in late 2016, and has contributed to actions under the Reef 2050 Plan applicable to ports within the Great Barrier Reef region. These included the Reef 2050 Advisory Committee, Maintenance Dredging Strategy and actions related to port planning, maintenance and operation. ▪ Ports North is committed to engaging with the community and stakeholders, particularly regarding major projects. Recent community engagement activities include involvement with the Ports North Environment Awards for FNQ secondary school students through the Business Liaison Association, continued sponsorship of the Crown of Thorns Starfish removal program as well as the ongoing support to the Turtle Rehabilitation Centre, and active participation in the Local Marine Advisory Committee. ▪ Ports North operates under an environmental management system that is consistent with the International Standard ISO 14001. This means that environmental considerations are incorporated into day-to-day operations, with a focus on continual improvement. ▪ The Ports North Board of Directors has documented responsibilities including long-term planning and risk management to ensure sustainable ongoing operations.	
4. Procurement and Supply Chain Procurement activities are responsible and they consider human rights, society and the environment.	Basic
▪ Ports North's existing procurement processes require environmental protection to be considered during design, implementation and management of project works. Similarly, Ports North requires ecologically sustainable development to be embraced at all stages of project development, from concept design through design and construction and ultimately to long-term operations. ▪ The Project will be implemented in keeping with the requirements of the Queensland Procurement Policy 2017, ensuring the majority of employees will be sourced from within the regional area. A small proportion of highly specialised workers may be sourced from elsewhere in Queensland or internationally, as required. ▪ However, the location of the site and the specialist skills required of suppliers, together with financial feasibility, will also dictate procurement strategies.	

SUSTAINABILITY ASSESSMENT	
DEMONSTRATE HOW THE PROJECT FULFILS THE FOLLOWING SUSTAINABILITY PRINCIPLES	ACHIEVEMENT LEVEL OF THE PRINCIPLE: Advanced, moderate, basic, compliant or poor
ENVIRONMENT	
5. Material Use Materials used on the project have a low lifecycle impact and low toxicity.	Basic
▪ Ports North's existing procurement processes require environmental protection to be considered during design, implementation and management of project works. Similarly, Ports North also requires ecologically sustainable development to be embraced at all project stages. However, the location of the site and the specialist skills required of suppliers, together with financial feasibility, will also dictate procurement strategies. ▪ Project materials will be re-used and re-purposed, where possible. For example, soft clay placed at the Northern Sands DMPA will contribute to the eventual remediation of the site. ▪ Materials and equipment will be sourced from the closest possible location, when feasible, to reduce the need for transportation of materials over long distances. ▪ Contracts will include energy-efficiency clauses in all equipment, machinery and vehicle tender specifications. ▪ The bulk of the material dredged from the site will be used for fill and eventual re-use. The channel has an indefinite design life if properly maintained and has low ongoing environmental impact. ▪ The deck fabric and pile elements within Wharf 6 may be retained in situ and used for heritage interpretation. If this proves unfeasible, they be relocated elsewhere within the wharf complex (or nearby). Prior to the demolition of Wharf 6, a photographic archival record of the feature will be made, consistent with the requirements of the Queensland Government's Archival Recording of Heritage Places guideline. Digital photographic recording (as opposed to, for example, measured drawings) would be sufficient.	
6. Climate-Change Mitigation The project will mitigate climate change through identifying an infrastructure solution to reduce global carbon emissions.	Basic
▪ Reduced coach traffic on the road between Yorkeys Knob and Cairns (due to less tendering and transferral of passengers) will reduce GHG emissions, however overall emissions will increase due to the increase in cruise ship calls anticipated in the future. ▪ The environmental impact assessment for the Project found it is not expected to measurably contribute to climate change. While the GHG emissions anticipated from construction of the Project (22.95 ktCO2-e) do not trigger reporting requirements under the NGER Act, measures such as training drivers in fuel-efficient practices will aid in reducing predicted GHG levels. ▪ Ports North is committed to re-using construction materials where practicable (see above), which is consistent with minimising the Project's climate change impact. ▪ In addition, potential climate hazards have been addressed through design, construction scheduling and measures within the Project EMP. ▪ Ports North's existing procurement processes also require environmental protection to be considered during design, implementation and management of project works. Similarly, Ports North also requires ecologically sustainable development to be embraced at all project stages. However, the location of the site and the specialist skills required of suppliers, together with financial feasibility, will also dictate procurement strategies. ▪ The Project will improve the port's resilience extreme weather events and improves the efficiency of the cruise shipping and export sectors in Cairns.	

SUSTAINABILITY ASSESSMENT	
DEMONSTRATE HOW THE PROJECT FULFILS THE FOLLOWING SUSTAINABILITY PRINCIPLES	ACHIEVEMENT LEVEL OF THE PRINCIPLE: Advanced, moderate, basic, compliant or poor
7. Water Management Managing water consumption and discharge according to local conditions now and in the future.	Basic
▪ The CGER identifies water quality and drainage into Trinity Inlet and at the Northern Sands DMPA site to be key concerns during construction. Filling the void at the Northern Sands quarry provides a good use of the soft material dredged. The site was selected ahead of many alternatives using a thorough assessment of land options. Ports North has assessed the void as having sufficient capacity to accommodate PASS materials and materials will remain below the water table. The site has also been assessed as suitable to accept 900,000 cubic metres (in situ volume in the channel) and the water introduced as part of the dredging and pumping process to the site. A bund wall will be constructed to achieve the required volume. ▪ Spill of dredge material or pipeline failure poses the greatest risk to water quality from construction of the delivery pipeline. However, the potential risk is short-term and negligible. ▪ Water will not be discharged into sensitive environments following construction of the Reference Project (that is, during operations). ▪ The Reference Project is not a highly intensive water-use project. Water use will be limited during construction and negligible during operations.	
8. Resource Recovery Reducing waste generated and increasing re-use in construction and operation.	Basic
▪ The EIS identified potential impacts and mitigation measures associated with the type, quantity and nature of waste that may be generated by the Reference Project during both construction and operation. The soft dredge material will be placed in an existing sand quarry, which will reduce future remediation costs of the site for the existing owner. The hard dredge material will be used to surcharge an existing Ports North land holding in Tingira Street. ▪ Ports North will continue to work with booking agencies to promote opportunities to improve waste management for cruise ship-generated wastes. ▪ Internationally recognised signs (e.g. ISO signage) will be used to aid international visitors and crew to meet government requirements for their waste and to prevent mixing.	
9. Land Selection The project is located on previously disturbed land and limits impacts to local habitat.	Moderate
▪ The Reference Project primarily involves upgrading existing infrastructure including the existing shipping channel. ▪ Potential habitat impacts both in the channel and at the disposal site have been considered by the environmental impact assessment. Construction of the delivery pipeline may affect mangroves and a melaleuca wetland. Environmental permits for clearing will be obtained as required and impacts will be avoided as much as possible by refining the pipeline route. Vegetation cleared for the delivery pipeline will be rehabilitated once the pipeline has been decommissioned. ▪ Mitigation strategies and offsets have been committed to by Ports North. The soft dredge material will be placed in an existing sand quarry and the hard dredge material will be used to surcharge an existing Ports North land holding in Tingira Street, which avoids the disposal offshore.	

SUSTAINABILITY ASSESSMENT	
DEMONSTRATE HOW THE PROJECT FULFILS THE FOLLOWING SUSTAINABILITY PRINCIPLES	ACHIEVEMENT LEVEL OF THE PRINCIPLE: Advanced, moderate, basic, compliant or poor
10. Ecology The local and regional habitat and ecology will be enhanced.	Basic
▪ As detailed in Chapter 12: Environmental Assessment, the Reference Project will impact MNES, including: – habitat for the beach stone-curlew and at the mouth of Richters Creek and Tingira Street – management of the existing marine ecology of Trinity Inlet and Bay and surrounds including seagrass – weed management within Northern Sands area and Tingira Street (terrestrial ecology). ▪ Based on the findings of the environmental impact assessment and given implementation of the EMP and offsets proposals, the Coordinator-General considers that the Reference Project can be undertaken without unacceptable environmental impacts.	
11. Green Infrastructure Traditional infrastructure is replaced with natural processes to do the same job. The term 'green infrastructure' refers to an interconnected network of landscape assets that is intertwined with engineered (grey) infrastructure and buildings (all the natural, semi-natural and artificial networks of multi-functional ecological systems within, around and between urban areas) at all spatial scales.	Not applicable
12. Sustainable Procurement Supporting and improving the lives of all employees, including subcontractors of the infrastructure project.	Basic
▪ See content contained under Procurement and Supply Chain above. ▪ Ports North's commitment to ecologically sustainable development is evidenced in corporate documentation, principally the Environment Policy. Ecologically sustainable development must be embraced at all stages of project development, from concept design through design and construction and ultimately to long-term operations. Works should be undertaken in a manner that minimises the ecological impact and be compliant with the Sustainable Development Code and Policy. The code sets the minimum standards that apply on Ports North's land and the policy provides further initiatives that may be implemented where relevant. ▪ The project procurement plan will consider opportunities to engage local businesses to provide services to the Project, in keeping with the Queensland Procurement Policy 2017. ▪ Ports North's LAPs include codes used to assess development proposals within the Cityport and Seaport areas. Ports North encourages advanced sustainable development beyond the requirements of the Sustainable Development Code, including best-practice sustainable operational management ▪ The Sustainable Development Policy supports the Sustainable Development Code by providing additional information and options to encourage ecologically sustainable development within Cityport and Seaport.	
13. Employees Supporting and improving the lives of all employees, including subcontractors of the infrastructure project.	Moderate
▪ The CGER includes a commitment by Ports North to work with its contractors to encourage local employment and supply opportunities. Ports North recognises it has a role to play in developing employment, training and supply opportunities for local people. As relevant, Ports North will work with its contractors to develop these opportunities during construction, focusing on skills development for school leavers, women, Indigenous people and unemployed/underemployed people. During construction and operation, where relevant, Ports North will also encourage the organisation and its contractors to develop strategies to assess the capacity and cost effectiveness of sourcing goods and services from the regional and wider state economy.	

SUSTAINABILITY ASSESSMENT	
DEMONSTRATE HOW THE PROJECT FULFILS THE FOLLOWING SUSTAINABILITY PRINCIPLES	ACHIEVEMENT LEVEL OF THE PRINCIPLE: Advanced, moderate, basic, compliant or poor
SOCIAL	
14. Social Return The project will have a positive social return on investment meaning that for every dollar spent, there will be more than one dollar of social outcomes.	Advanced
▪ Social outcomes will be improved through: – direct employment opportunities during construction and operation – increased demand for local businesses through project procurement – increased cruise liner vessels through a better port experience and access – improved opportunity for local tourism businesses – a reduction in road traffic between Yorkeys Knob and Cairns, resulting in increased safety, reduced travel time for cruise passengers and reduced stress for passengers and tourist bus drivers.	
15. Community and Stakeholders Understanding and incorporating community and stakeholder views including marginalised and affected groups to increase the social license to operate.	Moderate
▪ Ports North conducts ongoing engagement with the community and its stakeholders. ▪ Project-specific consultation and engagement has been undertaken for many years, specifically to support the environmental impact assessment process. Ports North engaged with a wide range of stakeholders and community members during the preparation of the Draft EIS and RDEIS. Engagement activities focused on the people and groups with the greatest potential to be impacted by the Project, included landowners, local residents, government departments and agencies, private sector operators, tourism bodies and non-government groups with an interest in the marine environment and economic development. ▪ Ports North has received in-principle approval from landowners whose properties may be impacted by the temporary dredge delivery pipeline, and it is committed to further consultation and negotiation with these landowners to obtain agreement on matters such as the final pipeline route and compensation. ▪ Ports North has also committed to receiving feedback on mitigation strategies through engagement with existing advisory groups and committees, and to establishing an expert advisory panel, a project management committee and a regulatory oversight committee to support delivery of the Project. ▪ The CGER requires Ports North to continue community and stakeholder engagement for the duration of the Project. A community and stakeholder engagement plan must be submitted prior to construction, which will provide the practical framework delivering ongoing engagement activities, including engagement with the Project's advisory panels and committees. ▪ Communication and engagement strategies will utilise a range of channels to ensure all relevant stakeholders have the opportunity to engage with the Project and are adequately informed. ▪ Ports North has committed to providing timely notification to directly impacted stakeholders regarding forthcoming project activities. ▪ Ports North has also committed to reviewing the existing community complaints management process to ensure that complaints received are appropriately investigated and, if necessary, actioned. ▪ The Reference Project will leave a community legacy by enabling the region to capitalise on expansion opportunities for cruise and non-cruise shipping. Port resilience to extreme weather will also be improved.	

SUSTAINABILITY ASSESSMENT	
DEMONSTRATE HOW THE PROJECT FULFILS THE FOLLOWING SUSTAINABILITY PRINCIPLES	ACHIEVEMENT LEVEL OF THE PRINCIPLE: Advanced, moderate, basic, compliant or poor
16. Heritage Protecting Indigenous and non-Indigenous heritage and sites highly valued by the community.	Moderate
▪ Locations within, and near, the Reference Project contain values that constitute cultural heritage as defined in the ACH Act. Ports North has extensive experience in the long-term maintenance and adaptive re-use of heritage structures such as the multi-award-winning Cairns Cruise Liner Terminal. ▪ There is potential to disturb identified cultural heritage that lies within areas where infrastructure is to be constructed or dredging is to occur. ▪ Future development applications for the heritage-listed Cairns Wharf Complex will include a heritage impact assessment and conservation management plan, and an archaeologist will monitor excavations near the 1940s multicultural camp, old Malay town, to preserve items of cultural heritage. ▪ A maritime archaeologist will be engaged to identify and preserve any potential historic shipwrecks in the area, which could include the Adieu, Mary and Miro. ▪ Constructing the delivery pipeline across Richters Creek may uncover Aboriginal artefacts or cultural heritage places. The CEMP will ensure adequate measures are undertaken to identify and manage potential impacts to Aboriginal and Torres Strait Islander cultural heritage places and artefacts. CHMPs will be developed with relevant and endorsed Aboriginal and Torres Straight Island peoples. Precautionary measures such as surveying the proposed delivery pipeline corridor before works begin will be also undertaken. Engagement between Ports North and relevant Aboriginal and Torres Strait Islander parties will continue in order to develop the CHMPs. ▪ Suitably qualified archaeologists will be engaged to archive, monitor and, measure and archive work during construction.	
ECONOMIC	
17. Equity Share the benefits and costs of infrastructure development in a fair and equitable way.	Moderate
▪ The charging of published pricing for use of the new port facilities will ensure equity across users. This enables cruise liner operators to plan in to the future itineraries that would utilise the new facilities and is a user-pays system. ▪ Improved access for people with mobility issues resulting from reduced tender usage. ▪ Changes to Port charges are subject to government approval.	
18. Whole-of-Life Impacts Making decisions based on the whole-of-life impacts and benefits of a project.	Moderate
▪ The Project has been reduced in scale in response to legislative and regulatory change and is in accordance with all legislation and government policies such as the SPD Act and the Reef 2050 Plan. ▪ The Reference Project has been designed and planned considering environmental and socio-economic protections for future generations, as shown through the management and mitigation measures provided in the RDEIS. These measures seek to ensure the Reference Project will not reduce or degrade the health, diversity and productivity of the environment or adversely affect current and future generations. ▪ A whole-of-life financial and economic appraisal of the Reference Project (against the Base Case) has been completed as part of this DBC.	

SUSTAINABILITY ASSESSMENT	
DEMONSTRATE HOW THE PROJECT FULFILS THE FOLLOWING SUSTAINABILITY PRINCIPLES	ACHIEVEMENT LEVEL OF THE PRINCIPLE: Advanced, moderate, basic, compliant or poor
19. Valuing Externalities Putting a value on material externalities and incorporating them into the decision-making process.	Moderate

- As noted above, the CBA considered all measurable and material benefits and costs attributable to the Reference Project to inform the decision-making process. Material externalities considered include:
  - short-term environmental impacts such as the quality of water being discharged into the Barron River and ultimately into the GBRWHA, due to placement of dredged material on land
  - improvements in regional connectivity through the development of integrated cruise itineraries as a result of improved infrastructure delivered by the Reference Project
  - wider flow-on benefits to the tourism industry regionally, benefits to regional and international trade and jobs growth locally and regionally
  - a social externality of safety (less coaches travelling from Yorkeys Knob to Cairns city)
  - air pollution from increased cruise liners.

CHAPTER 11
SOCIAL IMPACT EVALUATION

CHAPTER SUMMARY AND CONCLUSIONS:

- A social impact evaluation (SIE) was undertaken to assess the Project's potential social, economic and environmental impacts, and the measures proposed to avoid, manage, mitigate or offset predicted impacts.
- The study area considered by the SIE is defined as the area in which the social values and characteristics of the community may change as a result of the Project.
- Key social impacts evaluated included improvements to cruise passenger safety and experience, improved liveability for residents and users of the road corridor from Yorkeys Knob to Cairns City and increased employment, which has flow-on effects to community health and wellbeing, additional visitor spend, stability of local small businesses and translates into intergenerational benefits.
- Through a qualitative risk assessment, the SIE identified significant positive social impact (likelihood and consequence) as a result of the Project, particularly through increased employment and business opportunities. However, there remains a degree of concern among various groups, including some potentially affected stakeholders within the local community and other special interest groups.
- The Coordinator-General requires Ports North to develop a community and stakeholder engagement plan for approval at least three months before construction commences.

11.1 Purpose

This chapter documents the anticipated social impacts (both positive and negative) of the Project. The SIE complements the economic assessment, ensuring the social value of the Project and any non-monetised impacts are appropriately accounted for in the overall evaluation.

This chapter should be read in conjunction with Chapter 5: Base Case, which details the project baseline and Chapter 13: Economic Analysis, which provides further assessment on impacts that have been identified as quantifiable and/or monetisable.

11.2 Approach

The SIE is based on the outcomes of the social impact assessment (SIA) undertaken in 2017 as part of the RDEIS. The SIA was undertaken in accordance with the terms of reference issued by the Queensland Coordinator-General dated 30 November 2012 and the EIS guidelines issued by DoEE and the Department of Sustainability, Environment, Water, Population and Communities dated 21 March 2013.

The SIA Report, RDEIS Report and subsequent CGER have all informed the development of the SIE. This was supplemented by a review of the outcomes of targeted localised consultation undertaken by Ports North.

The social context, baseline description, social attributes and benefits detailed in the SIE were developed through a series of interviews, workshops, desktop studies and secondary research. Significant community and industry consultation has been undertaken for the Project as the Project has been under consideration since 2012.

Consultation during the preparation of the original EIS included:

- approximately 60 meetings, briefings and workshops with stakeholders, including federal, state and local government departments and agencies, representatives from potentially impacted industries (e.g. fishing, tourism), Aboriginal and Torres Strait Islander organisations, non-governmental organisations and Ports North advisory groups and committees
- a staffed Project display at the Cairns show, for the distribution of fact sheets and interviews with 250 attendees
- independent phone survey of 300 people within the Cairns local government area (LGA)
- dissemination of Project updates via a dedicated website and media announcements
- a dedicated project contact number and email address to receive and respond to enquiries and requests for information.

Additional community and stakeholder engagement was undertaken between March 2016 and May 2017 in support of the RDEIS.

11.3 Study Area

The study area for the SIE was based on the area addressed by the SIA, and took in the following areas of influence:

- EIS study area: the Cairns LGA, and where demographic information was not available, the combined Cairns and Douglas LGA
- project area: the overall footprint of the Project including the shipping channel, DMPAs and wharf upgrade
- Northern Sands DMPA study area: incorporating the suburbs or Yorkeys Knob, Holloways Beach, Machans Beach, Kamerunga, and Caravonica
- Tingira Street DMPA study area: incorporating the Portsmith industrial area and Wharf Street area.

The SIE considered the interests of local and regional users of port facilities, residents affected by the Project, local and regional businesses, special interest groups and local, state and federal governments, including the Australian Royal Navy base HMAS Cairns. The scope of the SIE was also expanded to include a statewide perspective of the Project's impact on other regional ports and interrelationship with the Brisbane International Cruise Terminal.

11.4 Social Impact Baseline

A baseline study of the environment was undertaken to profile existing conditions, characteristics and trends upon which the assessment of social impact could be based. This included:

- reviewing the Project, supporting project information and feedback from previous community consultation, and a literature review of other studies and reports to determine potential social issues and community values and aspirations
- establishing the regional and local community structure and activity patterns
- conducting a land use review of directly impacted and immediately neighbouring properties
- preparing an overview of local commercial and employment activities
- preparing a demographic profile of potentially affected communities

- preparing a description of the future community.

The population of the Cairns LGA is expected to grow to 227,542 people by 2036, an increase of around 64,000 people above the population estimate at 2016. This represents an anticipated increase of about 40 per cent during this 20-year period, and an average annual growth rate of about 1.7 per cent, as shown in Table 11.1.

Table 11.1: Population Projections, Cairns LGA and Queensland, 2011–2036

AREA	2011	2016	2021	2026	2031	2036
	POPULATION (AVERAGE ANNUAL GROWTH RATE FOR PRECEDING PERIOD)					
Cairns LGA	150,992 (2.7%)	163,469 (1.6%)	177,655 (1.7%)	193,970 (1.8%)	210,844 (1.7%)	227,542 (1.5%)
Queensland	**4,476,778** (2.2%)	**4,853,048** (1.6%)	**5,250,292** (1.6%)	**5,730,062** (1.8%)	**6,240,546** (1.7%)	**6,763,153** (1.6%)

The unemployment rate for the Cairns LGA was 6.6 per cent in 2011, which was slightly higher than for Queensland at 6.1 per cent. The participation rate for Cairns LGA was comparable to Queensland in 2011 (65 per cent for Cairns LGA, compared to 63 per cent for Queensland).

More recent data shows the Cairns LGA unemployment rate was about one percentage point higher than for Queensland in the December Quarter of 2016, as shown in Table 11.2.

Table 11.2: Employment Measures, Cairns LGA and Queensland, December 2016

AREA	EMPLOYED / UNEMPLOYMENT RATE (DEC QUARTER 2016) (A)
	Number and Rate
Cairns LGA	5,773 (7.1%)
Queensland	**154,184 (6.1%)**

(Note that the social impact baseline does not consider the Project reference design, that is, the social impact mitigation or enhancement strategies and facility improvements).

11.5 Identified Project Social Impacts

Table 11.3 summarises the key Project stakeholders and social impacts identified as part of the Project implementation.

The assessment is presented in accordance with the Project's SIA Report. Categorisation of impacts as quantifiable and monitised are presented as per Building Queensland's BCDF Social Impact Evaluation Guide Release 2, December 2016.

Table 11.4 outlines the high-level positive social impacts identified as a result of the Project. Table 11.5 outlines the high-level negative social impacts identified as a result of the Project. Impacts were rated according to their likelihood and consequence, with a revised rating provided assuming mitigations have been applied.

These social impacts fall within the following social impact categories:

- safety and wellbeing via increased local and regional employment
- improved cruise passenger experience and safety

- community experience for residents and users along the project corridor.

A number of management strategies and plans have been developed to manage the negative social impacts and enhance the positive impacts arising from the Project. These strategies and plans are included as imposed conditions within CGER. Ports North is required to review and report on the outcomes of the implementation of the commitments made regarding social impacts. Key mitigation and management measures are also presented in the following tables, along with the assessment of residual impacts.

Table 11.3: Summary of Identified Stakeholders and Impacts

POTENTIAL SOCIAL IMPACT ELEMENT	WHO IS LIKELY TO BE AFFECTED?	WHAT IS THE VALUE LIKELY TO BE AFFECTED?	WHAT WOULD BE THE CONSEQUENCE OF THE IMPACT?	WHAT WOULD BE THE DURATION OF THE IMPACT?	EXTENT OF IMPACT	WOULD THERE BE ANY CONSEQUENTIAL OR CUMULATIVE IMPACTS?
BARRON DELTA (NORTHERN SANDS) DMPA						
IMPACT ON THE CHARACTER OF THE NORTHERN BEACHES AREA						
A change of character of the coastal area – temporary change in the coastal area from the establishment and operation of a pipeline making landfall near the mouth of Richters Creek	Residents and users of Holloways Beach and Yorkeys Knob	Natural beachfront area	Minor	Temporary	Low – Reversible	No
Potential for change in views from northern beaches – temporary change in the amenity for residents in nearby suburbs, including those overlooking the Barron Delta DMPA and those in the northern part of Holloways Beach	Residents and users of three northern beaches	Uninterrupted ocean views	Negligible	Temporary	Low – Reversible	No
Potential for change in rural character	Residents and users of Yorkeys Knob, Holloways Beach and Machans Beach and tourists and users of Captain Cook Highway	Rural character of the area, especially the canelands	Negligible	Temporary	Low – Reversible	No
IMPACT ON LOCAL AMENITY AND LIVEABILITY						
Change in local amenity (from traffic, noise, visual impacts or lighting)	Residents in the immediate vicinity of the pipeline	Rural farming environment	Negligible	Temporary	Low – Reversible	No
	Users of the DMPA and surrounding land users	Amenity	Negligible	Temporary	N/A	No
	Students and staff at Holloways Beach Environmental Education Centre	Natural environment	Negligible	Temporary	Low – Reversible	No

POTENTIAL SOCIAL IMPACT ELEMENT	WHO IS LIKELY TO BE AFFECTED?	WHAT IS THE VALUE LIKELY TO BE AFFECTED?	WHAT WOULD BE THE CONSEQUENCE OF THE IMPACT?	WHAT WOULD BE THE DURATION OF THE IMPACT?	EXTENT OF IMPACT	WOULD THERE BE ANY CONSEQUENTIAL OR CUMULATIVE IMPACTS?
	Residents in nearby suburbs, especially those overlooking the DMPA and those in the northern part of Holloways Beach	Living environments	Minor	Temporary	Low – Reversible	No
IMPACT ON BEACH AND CREEK USE						
Change in use of beachfront and creek mouth	Users of Holloways Beach and Richters Creek mouth	Use of a natural foreshore area	Minor	Temporary	Low – Reversible	No
Effect on use of Holloways Beach Environmental Education Centre	Students at Holloways Beach Environmental Education Centre	Natural learning environment	Negligible	Temporary	Low – Reversible	No
Threats to safety and wellbeing	Users of Holloways Beach and Richters Creek mouth	Use of a natural foreshore area	Minor	Temporary	Low – Reversible	No
Restrictions to recreational fishing and boating use	Users of Richters Creek and Acacia Street boat ramp	Use of a natural creek environment	Minor	Temporary	Low – Reversible	No
Change in amenity of environment of Richters Creek – temporary minor restrictions to recreational fishing and boating on Richters Creek, and to the amenity of the creek environment	Users of Richters Creek and Acacia Street boat ramp	Natural creek environment	Minor	Temporary	Low – Reversible	No
IMPACT ON RECREATIONAL FACILITIES						
Effect on foreshore improvement programs	Residents and users of foreshore parks	Upgraded foreshores	Negligible	Long-term	N/A	No
Effect on future cycleway routes	Users of future planned routes	Unimpeded off road cycleway routes	Negligible	Long-term	N/A	No

POTENTIAL SOCIAL IMPACT ELEMENT	WHO IS LIKELY TO BE AFFECTED?	WHAT IS THE VALUE LIKELY TO BE AFFECTED?	WHAT WOULD BE THE CONSEQUENCE OF THE IMPACT?	WHAT WOULD BE THE DURATION OF THE IMPACT?	EXTENT OF IMPACT	WOULD THERE BE ANY CONSEQUENTIAL OR CUMULATIVE IMPACTS?
IMPACT ON LIVELIHOODS						
Change in local amenity (from traffic, noise, visual impacts or lighting)	Residents in the immediate vicinity of the pipeline	Rural farming environment	Negligible	Temporary	Low – Reversible	No
	Users of the DMPA and surrounding land users	Amenity	Negligible	Temporary	N/A	No
	Students and staff at Holloways Beach Environmental Education Centre	Natural environment	Negligible	Temporary	Low – Reversible	No
	Residents in nearby suburbs, especially those overlooking the DMPA and those in the northern part of Holloways Beach	Living environments	Minor	Temporary	Low – Reversible	No
Effect on landowners and affected properties	Cane growers in the vicinity of the pipeline, Northern Sands Operators and tenants	Agricultural activity	Beneficial	Long-term	High – Irreversible	No
TINGIRA STREET DMPA						
IMPACT ON THE CHARACTER OF THE PORTSMITH AREA						
Compatibility of the use with existing character	Employers, employees and visitors to Portsmith industrial area	Port-related industrial development	Minor/Beneficial	Short and long-term	High – Reversible adverse/irreversible beneficial	Yes, provision of additional port industrial land
IMPACT ON LOCAL AMENITY						
Change in local amenity (from traffic, noise, visual impacts or lighting)	Employers, employees and visitors to Portsmith Industrial Area	Employment-generating industry	Negligible	Short-term	N/A	No

POTENTIAL SOCIAL IMPACT ELEMENT	WHO IS LIKELY TO BE AFFECTED?	WHAT IS THE VALUE LIKELY TO BE AFFECTED?	WHAT WOULD BE THE CONSEQUENCE OF THE IMPACT?	WHAT WOULD BE THE DURATION OF THE IMPACT?	EXTENT OF IMPACT	WOULD THERE BE ANY CONSEQUENTIAL OR CUMULATIVE IMPACTS?
IMPACT ON NEIGHBOURING LAND USES						
Change to usage of neighbouring port/commercial activities (including Maritime College, Queensland Police Service Water Police etc.)	Government services located in the area	Community services	Negligible	Short-term	N/A	No
Change to usage of the boat ramp and community facilities (including Wooden Boat Association)	Users of boat ramp and community facilities	Unimpeded use of boat ramp and community facilities	Negligible	Temporary	Low – Reversible	No
IMPACT ON MARITIME USERS						
Changes to usage of Smiths Creek	Boat owners/live-aboards	Mooring area	Negligible	Temporary	N/A	No
Impacts on maintenance dredging – channel widening will better allow for siltation between dredging campaigns	Ports North	Channel	Beneficial	Long-term	High – Irreversible	Yes
OTHER AREAS						
IMPACTS ON RESIDENTS IN THE WHARF STREET AREA						
Effects of landside construction and increased ship arrivals at the Port of Cairns	Residents in Wharf Street area	City living environment	Minor/Moderate	Short and long-term	High – Reversible minor/irreversible moderate	No
IMPACTS ON YORKEYS KNOB						
Effect of change in ship arrivals in Yorkeys Knob	Businesses and tourism operators	Economic development	Minor/Beneficial	Short and long-term	High – Reversible minor/irreversible beneficial	No
	Members of the Yorkeys Knob community and tourists	Living and tourist environment	Beneficial	Short-term	High – Irreversible	No
	Boat Club	Economic development	Minor/Beneficial	Short and long-term	Medium – Irreversible minor/irreversible beneficial	No
	Ship passengers and crew	Safe and efficient shore transfer	Beneficial	Short-term	High – Irreversible	No

11.6 Impact Evaluation

Table 11.4: Evaluation of Positive Social Impacts

REF	IMPACT	MONETISED (YES/ NO)	IMPACT ASSESSMENT AGAINST BASE CASE			MITIGATION/ENHANCEMENT MEASURES	IMPACT ASSESSMENT AFTER MITIGATION/ENHANCEMENT			OUTCOME
			LIKELIHOOD	CONSEQ.	RATING		LIKELIHOOD	CONSEQ.	RESIDUAL RATING	
BARRON DELTA (NORTHERN SANDS) DMPA										
IMPACT ON LIVELIHOODS										
+1	Effect on landowners and affected properties ▪ cane growers in the vicinity of the pipeline, Northern Sands Operators and tenants	No	Likely	Moderate	High	▪ Landowners will receive compensation ▪ Ongoing consultation and negotiation with cane growers and the Northern Sands operators and tenants to ensure minimal disruption	Likely	Moderate	High	▪ Compensation will be negotiated ▪ Social impacts considered included in this chapter ▪ Ongoing consultation to achieve agreed outcome via community and stakeholder engagement plan
IMPACT ON RECREATIONAL FACILITIES										
+2	Effect on foreshore improvement programs residents and users of foreshore parks	No	Unlikely	Minor	Low	▪ Design will provide improved foreshore and facilities	Likely	Minor	Medium	▪ Social impacts considered included in this chapter ▪ Ongoing consultation to achieve agreed outcome via community and stakeholder engagement plan
+3	Effect on future cycleway routes users of future planned routes	No	Unlikely	Minor	Low	▪ Design will provide improved foreshore and facilities	Likely	Minor	Medium	▪ Social impacts considered included in this chapter ▪ Ongoing consultation to achieve agreed outcome via community and stakeholder engagement plan

REF	IMPACT	MONETISED (YES/ NO)	IMPACT ASSESSMENT AGAINST BASE CASE			MITIGATION/ENHANCEMENT MEASURES	IMPACT ASSESSMENT AFTER MITIGATION/ENHANCEMENT			OUTCOME
			LIKELIHOOD	CONSEQ.	RATING		LIKELIHOOD	CONSEQ.	RESIDUAL RATING	
TINGIRA STREET DMPA										
IMPACT ON THE CHARACTER OF THE PORTSMITH AREA										
+4	Compatibility of the use with existing character ▪ employers, employees and visitors to Portsmith industrial area	No	Unlikely	Minor	Low	▪ Ongoing consultation and information sessions for users ▪ Provision of additional port industrial land	Almost certain	Moderate	High	▪ Consultation and information sessions commitment via the community and stakeholder engagement plan ▪ Provision of additional port industrial land will increase employment and trade opportunities ▪ Social impact noted in this and economic impact noted the economic assessment
IMPACT ON MARITIME USERS										
+5	Changes to usage of Smiths Creek ▪ boat owners/live-aboards	No	Unlikely	Minor	Low	▪ Ongoing consultation and information sessions for users ▪ Temporary impacts during dredging	Unlikely	Minor	Low	▪ Consultation and information sessions commitment via the community and stakeholder engagement plan ▪ Social impact only during the dredging campaign noted in this chapter
+6	Impacts on maintenance dredging – channel widening will better allow for siltation between dredging campaigns ▪ Ports North	Yes	Possible	Moderate	Medium	▪ Proceeding with the Project will capitalise on the opportunity to attract larger cruise vessels to the Port of Cairns	Almost certain	Significant	High	▪ Social and economic impact locally and regionally considered in social impact evaluation

REF	IMPACT	MONETISED (YES/ NO)	IMPACT ASSESSMENT AGAINST BASE CASE			MITIGATION/ENHANCEMENT MEASURES	IMPACT ASSESSMENT AFTER MITIGATION/ENHANCEMENT			OUTCOME
			LIKELIHOOD	CONSEQ.	RATING		LIKELIHOOD	CONSEQ.	RESIDUAL RATING	
OTHER AREAS										
IMPACT ON YORKEYS KNOB										
+7	Effect of change in ship arrivals in Yorkeys Knob ▪ businesses and tourism operators ▪ members of the Yorkeys Knob community and tourists ▪ boat club ▪ ship passengers and crew	No	Possible	Minor	Medium	▪ Ongoing consultation and information sessions for local tourism operators, community members and interested groups	Possible	Minor	Medium	▪ Consultation and information sessions commitment via the community and stakeholder engagement plan ▪ Vessels in excess of 300 metres will continue to use Yorkeys Knob ▪ Social impacts and economic impacts included in this chapter

Table 11.5: Evaluation of Negative Social Impacts

REF	IMPACT	MONETISED (YES/ NO)	IMPACT ASSESSMENT AGAINST BASE CASE			MITIGATION/ENHANCEMENT MEASURES	IMPACT ASSESSMENT AFTER MITIGATION/ENHANCEMENT			OUTCOME
			LIKELIHOOD	CONSEQ.	RATING		LIKELIHOOD	CONSEQ.	RESIDUAL RATING	
BARRON DELTA (NORTHERN SANDS) DMPA										
IMPACT ON THE CHARACTER OF THE NORTHERN BEACHES AREA										
-1	A change of character of the coastal area – temporary change in the coastal area from the establishment and operation of a pipeline making landfall near the mouth of Richters Creek ▪ residents and users of Holloways Beach and Yorkeys Knob	No	Unlikely	Minor	Low	▪ Consultation and information sessions commitment via the community and stakeholder engagement plan ▪ Design of new facilities will minimise amenity disruption ▪ Consideration of pipeline placement will minimise impacts and they will be temporary	Unlikely	Minor	Low	▪ Social impacts included in this chapter ▪ Consultation and information sessions commitment via the community and stakeholder engagement plan ▪ Design will ensure minimal impact

REF	IMPACT	MONETISED (YES/ NO)	IMPACT ASSESSMENT AGAINST BASE CASE			MITIGATION/ENHANCEMENT MEASURES	IMPACT ASSESSMENT AFTER MITIGATION/ENHANCEMENT			OUTCOME
			LIKELIHOOD	CONSEQ.	RATING		LIKELIHOOD	CONSEQ.	RESIDUAL RATING	
-2	Potential for change in views from northern beaches – temporary change in the amenity of residents in nearby suburbs, including those overlooking the Barron Delta DMPA and those in the northern part of Holloways Beach ▪ residents and users of three northern beaches	No	Unlikely	Insignificant	Low	▪ Consultation and information sessions commitment via the community and stakeholder engagement plan ▪ Design of new facilities will minimise amenity disruption ▪ Consideration of pipeline placement will minimise impacts and they will be temporary	Unlikely	Insignificant	Low	▪ Social impacts included in this chapter ▪ Consultation and information sessions commitment via the community and stakeholder engagement plan ▪ Design will ensure minimal impact
-3	Potential for change in rural character ▪ residents and users of Yorkeys Knob, Holloways Beach and Machans Beach and tourists and users of Captain Cook Highway	No	Unlikely	Insignificant	Low	▪ Consultation and information sessions commitment via the community and stakeholder engagement plan ▪ Design of new facilities will minimise amenity disruption ▪ Consideration of pipeline placement will minimise impacts and they will be temporary	Unlikely	Insignificant	Low	▪ Social impacts included in this chapter ▪ Consultation and information sessions commitment via the community and stakeholder engagement plan ▪ Design will ensure minimal impact

REF	IMPACT	MONETISED (YES/ NO)	IMPACT ASSESSMENT AGAINST BASE CASE			MITIGATION/ENHANCEMENT MEASURES	IMPACT ASSESSMENT AFTER MITIGATION/ENHANCEMENT			OUTCOME
			LIKELIHOOD	CONSEQ.	RATING		LIKELIHOOD	CONSEQ.	RESIDUAL RATING	
IMPACT ON LOCAL AMENITY AND LIVEABILITY										
-4	Change in local amenity (from traffic, noise, visual impacts or lighting) ▪ residents in the immediate vicinity of the pipeline ▪ users of the DMPA and surrounding land users ▪ students and staff at Holloways Beach Environmental Education Centre ▪ residents in nearby suburbs, especially those overlooking the DMPA and those in the northern part of Holloways Beach	No	Unlikely	Minor	Low	▪ Consultation and information sessions commitment via the community and stakeholder engagement plan ▪ Design of new facilities will minimise amenity disruption ▪ Consideration of pipeline placement will minimise impacts and they will be temporary	Unlikely	Minor	Low	▪ Social impacts included in this chapter ▪ Consultation and information sessions commitment via the community and stakeholder engagement plan ▪ Design will ensure minimal impact
IMPACT ON BEACH AND CREEK USE										
-5	Change in use of beachfront and creek mouth ▪ users of Holloways Beach and Richters Creek mouth	No	Unlikely	Minor	Low	▪ Consultation and information sessions commitment via the community and stakeholder engagement plan ▪ Design of new facilities will minimise amenity disruption ▪ Consideration of pipeline placement will minimise impacts and they will be temporary	Unlikely	Minor	Low	▪ Social impacts included in this chapter ▪ Consultation and information sessions commitment via the community and stakeholder engagement plan ▪ Design will ensure minimal impact

REF	IMPACT	MONETISED (YES/ NO)	IMPACT ASSESSMENT AGAINST BASE CASE			MITIGATION/ENHANCEMENT MEASURES	IMPACT ASSESSMENT AFTER MITIGATION/ENHANCEMENT			OUTCOME
			LIKELIHOOD	CONSEQ.	RATING		LIKELIHOOD	CONSEQ.	RESIDUAL RATING	
-6	Effect on use of Holloways Beach Environmental Education Centre ▪ students at Holloways Beach Environmental Education Centre	No	Unlikely	Insignificant	Low	▪ Consultation and information sessions commitment via the community and stakeholder engagement plan ▪ Design of new facilities will minimise amenity disruption ▪ Consideration of pipeline placement will minimise impacts and they will be temporary	Unlikely	Minor	Low	▪ Social impacts included in this chapter ▪ Consultation and information sessions commitment via the community and stakeholder engagement plan ▪ Design will ensure minimal impact
-7	Threats to safety and wellbeing ▪ users of Holloways Beach and Richters Creek mouth	No	Unlikely	Minor		▪ Consultation and information sessions commitment via the ▪ Design of new facilities will minimise amenity disruption ▪ Consideration of pipeline placement will minimise impacts and they will be temporary	Unlikely	Minor	Low	▪ Social impacts included in this chapter ▪ Consultation and information sessions commitment via the community and stakeholder engagement plan ▪ Design will ensure minimal impact
-8	Restrictions to recreational fishing and boating use ▪ users of Richters Creek and Acacia Street boat ramp	No	Unlikely	Minor		▪ Consultation and information sessions commitment via the community and stakeholder engagement plan ▪ Design of new facilities will minimise amenity disruption ▪ Consideration of pipeline placement will minimise impacts and they will be temporary	Unlikely	Minor	Low	▪ Social impacts included in this chapter ▪ Consultation and information sessions commitment via the community and stakeholder engagement plan ▪ Design will ensure minimal impact

REF	IMPACT	MONETISED (YES/ NO)	IMPACT ASSESSMENT AGAINST BASE CASE			MITIGATION/ENHANCEMENT MEASURES	IMPACT ASSESSMENT AFTER MITIGATION/ENHANCEMENT			OUTCOME
			LIKELIHOOD	CONSEQ.	RATING		LIKELIHOOD	CONSEQ.	RESIDUAL RATING	
-9	Change in amenity of environment of Richters Creek ▪ users of Richters Creek and Acacia Street boat ramp	No	Unlikely	Minor		▪ Consultation and information sessions commitment via the community and stakeholder engagement plan ▪ Design of new facilities will minimise amenity disruption ▪ Consideration of pipeline placement will minimise impacts and they will be temporary	Unlikely	Minor	Low	▪ Social impacts included in this chapter ▪ Consultation and information sessions commitment via the community and stakeholder engagement plan ▪ Design will ensure minimal impact
IMPACT ON LIVELIHOODS										
-10	Change in use of beachfront and creek mouth ▪ users of Holloways Beach and Richters Creek mouth	No	Unlikely	Insignificant	Low	▪ Consultation and information sessions commitment via the community and stakeholder engagement plan ▪ Design of new facilities will minimise amenity disruption ▪ Consideration of pipeline placement will minimise impacts and they will be temporary	Unlikely	Insignificant	Low	▪ Social impacts included in this chapter ▪ Consultation and information sessions commitment via the community and stakeholder engagement plan ▪ Design will ensure minimal impact
-11	Effect on use of Holloways Beach Environmental Education Centre ▪ students at Holloways Beach Environmental Education Centre	No	Unlikely	Insignificant	Low	▪ Consultation and information sessions commitment via the community and stakeholder engagement plan ▪ Design of new facilities will minimise amenity disruption ▪ Consideration of pipeline placement will minimise impacts and they will be temporary	Unlikely	Insignificant	Low	▪ Social impacts included in this chapter ▪ Consultation and information sessions commitment via the community and stakeholder engagement plan ▪ Design will ensure minimal impact

REF	IMPACT	MONETISED (YES/ NO)	IMPACT ASSESSMENT AGAINST BASE CASE			MITIGATION/ENHANCEMENT MEASURES	IMPACT ASSESSMENT AFTER MITIGATION/ENHANCEMENT			OUTCOME
			LIKELIHOOD	CONSEQ.	RATING		LIKELIHOOD	CONSEQ.	RESIDUAL RATING	
-12	Threats to safety and wellbeing ▪ users of Holloways Beach and Richters Creek mouth	No	Unlikely	Insignificant	Low	▪ Consultation and information sessions commitment via the community and stakeholder engagement plan ▪ Design of new facilities will minimise amenity disruption ▪ Consideration of pipeline placement will minimise impacts and they will be temporary	Unlikely	Insignificant	Low	▪ Social impacts included in this chapter ▪ Consultation and information sessions commitment via the community and stakeholder engagement plan ▪ Design will ensure minimal impact
-13	Restrictions to recreational fishing and boating use ▪ users of Richters Creek and Acacia Street boat ramp	No	Unlikely	Minor	Low	▪ Consultation and information sessions commitment via the community and stakeholder engagement plan ▪ Design of new facilities will minimise amenity disruption ▪ Consideration of pipeline placement will minimise impacts and they will be temporary	Unlikely	Minor	Low	▪ Social impacts included in this chapter ▪ Consultation and information sessions commitment via the community and stakeholder engagement plan ▪ Design will ensure minimal impact
-14	Change in amenity of environment of Richters Creek – temporary minor restrictions to recreational fishing and boating on Richters Creek, and to the amenity of the creek environment ▪ users of Richters Creek and Acacia Street boat ramp	No				▪ Consultation and information sessions commitment via the community and stakeholder engagement plan ▪ Design of new facilities will minimise amenity disruption ▪ Consideration of pipeline placement will minimise impacts and they will be temporary				▪ Social impacts included in this chapter ▪ Consultation and information sessions commitment via the community and stakeholder engagement plan ▪ Design will ensure minimal impact

REF	IMPACT	MONETISED (YES/ NO)	IMPACT ASSESSMENT AGAINST BASE CASE			MITIGATION/ENHANCEMENT MEASURES	IMPACT ASSESSMENT AFTER MITIGATION/ENHANCEMENT			OUTCOME
			LIKELIHOOD	CONSEQ.	RATING		LIKELIHOOD	CONSEQ.	RESIDUAL RATING	
TINGIRA STREET DMPA										
IMPACT ON LOCAL AMENITY										
-15	Change in local amenity (from traffic, noise, visual impacts or lighting) ▪ Employers, employees and visitors to Portsmith Industrial Area	No	Possible	Insignificant	Low	▪ Consultation and information sessions commitment via the community and stakeholder engagement plan ▪ Design of new facilities will minimise amenity disruption ▪	Possible	Insignificant	Low	▪ Social impacts included in this chapter ▪ Consultation and information sessions commitment via the community and stakeholder engagement plan ▪ Design of new facilities will enhance visual amenity
IMPACT ON NEIGHBOURING LAND USES										
-16	Change to usage of neighbouring port/commercial activities (including Maritime College, QPS Water Police etc.) ▪ Government services located in the area	No	Unlikely	Minor	Low	▪ Impact of change to usage will be minimised by consultation and engagement with affected agencies	Unlikely	Minor	Low	▪ Social impacts ▪ Consultation and information sessions commitment via the community and stakeholder engagement plan ▪ Design of new facilities will enhance overall experience of usage of facilities
-17	Change to usage of the boat ramp and community facilities (including Wooden Boat Association) ▪ Users of boat ramp and community facilities	No	Likely	Minor	Medium	▪ Temporary disruption during the dredging campaign from the placement of the pipeline will be minimised by short duration and consideration of placement of pipeline	Unlikely	Minor	Low	▪ Social impacts ▪ Consultation and information sessions commitment via the community and stakeholder engagement plan

REF	IMPACT	MONETISED (YES/ NO)	IMPACT ASSESSMENT AGAINST BASE CASE			MITIGATION/ENHANCEMENT MEASURES	IMPACT ASSESSMENT AFTER MITIGATION/ENHANCEMENT			OUTCOME
			LIKELIHOOD	CONSEQ.	RATING		LIKELIHOOD	CONSEQ.	RESIDUAL RATING	
OTHER AREAS										
IMPACT ON RESIDENTS IN THE WHARF STREET AREA										
-18	Effects of landside construction and increased ship arrivals at the CCLT ▪ Residents in Wharf Street Area	No	Likely	Minor	Medium	▪ Ongoing consultation and information sessions for local tourism operators, community members and interested groups	Likely	Minor	Medium	▪ Social impacts ▪ Consultation and information sessions commitment via the community and stakeholder engagement plan to minimise any impact

11.7 SIE Results

Through a qualitative risk assessment, this SIE identified significant positive social impact (likelihood and consequence) as a result of the Project, particularly through increased employment and business opportunities. However, there remains a degree of concern among various groups, including some potentially affected stakeholders within the local community and other special interest groups.

Management strategies and plans have been developed to manage the negative social impacts and enhance the positive impacts arising from the Project.

As stated in the CGER, Ports North is required to develop a community and stakeholder engagement plan for approval at least three months before commencement of construction indicating how the stakeholders will be informed and consulted throughout all Project stages.

CHAPTER 12
ENVIRONMENTAL ASSESSMENT

CHAPTER SUMMARY AND CONCLUSIONS:

- A Revised Draft EIS (RDEIS) has been prepared to respond to federal and state government environmental legislation, processes and guidelines.
- The Queensland Coordinator-General's Evaluation Report (CGER) dated February 2018 lists the key approvals required for the Project and conditions imposed.
- Strategies have been developed to avoid, minimise, mitigate and manage impacts on the land and landscape, nature conversation areas, coastal processes, marine sediment and water quality, water resources, marine and terrestrial ecology, community and cultural heritage, noise, air quality, local transport, greenhouse gases and waste. Potential cumulative impacts will also be monitored and managed.
- Risks from environmental impacts were identified through a formal assessment process. Of the 349 risks identified, eight scored a medium risk rating when the adoption of tailored and best practice mitigation and management strategies was assumed. No risks rated as extreme or high.

12.1 Purpose

This chapter provides an overview of environmental impacts, relevant approvals and management measures for the Project.

12.2 Background

The Project has been subject to detailed environmental impact assessment due to its location in an environmentally sensitive environment adjacent to the GBRMP. This process was triggered in September 2012 by its declaration as a 'coordinated project' by the Queensland Coordinator-General under the SDPWO Act.

Both the Draft EIS (2015) and subsequent RDEIS (2017) respond to federal and state government environmental assessment legislation, processes and guidelines. The Draft EIS summarised federal, state and local government legislation, policies and approvals relevant to the Project. These are detailed further in Chapter 8: Legal and Regulatory Considerations.

The CGER dated February 2018 lists the key approvals required for the Project and the conditions imposed. These are detailed further in Chapter 8: Legal and Regulatory Considerations. Mitigation and management measures outlined in this chapter respond directly to the conditions imposed in the CGER, with the key environmental management strategies summarised in Section 12.5.

12.3 Environmental Impacts and Mitigation Measures

Environmental impacts were assessed, and mitigation and management measures developed, during the preparation of the RDEIS for the Project. The assessment found that Project activities could affect the marine and coastal environment, MSES, State and Aboriginal cultural heritage, existing traffic and transport, noise and vibration, air quality and greenhouse gas emissions.

The following section details these potential impacts, and proposed mitigation measures, due to construction activities (that is, capital dredging and construction of ancillary infrastructure and port upgrades) and operational activities. Impacts and mitigations related to the delivery pipeline are outlined separately at the end of the section.

12.3.1 Marine and Coastal Environment

Construction works will involve capital dredging and placement of dredge material at onshore DMPAs. Ongoing maintenance dredging and dredged material placement will also be required. Dredging and other disturbances can alter the physical and chemical characteristics of the marine sediment environment, and adversely affect the marine ecological values.

12.3.1.1 Current Situation

Marine Water Quality

Trinity Bay is part of the Coral Sea. It extends east to Cape Grafton and north to Double Island. The Great Barrier Reef is located 25 to 30 kilometres offshore to the northeast.

Trinity Inlet is a natural harbour characterised by high siltation from natural coastal processes. Annual maintenance dredging to counter siltation ensures ensure safe navigation for vessels using the port.

Freshwater creeks that drain small catchments, carrying urban and industrial inputs, flow into the Inlet including Smiths Creek, Skeleton Creek, Redbank Creek, Chinaman Creek and Fearnley Street Drain.

Existing water quality within Trinity Inlet and Trinity Bay is characterised by naturally high turbidity levels, especially during periods of high rainfall and sustained winds, and currents that resuspend seabed sediments. Water in near-shore areas is shallow, with muddy benthic sediments that are regularly resuspended. In areas further offshore, turbidity levels are lower due to deeper waters and less resuspension of benthic sediments.

High suspended sediment concentrations are common in the project area, driven primarily by south-west trade winds during the dry season, north and north-east winds and tropical cyclones during the wet season. During the dry season, the wind, current and wave climates drive seabed mud resuspension. During the wet season, salinity is typically lower closer to Trinity Inlet than during the dry season, due to the influence of increased freshwater inflows.

A commercial aquaculture enterprise operates a local finfish hatchery. It intakes and discharges seawater at Smiths Creek and Chinaman Creek and relies on maintaining existing water quality. The aquaculture water intake is located on the city-side bank of Smiths Creek approximately 900 metres upstream from the nearest capital dredging proposed for the Smiths Creek swing basin, at the confluence of Smiths Creek and Trinity Inlet.

Marine Sediment Quality

The Port of Cairns is located within a heavily urbanised catchment, and is exposed to contaminants from adjacent and upstream agricultural, residential, commercial and industrial activities.

Characteristics of the background marine sediment quality in the project area are as follows:

- inner port and outer channel dominated by silt and clay sediments, with small proportions of sand and gravel (e.g. near the mouth of Trinity Inlet)
- surface sediments in the proposed dredge area are not considered potential acid sulfate soil (PASS) material but a proportion of deeper soft clay and silt sediments to be extracted during capital dredging are expected to be PASS material
- concentrations of metals and metalloids are generally below national screening levels under the National Assessment Guidelines for Dredging 2009 (NAGD), except arsenic (which is naturally elevated in the Cairns region, although levels in the project area remain below the Local Screening Level agreed

for maintenance dredging activities in the existing Long Term Management Plan – Dredging and Disposal)

- levels of other contaminant types are either below laboratory detection levels or below national screening levels under the NAGD (as demonstrated in recent sampling of the existing shipping channel and port).

Coastal Processes

The key coastal processes of Trinity Bay and Trinity Inlet are summarised in Table 12.1.

Table 12.1: Key Components of Coastal Processes in Trinity Bay and Trinity Inlet

TYPE OF COASTAL PROCESS	PROCESS COMPONENTS
Hydrodynamics	▪ water levels relating to tides and storm surges ▪ the wave climate, comprising Coral Sea waves propagating into the Great Barrier Reef Lagoon through passages in the outer reef, wind waves within the Great Barrier Reef Lagoon and refracting into Trinity Bay, and short periods of wind waves generated within Trinity Bay ▪ currents within Trinity Bay, generated predominantly by tidal and wind forces ▪ freshwater flows affecting seabed and bank stability in the Barron River and Trinity Inlet ▪ key influencing factors of cyclonic and other sever weather events
Marine sedimentation	▪ fluvial sediment supply from the rivers and streams, which may be fine wash load that extends out into Trinity Bay before settling to the seabed or coarser sand that deposits near the stream mouths and may be redistributed along the coast by wave or current action ▪ Trinity Bay seabed sediment resuspension, transport and deposition, potentially changing the seabed morphology or sediment composition and/or filling dredged areas
Shoreline sedimentation	▪ sand transport along the coast, driven by wave breaking ▪ beach erosion and accretion along the adjacent beach system, including the Northern Beaches ▪ factors affecting and required for beach stability

Water Quality Rating

Water quality in Queensland is measured by the quantification of parameters against water quality objectives (WQOs), as stipulated in the Environmental Protection (Water) Policy 2009. All but one monitoring region presented in the EIS documentation demonstrated background median turbidity levels that exceed WQOs for both wet and dry seasons.

Trinity Inlet and Trinity Bay pH levels increased (i.e. became more basic) with increased connection with the open ocean, likely due to the influence of more acidic conditions of catchment flows and acid sulfate soils (ASS), and because of the basic nature of oceanic water. Generally, pH levels were compliant with relevant WQOs in the study area, except for one region of testing during the dry season where the median pH was slightly above the WQO value.

While there are some exceedances of WQO values for background marine water quality in the study area, this is not unexpected of a marine environment located adjacent to an urban and industrialised area.

12.3.1.2 Impacts and Mitigation Measures

Marine Water Quality – Construction Impacts

Without mitigation, capital dredging and upgrading port infrastructure could impact on marine water quality within Trinity Inlet and Trinity Bay.

As dredging is proposed within the GBRCMP, the Project will require a state government marine park permit for dredging work within Trinity Inlet, in accordance with the Marine Parks Act. This permit will protect values in the general use zone of the GBRCMP.

The CGER includes conditions regarding the GBRCMP.

Capital Dredging

Turbidity

Capital dredging has potential to affect marine water quality by generating turbid plumes and releasing sediment particles into the water body (sediment deposition), both of which could affect seagrass and coral reefs.

The EIS documentation reported that when compared to existing turbidity conditions, the dredging campaign will increase turbidity values at most locations by less than seven per cent for the duration of dredging. Further assessment was undertaken for locations where turbidity is predicted to increase substantially, including Trinity Bay next to the channel dredging, and within Trinity Inlet. Time series data comparing dredging plumes with naturally occurring turbidity levels indicates that naturally occurring sediment due to resuspension will remain the dominant source of predicted turbidity at all sites.

Table 12.2: Site-specific Turbidity Impacts

AREA AND ACTIVITY	IMPACT
Inner port dredging	Dredge plume modelling results indicate that short-term (12 weeks) minor impacts are expected from turbid plumes generated by capital dredging within the inner port area. Based on the worst-case scenario and using the zones of impact method, the EIS documentation identified that no zones of high impact will occur within the inner port area. A zone of low-to-moderate impact is predicted to extend approximately two kilometres southwards along Trinity Inlet and approximately two kilometres northwards adjacent to the channel. Predicted impacts within this low-to-moderate zone include sublethal impacts or mortality to ecological receptors, with recovery between 6 to 24 months. The zone of influence, with no predicted ecological impact, is predicted to extend from the inner port southwards along Trinity Inlet. Further consideration of predicted zones of impact and influence against sensitive ecological receptors is presented in Section 12.3.2. The finfish hatchery is within the predicted zone of influence only, and only under the modelled worst-case scenario.

AREA AND ACTIVITY	IMPACT
Outer channel dredging	Modelling results indicate that short-term, minor impacts are expected to result from turbid plumes generated from capital dredging in the outer channel. Using the zones of impact method for the modelled worst-case scenario: ▪ the zone of high impact was restricted to the channel area being dredged ▪ a relatively small zone of low-to-moderate impact is predicted near the bend in the channel close to the inner port area ▪ a zone of influence, with no detectable ecological impact expected, is predicted for remaining areas in the vicinity of outer channel dredging.

Sediment Deposition

Modelling presented in the EIS documentation predicts changes in sedimentation rates due to deposition of suspended sediments from dredge plumes within and adjoining the capital dredge footprint. Consideration of predicted zones of impact and influence against sensitive ecological receptors is discussed in Section 12.3.2.

Potential Acid Sulfate Soils

Dredging could result in disturbance and exposure of PASS material. This issue has been raised in public submissions. If dredged material was exposed to air for extended periods of time, the PASS material could oxidise, which may impact on water quality via changes to pH levels. PASS material represents approximately fifty-five per cent of the total proposed dredge volume.

As dredged material remains waterlogged during normal operation of the Trailing Suction Hopper Dredger (TSHD), the risk of oxidation is negligible. There are no expected water quality impacts associated with PASS material for the capital dredging activities.

Ancillary Infrastructure and Port Upgrade

Pile driving required for port upgrade construction has the potential to impact on water quality. Construction plant and equipment may pollute marine waters (e.g. via fuel or oil and other contaminant spills) if not managed appropriately. The potential for fuel or oil spills as part of the construction phase of the Project presents a short-term negligible impact.

Disturbance and mobilisation of marine sediments may occur as a result of construction activities besides dredging, particularly the pile driving activities associated with the structural upgrade to the existing shipping wharves. Direct impacts on benthic communities are discussed in Section 12.3.2.

Marine Water Quality – Mitigation Measures for Construction Impacts

Capital Dredging

Turbidity and Sediment Deposition

In addition to existing management practices and monitoring programs for current port operations, turbidity and sediment deposition impacts associated with capital dredging and port upgrades will be addressed through a dredge management plan (DMP).

The DMP will include the following measures:

- TSHD and Backhoe Dredger (BHD) to operate only within the approved dredge footprint at all times
- dredging campaign to occur in dry season months (May to September) to minimise ecological risk associated with water quality impacts and risks associated with extreme weather events

- overflow dredging by the TSHD is undertaken in accordance with the approved overflow regime in the DMP
- dredge hopper compartment is to be kept watertight during all dredging activities, except emptying and washing of the hopper at the pump-out location
- the top of overflow valves are not to be lowered during the transport component of the dredging cycles
- no high-pressure jets to be used on drag heads outside of the dredge footprint
- dredger to be fitted with a green valve to minimise the spatial extent of turbidity plumes generated.

As part of the DMP, a reactive monitoring program (RMP) will be prepared in line with guidance in the Water Quality Review and Monitoring (SKM 2012) document developed as part of the GBRMP's Strategic Assessment. This monitoring program will be implemented during the dredging campaign to monitor water quality at sensitive ecological receptors. The RMP will be overseen by a technical advisory group (TAG), which will determine parameters to be monitored, frequency of monitoring and reporting. The RMP will consist of a water quality dredge plume turbidity monitoring program and a seagrass monitoring program.

Potential Acid Sulfate Soils

As outlined in the acid sulfate soils management plan (ASSMP), prepared as part of the RDEIS, dredged material collected in the hopper of the dredge vessel during capital dredging will remain saturated during transport to the pump-out point. Under normal operating activities, there is little opportunity for these materials to oxidise and generate acid. Contingency measures for equipment breakdown of longer than 24 hours are included in the DMP to address the potential for dredged material oxidisation in the hopper.

The CGER includes conditions requiring an ASSMP to be in place for any PASS material that may be disturbed by project activities.

Ancillary Infrastructure and Port Upgrades

A construction environmental management plan (CEMP), contained in the EIS documentation, outlined management measures to address potential marine water quality impacts by land-based construction activities. A further detailed CEMP (to be developed by the construction contractor) will reflect measures included in the existing CEMP, and the Ports North environmental management system and guidelines for CEMPs. Measures include:

- sampling of soils and testing for PASS material to determine treatment required during construction
- management of stormwater run-off
- actions to minimise soil erosion potential
- practices to minimise the risk of fuel or oil spills from construction plant and equipment.

Detailed CEMP measures will also be considered in the assessment of proposed land-based construction activities under the Ports North (Cairns Port Authority) LUP.

Marine Water Quality – Operational Impacts and Mitigation Measures

More large cruise vessels docking at Trinity Inlet wharves (potentially releasing contaminants such as wastewater, antifouling agents and ballast water) and greater maintenance dredging, with the associated disposal of materials, could impact on marine water quality.

Most additional cruise ships will be subject to international maritime and environmental requirements, including AMSA's North East Shipping Management Plan, which outlines measures to manage the safety of shipping in the sensitive marine environment of Australia's north-east region. Multiple international

standards and Commonwealth and State laws will also apply to all cruise ships, which regulate the release of shipping contaminants.

Where these legal requirements are met, the potential for introduced contaminants from increased shipping presents a long-term, minor impact compared to the current situation. Mitigation of these potential impacts will be addressed by compliance with standards and legislation, and implementation of the Ports North environmental management system for operational activities.

Marine Sediment Quality – Construction Impacts and Mitigation Measures

Marine sediments may be directly disturbed by dredging activities and movement of the dredger itself. There is also the potential for minor disturbance due to other construction activities, particularly pile driving for the port upgrades.

Sediment sampling and analysis results from inner port and outer channel sites indicate that all potential contaminants of concern in capital dredge material (i.e. metals or organic contaminants) are below the relevant NAGD screening levels, with the exception of total mercury concentrations. Elutriate and bioavailable concentrations of total mercury are below the relevant ANZECC/ARMCANZ (2000) default marine water quality guidelines and NAGD screening level. Therefore, it is unlikely that concentrations of contaminants of concern released during dredging will pose a significant risk to the surrounding marine environment. This assessment is consistent with results of annual maintenance dredging sediment sampling and analysis between 1995 and 2016, which found the material to be suitable for unconfined marine placement.

To address the potential risk to marine sediment quality associated with disturbance of PASS material, the DMP provided with the RDEIS documentation identifies that if dredge material is required to be stored in barges for longer than 24 hours (e.g. in case of vessel breakdown) and there is increased risk of oxidation, material is to be tested for ASS and treated (if necessary) prior to the placement at the Northern Sands DMPA.

Marine Sediment Quality – Operational Impacts and Mitigation Measures

Modelling predicts a negligible operational impact on marine sediment quality due to increased numbers of large cruise vessels docking at Trinity Inlet wharves and greater maintenance dredging, with the associated disposal of materials. Any impacts could be addressed by implementing the Ports North environmental management system.

Coastal Processes – Construction Impacts and Mitigation Measures

Hydrodynamic modelling results presented in the RDEIS documentation identify that capital dredging may impact tidal currents in the immediate vicinity of dredging activities, particularly associated with increasing the flow capacity of the shipping channel.

Analysis of modelling results identified:

- barely discernible differences for velocity impact and depth-averaged velocity due to the Project, even under relatively large spring tide conditions
- negligible impact on seagrass or benthic habitats expected due to changes to tidal current velocity
- negligible changes to water levels due to changes in tidal flow patterns
- no discernible difference in storm time level between base case and developed case
- no substantial change to flood plumes due to project activities

- very minor (< 1cm) impacts on wave heights, with no significant impact predicted on nearshore wave conditions driving littoral and beach system processes.

The low-to-negligible predicted impacts on coastal processes do not necessitate any specific mitigation or management measures.

The increased siltation of the channel will require a two to six per cent increase in maintenance dredging of the entrance of the channel and placement of dredged material at the existing offshore Cairns Port DMPA. Management of potential impacts associated with placement of maintenance dredge material will be regulated through existing approvals for placement of maintenance dredge.

Cumulative Dredging Impacts and Mitigation Measures

The RDEIS documentation reported the potential for cumulative impacts on marine water quality if capital and maintenance dredging activities were to occur in succession. This is considered likely, as maintenance dredging immediately prior to capital dredging will minimise the amount of dredged material to be placed in the Northern Sands DMPA void.

The cumulative assessment presented in the RDEIS documentation concluded that any residual turbidity from maintenance dredging still in the system when capital dredging commences will be relatively insignificant. Therefore, the potential cumulative impacts on water quality are predicted to be similar to impacts due to capital dredging only. Management and mitigation measured proposed to protect marine water quality during the capital dredging campaign will provide for measures necessary to address potential cumulative impacts.

The CGER includes conditions regarding the management of water quality impacts, specifically to:

- define the extent and duration of capital dredging activities
- set water quality limits and require monitoring at defined sensitive ecological receptor locations
- require a DMP, which is to also include a sediment plume-associated monitoring program and a receiving environmental monitoring program.

The CGER requires that a TAG be established to oversee dredging works for the Project. The TAG would be made up of independent subject matter experts with the responsibility of reviewing data related to water quality and ecosystem health. The CGER includes conditions regarding the role and function of the TAG.

The CGER also includes conditions regarding approvals to be obtained prior to the commencement of construction, specifically:

- a development permit for operational works for tidal works (capital dredging)
- a marine park permit for dredging in Trinity Inlet.

12.3.2 Matters of State Environmental Significance

Trinity Inlet Declared Fish Habitat Area

The Trinity Inlet FHA was declared in 1998 with an exclusion area to cater for future expansion of the shipping channel. The proposed shipping channel footprint is not completely within the exclusion area. Approximately 9.21 hectares of the proposed channel is in the Trinity Inlet declared FHA. Dredging is not permitted within declared FHAs in accordance with the SDAP State Code 12. The proposed dredging activities cannot commence unless the FHA boundaries are amended.

The proposal will involve adjusting the current exclusion zone slightly west and converting sections of the current exclusion zone to declared FHA. These proposed changes to the exclusions zones would increase the declared FHA by five square metres overall.

Amending FHA boundaries is a legislative process requiring amendment to the Fisheries Regulation 2008. The responsible Queensland Government department, DES, has confirmed general support for the proposed amendment.

Water Quality

Assessment of marine water quality impacts on values of the Trinity Inlet FHA presented in the EIS documentation include:

- low risk of impact to mangroves: predicted impacts on hydrodynamics, sedimentation rates and water quality are not expected to adversely affect mangroves in areas such as Trinity Inlet with rates and deposition levels well within the range of natural variability
- medium potential impact to seagrass, reduced to low risk of impact with mitigation measures: seagrass is not presently found in the dredge footprint; water quality modelling predicts that adjacent seagrass areas are either in the zone of low-to-moderate impacts (immediately adjacent to the channel) or zone of influence but that dredging turbidity plumes are not expected to adversely impact these areas in terms of turbidity and sedimentation. A RMP will be implemented during the dredging to control impacts to these communities with corrective actions as detailed in the DMP, which was developed as part of the RDEIS documentation.
- low risk of impact to soft sediment benthic habitats: unvegetated soft bottom benthic habitats will recover following disturbance by dredging. Recovery will occur progressively but full recovery is not expected for periods of months (e.g. 6–24 months)
- low risk of impact to fisheries resources: impacts on fisheries species of significance are not expected other than temporary impacts on fish movement during dredging.

Mitigation and management measures proposed to protect marine water quality from potential capital dredging impacts, as detailed in Section 12.3.1.2, will protect fish habitat values of this FHA.

Marine Plants and Coral Reefs

The RDEIS documentation concludes that capital dredging and port upgrades could potentially affect marine plants including seagrass and benthic communities, and coral reefs.

Up to 800 hectares of seagrass meadows have been mapped previously in and around Cairns. Seabed areas within Trinity Bay, at the mouth of Barron River, near False Cape, along the east side of Cape Grafton and near the existing offshore Cairns Port DMPA are identified as potential seagrass habitat areas based on historic records.

Seagrass surveys undertaken in 2015 identified six seagrass meadows within Trinity Bay, located along the eastern and western boundaries of the existing Trinity Inlet shipping channel. Seagrass meadows along the boundaries of Trinity Inlet are currently considered to be of poor or very poor condition due to limited biomass and area but are showing signs of recovery.

The nearest coral reefs to the Project are at Mission Bay, five kilometres to the east of the existing Trinity Inlet shipping channel. Coral reefs located closest to the dredging area and port upgrade activities include:

- Double Island and Haycock Reefs to the north and south of Double Island, approximately 18 kilometres north of the Project, considered to be in excellent condition with some resilience to periods of increased turbidity as occurs during natural disturbance events
- Rocky Island Reef within Mission Bay, considered to be of degraded condition with coral species most resilient to disturbance remaining
- a small fringing reef at Taylor Point, 12 kilometres north of Cairns
- a series of unnamed rocky shores supporting fringing reefs along the east side of Cape Grafton, over eight kilometres from the Project.

Mid-shelf reef systems are located further offshore, more than 20 kilometres north-east of the project area.

Soft sediment habitats in Trinity Inlet and Trinity Bay include sandy beaches, intertidal mudflats and subtidal soft sediments. These can be key drivers in coastal marine food chains, and unvegetated soft sediment habitats vary considerably in response to changes in seagrass meadow extent.

The RDEIS documentation indicates that benthic communities were found only in low densities in Trinity Inlet. The documentation described sediment macroinvertebrates ('infauna') in offshore and estuarine project areas as having significantly varying community assemblages. These were across sediment class and locations of sampling (by coastline proximity and depth), with variations in species diversity between wet and dry seasons.

Ports North is committed to conducting seagrass surveys before commencement of dredging to confirm whether any seagrass has become established since the completion of the RDEIS. The CGER includes conditions regarding the provision of offsets for any significant residual impacts. The offset requirements would be finalised following further seagrass surveys, to be submitted as part of the operational works disturbance to marine plants.

Benthic Communities

Approximately 34.5 hectares of potential benthic communities that have not previously been dredged will be removed during capital dredging and port upgrades. The EIS documentation indicates that, following initial loss of communities, dredging is expected to result in the creation of similar benthic habitat in this newly disturbed area to that found in the existing outer channel and previously dredged inner port, including simplified macroinvertebrate assemblages with lower species diversity. This may be considered a significant residual impact to marine plants and would require an offset under the EO Act.

Installing piles for mooring and berthing dolphins as part of the port upgrades will damage approximately 53.76 square metres of potential benthic communities. The inner port is a highly mobile fine sediment environment and only supports very sparse benthic communities. Therefore, although potential benthic communities would be permanently lost by installing the piles, the fisheries value of these potential communities is considered to be low. This could be a significant residual impact to marine plants and may require an offset under the EO Act. The requirement for offsets will be determined during subsequent approvals prior to commencement of dredging. The CGER includes conditions regarding impacts to marine plants from dredging and port upgrades. The requirements for offsets (if any) will be finalised during the detailed design stage of the Project as part of the operational works approval for disturbance to marine plants.

Coral Reefs

Modelling presented in the RDEIS predicts changes in sedimentation rates due to deposition of suspended sediments from dredge plumes within and adjoining the capital dredge footprint.

While zones of impact are predicted within and adjacent to the shipping channel, the zones of impact for sediment deposition do not coincide with areas containing coral reefs within the study area. A zone of influence is predicted to extend near to Rocky Island reef during a worst-case scenario, however no ecological impacts are predicted within this zone of influence.

Protected Wildlife

The Cairns region, and Trinity Inlet in particular, is a busy shipping area. While protected marine wildlife are sighted in the area, there is no important habitat for them in or near Trinity Inlet. Sighted animals are likely to be transiting through the area.

Vessel Strike and Interaction with Dredge Machinery

Inshore dolphins, dugongs and turtles may be injured by interacting with moving vessels and dredgers during construction, operation and decommissioning of the Project. Submissions on the EIS documentation raised issues about impacts on marine wildlife during the dredging campaign.

Protected marine wildlife swimming near the water surface could be injured by vessels travelling to and from the Port of Cairns, and marine turtles resting in the Trinity Inlet shipping channel could be injured by interactions with the TSHD during capital dredging. To minimise the risk of vessel strike and prevent potential impacts to marine turtles from dredging, the following measures will be implemented (as outlined in the DMP):

- ensure vessel masters and spotters are adequately trained in marine mammal and marine turtle interaction procedures
- maintain a 300-metre exclusion zone between vessels and marine mammals, when they are sighted. In the event that a marine mammal is sighted, vessel speed and direction will be adjusted until the animal has moved further than 300 metres or have not been sighted for 15 minutes.
- mount turtle deflectors or chains on the draghead of the TSHD
- activate water jets on the draghead before the dredge pump is started, where practicable
- start the dredge pump only when the draghead is close to the seafloor, and stop the dredge pump as soon as possible after completing dredging
- maintain a lookout for marine wildlife while dredgers operate
- amending dredging operations when marine mammals (except dolphins) and turtles are observed within 300 metres of the operating dredger until the wildlife have moved further than 300 metres away or have not been sighted for 15 minutes.

Ports North will also ensure that animal sightings and any relevant actions taken will be recorded, and that any incidents involving injured or killed animals will be immediately reported to the relevant regulatory authorities.

Underwater Noise and Vibration

Installing piles for mooring and berthing dolphins as part of the port upgrades will generate underwater noise and vibration that may affect protected marine wildlife. Submissions on the EIS documentation raised issues about underwater noise and vibration impacts to protected marine wildlife.

Underwater noise and vibrations could affect inshore dolphins' echolocation abilities, damage their hearing and deter them from foraging near the piling activities. Hearing damage is only likely to occur to marine mammals that are within ten metres of the piling rig for long periods. To mitigate impacts from underwater noise and vibration, the following measures will be implemented (as outlined in the CEMP):

- use a resilient pad (dolly) where feasible between the pile and hammer head to attenuate noise
- adopt a 'soft-start' regime at the start of each day's piling activities to encourage wildlife to move away from the area
- implement a marine mammal observation zone of one kilometre and an exclusion zone of 100 metres during piling activities
- stop piling activities if marine mammals are spotted within or approaching the exclusion zone.

Artificial Lighting

The RDEIS documentation identified that marine turtles may occasionally nest in the harbour but there are no nesting sites adjacent to the Trinity Inlet shipping channel or port. Submissions on the EIS documentation raised issues about artificial lighting effects to sea turtles.

Marine turtles could become disoriented due to artificial lighting, particularly during nesting and hatching periods. Marine turtles nesting or hatching in the harbour could be disoriented by light spill from the port and dredging activities. However, given there are no nesting sites adjacent to the Trinity Inlet shipping channel or port and there is a low incidence of turtles nesting in the harbour, the likelihood of any potential impact would be low. To ensure that potential impacts from artificial lighting are minimised, low wattage or directional light fixtures will be used. The DMP proposes that light levels from the dredging works will be limited to those lights that are necessary for the safe operation of the vessel and the health and safety of those onboard.

12.3.3 Cultural Heritage

Queensland Cultural Heritage

Cairns Wharf Complex

The Cairns Wharf Complex is listed as a state heritage place (ID: 601790) for aesthetic, scientific, historic and social values.

Wharves 1 to 5 and their associated sheds were originally constructed from 1910–1929. A new building was constructed in 1984 as a cruise liner terminal, opening the wharf to cruise ships.

Wharf 6 was constructed during WWII and demonstrates the importance of Cairns as a centre for Pacific forces. Its timber and reinforced concrete construction reflect wartime expediency. It is in poor condition from weather exposure and borer infestation. The structural assessment in the EIS documentation found that Wharf 6 does not comply with current Australian standards for the design of maritime structures (AS4997-2005) and is not fit for purpose.

Ports North will be required to submit a development application for works on the State heritage place, that will need to include a description of the proposed development, a heritage impact statement and additional information addressing specific technical issues and relevant mitigation measures in a conservation management plan.

Malay Town

Malay Town was a multicultural camp located at the mouths of Alligator and Lily Creeks from the late 1890s. It was demolished in the 1940s to reclaim land to expand the Cairns wharf area. While it is not a State

heritage place, it may be possible that archaeological material from the camp may be uncovered during upgrading works at the Port of Cairns.

Ports North is committed to engaging a suitably qualified archaeologist to monitor excavations in the vicinity of the Malay Town site to address recovery, protection and, if required, documentation of archaeological artefacts, features and deposits that may be uncovered.

Underwater Cultural Heritage Artefacts

At least three historic shipwrecks, the Adieu, Mary and Miro, may be located within the proposed Crystal Swing Basin. However, the exact locations and integrity of the wrecks are unknown and the EIS documentation notes that such material has not been uncovered in any maintenance dredging programs to date.

Ports North is committed to engaging a suitably qualified maritime archaeologist to review hydrographic surveys to determine the likelihood of whether maritime archaeological features are present in the area. The archaeologist will also be engaged to establish the extent of known shipwrecks and prepare a report on the likelihood of the presence of additional wrecks or maritime archaeological features in the project area.

Aboriginal and Torres Strait Islander Cultural Heritage

Story Places

Story places significant to the Gimuy Walubara Yidinji People may be impacted by dredging activities and port upgrades.

Ports North has commenced engagement with the relevant Aboriginal and Torres Strait Islander parties and will develop CHMPs with each affected party.

12.3.4 Maritime Transport

Key issues associated with maritime transport and the Project are pilotage and captains unfamiliar with channel navigation within the port limits as a result of capital dredging and port upgrade activities.

Capital Dredging Impacts and Mitigations

The dredging program will involve the removal of 1,000,000 cubic metres of in situ sediment material for onshore placement including:

- soft clay drawn via TSHD
- stiff clay materials via BHD, transported to Tingira Street DMPA utilising a tug boat.

Both dredgers are proposed to operate seven days a week with 24-hour operations. Dredging activities will generate vessel traffic in the inner port and may impact on vessel safety and navigation of other traffic such as commercial shipping vessels, tug boats, pilot boats, navy vessels, and fishing and recreation vessels. Dredging activities could also increase the likelihood of collisions, delays, congestion and interfere with scheduled shipping movements.

Potential maritime transport impacts in the existing port navigation areas during the pre-construction and construction phases include:

- ship collisions or groundings
- discharge of general and hazardous waste generated by dredging activities
- oil and fuel spills from dredges.

Ports North is responsible for maintaining navigable port depths, port facilities and port operations while vessels are alongside its facilities. Ports North's marine pilots undertake pilotage of all cruise ship transits of the Cairns Shipping Channel, berthing arrivals and departures.

The RDEIS documentation reported that concurrent movement of shipping within the channel and inner port during the Project's dredging activities will be managed through communication between vessel operators and MSQ. Procedures are in place at the port where shipping movements, dependent on size and movement requirements, are managed to allow optimisation of channel and inner port use.

To assist in managing potential vessel interaction impacts, Ports North will:

- prepare and implement a vessel traffic management plan (VTMP) if deemed necessary by the RHM to manage potential marine traffic and safety issues from vessel operations
- consult with MSQ, the Regional Harbour Master (RHM) and other relevant advisory agencies during the development of the VTMP
- include the implementation of measures designed to ensure the safe movement of dredgers and vessels during the dredging program in the VTMP.

The VTMP would bolster existing port operational procedures.

The CGER includes conditions requiring Ports North to develop and implement a VTMP and for the plan to be approved prior to the commencement of the dredging program.

Once the dredging program commences, the general safety and management of vessel traffic would be controlled under Standard for Marine Construction Activities within Cairns Harbour by the RHM's direction under section 86 of the *Transport Operations (Marine Safety) Act 1994.*

Ancillary Infrastructure and Port Upgrade Impacts and Mitigations

Construction of the port upgrade is likely to precede the dredging program. Existing navigation aids will need to be relocated and new navigation aids installed as part of the Project. Marker buoys will also be required to demarcate the Crystal and Smiths Creek swing basins.

To allow larger cruise ships to berth, additional independent structures will need to be incorporated into the wharves. With the projected increase in ship arrivals, Wharf 6 will be rebuilt to allow for berthing of two mega class ships simultaneously. This will include the installation of a new independent berthing and mooring structures.

The port upgrade works at the terminal and the installation and or removal of navigation aids will require the following marine vessels:

- pile driving barge to deliver piling and construction material
- ancillary work boat to reposition the barge
- ancillary small vessel for transport of personnel.

The activities involved with the deployment of marine equipment and vessels associated with the construction of the wharf upgrade and navigational aid installation works will have a duration of six to eight months during the pre-construction, construction and decommissioning phases.

The RDEIS documentation also assessed the safety risks associated with movement of cruise ships and navigational hazards associated with the Project.

Ports North proposes to ensure safety, efficiency and environmental objectives are achieved for the movement and navigation of vessels through a VTMP that would be developed in consultation with MSQ, RHM and other relevant advisory agencies.

The CGER includes conditions requiring Ports North to consult with the RHM in determining necessary maritime infrastructure mitigation measures and the development and approval of an aids to navigation plan prior to the commencement of project construction.

Operational Impacts and Mitigations

The RDEIS documentation indicated that increased shipping activities and movements could increase the likelihood of collisions, delays, congestion, and grounding of all port operations.

There are procedures for the safe passage and handling of vessel traffic, with management controls and actions for the port currently in place. The EIS documentation notes there would be no change to anchorage procedures for operational vessels and no update to current procedures.

A submission on the EIS requested further information on pilotage procedures and for that information to be made available to international cruise ships.

The EIS documentation also notes that pilotage areas fall under the control of the MSQ through the authority of the RHM. Ports North, in consultation with the RHM and MSQ, will update the Project's pilotage and navigational safety requirements in accordance with RHM and MSQ guidelines. The Cairns MSQ currently provides this information within its Port Procedures and Information for Shipping for the Port of Cairns policy.

Management plans involving maritime safety, vessel traffic and navigation are required to be prepared and reviewed by the RHM prior to commencement of the Project. Ports North has prepared a maritime operations management plan (MOMP) to manage such impacts. The MOMP outlines mitigation measures required to manage the environment, vessel safety, navigation and operational efficiency of the port.

Ports North has committed to implement the necessary management plans and to working with the RHM and MSQ to ensure all relevant management plans are regularly audited.

12.3.5 Noise and Vibration

12.3.5.1 Current Situation

Noise

Ports North conducted background noise monitoring at apartments and hotels located approximately 100 metres from the proposed construction worksite and within the Trinity Inlet shipping channel. Data was gathered in accordance with the DES Noise Measurement Manual (2013).

In the absence of Queensland construction noise criteria, the NSW Department of Environment and Climate Change Interim Construction Noise Guideline (2009) (ICNG) was used to develop noise level targets for the Project. The ICNG recommends management levels for noise at residences and how they are to be applied, including the highly noise affected level (75 dB(A)) above which there may be strong community reaction to noise.

The assessment considered a best-case and worst-case scenario, where the best case assumes wind speeds of zero metres per second with 60 per cent humidity, while the worst case assumes wind speeds of two metres per second with 80 per cent humidity. The worst-case scenario is representative of a conservative assessment, with potential impacts likely to be lower than predicted. Where construction works are proposed to occur 24 hours per day, seven days per week, the assessment focussed on compliance with the

more stringent night-time noise goals. Underwater noise impacts from the construction of the Project are discussed in Section 12.3.2.

The TSHD noise assessment did not consider residential boat moorings as part of the assessment, based on the premise that Ports North would control the use of the moorings to limit the potential for construction noise impacts to those sensitive receptors.

Vibration

The impact of vibration on human comfort was assessed by applying the vibration impact criteria recommended by the NSW Department of Environment and Conservation's Assessing vibration: A technical guideline 2006 and British Standard (BS) 5228.2 Code of Practice for noise and vibration control on construction and open sites (2009). The impact of vibration on buildings was assessed using German Standard (DIN) 4150:3 Structural vibration – Effects of vibration on structures (1986).

12.3.5.2 Impacts and Mitigation Measures

Capital Dredging – Construction Impacts and Mitigations

TSHD Dredging

TSHD dredging is proposed to occur 24 hours per day, seven days per week for 12 weeks. Noise would be generated through the operation of the dredger and the movement of dredge material to the offshore pump-out area.

In the absence of mitigation measures, the assessment predicted that during standard construction hours (6.30 am to 6.30 pm, Monday to Saturday), noise levels produced by the TSHD may be above the noise level target of 62 dB(A) for the majority of TSHD works. However, the assessment noted that the TSHD would be highly mobile within the channel and unlikely to result in noise exposure at any single receptor for an extended period of time. If the TSHD works are undertaken outside of standard construction hours, moored sensitive receptors located in the Trinity Inlet shipping channel would experience noise levels above the evening and night-time noise level targets of 55 dB(A) and 52 dB(A) respectively.

Should the TSHD remain in the vicinity of a sensitive receptor for more than one month, the expected noise impact outside of standard construction hours would increase to 'moderate', where noise above the 'highly noise affected level' of 75 dB(A) may be experienced at sensitive receptors.

Assessment conducted as part of the RDEIS predicts that vibration from TSHDs would be below 0.1 mm/s for all sensitive receptors. This is well below vibration impact criteria for all sensitive receptor types and is considered to be a 'negligible' impact.

In order to manage the potential impacts from the operation of the TSHD for both construction and operations, dredging will be scheduled to avoid dredging within Trinity Inlet shipping channel in the vicinity of sensitive receptors outside of standard construction hours wherever possible.

However, should scheduling constraints prove infeasible, potentially affected sensitive receptors will be consulted and the proposed mitigation measures reviewed based on this consultation. The use of the boat moorings as residences during the construction of the Project may be limited to prevent the potential for noise impacts.

Ports North has committed to consulting with the moored sensitive receptors near construction areas to manage the potential impacts associated with TSHD dredging.

Backhoe Dredging

Works requiring the BHD are proposed to be undertaken 24 hours per day, seven days per week for five weeks. Noise would be generated by the BHD machinery during the excavation of sediments from the seabed.

Without mitigation, backhoe dredging is predicted to result in 'minor' noise impacts to all sensitive receptors (including closest sensitive receptors located approximately 100 metres away along Wharf Street and within the Trinity Inlet shipping channel) during standard construction hours. Should dredging be undertaken in the vicinity of the Wharf Street waterfront outside of standard construction hours, it is predicted that there would be 'high' noise impacts and the potential for sleep disturbance to sensitive receptors located along Wharf Street and within the Trinity Inlet shipping channel.

Ports North has identified the following mitigation measures to address the identified backhoe dredging noise impacts:

- should scheduling constraints (avoidance of works during night-time hours) for backhoe dredging prove infeasible, affected residents would be consulted about potential mitigation measures
- all works will be undertaken in accordance with Australian Standard (AS) 2436 Guide to noise and vibration control on consultation, demolition and maintenance sites (2010)
- a construction noise and vibration management plan will be prepared that details noise mitigation measures agreed in consultation with DES or CRC.

Ports North has committed to avoid backhoe dredging in the immediate vicinity of the Wharf Street waterfront outside of standard construction hours. Ports North will also consult with moored sensitive receptors located in Trinity Inlet and at Wharf Street waterfront near project activities to manage potential impacts of all forms of dredging.

The CGER includes conditions requiring Ports North to ensure that mitigation strategies are updated in response to feedback from sensitive receptors.

Ancillary Structures and Port Upgrade – Construction Impacts and Mitigations

Wharf Construction

Wharf construction associated with port upgrades is proposed to be undertaken over 12 months and would be limited to occurring only within the standard construction hours of 6.30 am to 6.30 pm, Monday to Saturday. Minor works unlikely to result in significant noise may be undertaken outside of standard working hours.

The greatest noise impact would be generated through driving the 84 racking steel piles required for the reconstruction of Wharf 6. The potentially worst-affected sensitive receptors will be the residential apartments and hotels located on Wharf Street and the moored residences within the Trinity Inlet shipping channel.

The assessment predicted that without mitigation measures, piling noise will generate noise above the relevant daytime construction noise target by 5 dB(A). If works are undertaken during the night-time period, piling will generate noise above the relevant night-time noise target by 15 dB(A). The assessment concluded that piling will result in 'minor' noise impacts to sensitive receptors when undertaken during standard construction hours. If piling is to be undertaken outside of standard construction hours, the level of impact will increase to 'high' at Wharf Street sensitive receptors and 'moderate' for Trinity Inlet sensitive receptors and may result in sleep disturbance impacts.

The RDEIS documentation notes that vibration levels from piling are dependent on the hammer energy, which is related to the hammer mass and drop height. For typical hammer energies, the assessment predicts that vibration would be experienced as a 'minor' impact at Wharf Street residential receptors, within the range of 0.3 PPV to 1.0 PPV for the duration of piling (for one month). The EIS documentation notes that human comfort vibration impacts may be experienced if vibration levels exceed 0.3 mm/s PPV.

To manage potential impacts to the heritage wharf, the piling hammer energy would be controlled and reduced as the piling rig approaches the wharf. This is expected to result in a 'negligible' impact. Further, the proponent would also set vibration criteria for piling activities to avoid heritage damage to the wharf.

The following mitigation measures are proposed in the CEMP to address the potential piling noise and vibration impacts:

- if night-time works are required, residents will be consulted to explore mitigation options including:
  - monitoring of noise generated by piling works, to identify when noise may be above the relevant noise targets and further mitigation is required
  - respite period and shutting down of intermittently used machinery
  - temporary alternative accommodation if night-time works occur over an extended period
  - piling soft-start procedures
  - regular maintenance of vehicles and machinery and muffling devices
- resilient pads will be used where feasible between the pile and hammer to reduce airborne noise impacts, in accordance with British Standard (BS) 5228 Code of practice for noise and vibration control on construction and open sites (2009)
- hammer energy used to undertake piling will be limited, based on the distance to nearest sensitive receptors and structures
- potentially affected residents will be notified of any out-of-hours construction works
- the contractor will review existing dilapidation surveys for the heritage wharf during planning of, and prior to commencement of, construction, and adjust the construction program accordingly
- vibration monitoring will be undertaken on the first day of piling to confirm and calibrate the vibration predictions and develop vibration criteria to avoid damage to the heritage-listed wharf.

Ports North has committed to limiting piling activities to standard construction hours, unless approval is obtained from DES or CRC to justify construction works outside 6:30 am to 6:30 pm.

Noise and vibration activities generated through construction works associated with the port upgrades will be addressed and managed through future development application made by Ports North under the *Planning Act 2016*.

The CGER includes conditions requiring Ports North to ensure that impact mitigation strategies are implemented in response to feedback received from sensitive receptors.

IFO Pipeline

The construction of the intermediate fuel oil (IFO) pipeline is expected to take more than one month and will be undertaken during standard construction hours. Modelling indicates that construction of the IFO pipeline will comply with construction noise level targets at sensitive receptors near the wharf construction area.

Noise and Vibration – Operational Impacts and Mitigations

Operational noise sources will include noise generated by:

- ship propulsion engines, berthing motors, auxiliary engines and ventilation systems
- docking, loading and unloading of ships, including refuelling
- use of ship public address systems.

The Port of Cairns operates 24 hours per day, seven days per week, 365 days per year. Sensitive receptors are already exposed to high noise levels due to their proximity to the port and surrounding industrial areas. Although the Project would not introduce a new noise source, the amount of operational noise generated will increase as a result of the expansion.

The assessment considered typical noise emissions likely to be produced by various sizes of cruise ships during the Project's operational phase, and the associated impacts at the nearest sensitive receptors, which include the apartments and hotels located approximately 100 metres from the wharf. Table 12.3 provides the noise criteria adopted for the assessment of operational noise for the Project.

Table 12.3: Planning Level Noise Criteria for Operational Noise

TIME PERIOD	BACKGROUND LEVEL (RBL L_{90} (1 HOUR) DB(A))	EPP (NOISE) OBJECTIVE $L_{AEQ,ADJ,1HR}$ DB(A)	CALCULATED EXTERNAL NOISE LIMIT L_{EQ} (1 HOUR) DB(A)
Day	54	35	42- doors/windows open 55 – doors/windows closed
Evening	48	35	42 – doors/windows open 55 – doors/windows closed
Night	46	30	37 – doors/windows open 50 – doors/windows closed

Existing worst-case operational noise assessments were based on noise likely to be generated by the Rhapsody of the Seas, the largest ship that currently accesses the Port of Cairns. During worst-case conditions and without mitigation, Rhapsody of the Seas could produce noise emissions up to 55 LeqdB(A), which is above the night-time EPP(Noise) objective by 25 dB(A). The assessment found that operational noise above the EPP(Noise) objectives is likely to be produced during best-case conditions by up to 24 dB(A).

The assessment predicts that during operations, without mitigation and during worst-case conditions, noise generated by medium-sized ships would be above the night-time EPP(Noise) objective by up to 23 dB(A). Large ships were also predicted to generate noise above the objectives by up to 25 dB(A) during worst-case conditions, an impact consistent with existing operations. Similar noise levels above the noise objectives are predicted for both medium and large ships during best-case conditions.

However, when taking into account the noise attenuation that could be provided (20 dB(A)) if doors and/or windows are closed in surrounding properties, medium and large ships would only generate noise above the night-time EPP(Noise) objectives by up to 3 dB(A) and 5 dB(A) respectively during worst-case conditions.

Ports North has indicated to date, that no noise complaints have been received during visits by Rhapsody of the Seas. In conclusion, the assessment stated that cruise ship transits would not occur at night, would be discrete sound events and therefore noise levels above the noise objectives are unlikely to occur and can be considered low-risk.

Should operational noise impacts occur, mitigation measures to reduce operational shipping noise impacts may include:

- avoid running the ships primary propulsion engines at night (between 10:00 pm and 6:00 am)
- avoid conducting loading or unloading activities or refuelling at night
- avoid the use of the ship's external public address system at night.

If ships berthed at the Port of Cairns need to conduct noise-generating activities at night, Ports North may update its operational procedures to require ship operators to provide advance notice of their intention to do so. Additional management measures may also be implemented such as notification of surrounding residents of potentially noisy night-time activities and directing residents to details of the port's complaints handling procedure.

12.3.6 Air Quality

12.3.6.1 Current Situation

The RDEIS documentation adopted baseline air quality values for pollutants based on a review of baseline monitoring undertaken for projects in similar locations. Data obtained from air quality monitoring stations located at Earlville (Cairns), Pimlico (Townsville), Gladstone Memorial Park, South Gladstone and Toowoomba was used.

In order to simulate the impacts from construction and operational activities, dispersion modelling software California Puff Model (CALPUFF) was used to predict pollutant concentrations and dust deposition at the nearest sensitive receptors.

The Air Pollution Model (TAPM) was used to generate broadscale meteorological inputs to inform CALPUFF modelling. TAPM used wind speed and direction monitored at Cairns Airport. Cairns has winds predominately from the south-east. TAPM input meteorology was enhanced using Calmet, the meteorological pre-processor to CALPUFF.

The emission rates entered into the dispersion modelling are based on the source and activities scheduled to be undertaken during construction provided by the proponent. The EIS documentation predicted baseline air quality values for pollutants from cruise ships. To estimate air quality impacts associated with the operation of the Port of Cairns, the EIS forecast medium and high projections of annual increases in cruise ships following project completion for 2018 and 2028.

Sensitive Receptors

Sensitive receptors are associated with what is defined as a sensitive land use under the Planning Regulation 2017. These include, among others, dwellings (boats, apartments, houses), hotels and community centres.

Capital Dredging

There are three sensitive receptors adjacent to the shipping channel. These include hotels and an apartment. The EIS identified the nearest sensitive receptor as sensitive receptor (SR) F, Cairns Hilton Hotel, located approximately 80 metres west of the shipping channel.

Port Upgrades

There are five sensitive receptors near the port upgrade area. The EIS documentation identified the nearest sensitive receptor as SR E, the Pullman Reef Hotel and Casino, located approximately 100 metres west of the proposed port upgrade area. The remaining sensitive receptors are hotels and apartments, each located approximately 180 metres west of the port upgrade area. Moored boats are used as dwellings on the east side of Trinity Inlet and are considered a sensitive receptor. The distances of these boats from project activities vary, with the nearest boat located approximately 395 metres from port upgrade activities.

12.3.6.2 Impacts and Mitigation Measures

Pre-construction and Construction Impacts

Dredging is proposed for 24 hours per day, seven days a week, for 12 weeks, unless noise restrictions apply.

The RDEIS documentation states that construction of port upgrades will be undertaken between 6.30 am and 6.30 pm, Monday to Saturday, and will take an estimated seven to eight months intermittently over a year. Upgrades to existing water mains, firefighting equipment, installation of a sewage pump station and installation of an additional fuel storage tank will be undertaken concurrently with port upgrades.

Sources of air pollutants from these activities include:

- exhaust emissions from the TSHD moving progressively up and down the shipping channel dredging soft clay, then motoring to the pump-out facility
- exhaust emissions from the barge-mounted backhoe excavating stiff clay
- exhaust emissions from the barge motoring to and from the Tingira Street DMPA
- exhaust emissions from construction plant equipment
- dust from vehicle movement on unsealed roads
- dust from exposed soil under high wind conditions from port upgrade activities
- odour from dredge material being exposed to air.

The RDEIS documentation air quality assessment concluded that potential impacts of unmitigated capital dredging activities and port upgrade activities may result in exceedances of the air quality objectives for $PM_{2.5}$, PM_{10}, NO_2 and dust deposition at SR B, SR C, SR D and SR E. These sensitive receptors are hotels and apartments located on the corner of Lake, Wharf and Abbott streets, approximately between 100 and 130 metres west of the port upgrade area. All concentrations of other pollutants are expected to be below the air quality objectives.

Particulates $PM_{2.5}$ and PM_{10}

The model assumes the BHD used for stiff clay excavation and the associated tugs will use heavy fuel oil and will be constantly emitting relatively close to sensitive receptors. The EIS documentation confirms the BHD will be close to sensitive receptors for a small portion of the 12-week dredge campaign and the barge transfer will occur intermittently within each day. In addition, the BHD and tugs will use marine diesel fuel to provide a major reduction in particulate and black smoke emissions ($PM_{2.5}$ and PM_{10}). The use of marine diesel fuel and the intermittent nature of project activities means that potential air quality impacts to sensitive receptors can be adequately managed. The CGER details this commitment to use marine diesel fuel.

Dust Deposition

Increased dust deposition and particulate emissions may be experienced at the port upgrade area due to vehicle movement on unsealed roads and wind erosion of exposed soil. The EIS predicted the maximum concentration of dust deposition would be 135 $mg/m^2/day$, which is above the air quality criteria of 120 $mg/m^2/day$. To mitigate these impacts, wharf construction dust management measures will be adopted as required to minimise dust generation. The RDEIS reported the use of water sprays is efficient at mitigating 75 per cent of dust produced.

Nitrogen Dioxide

Nitrogen oxides refers to nitrogen monoxide (NO) and nitrogen dioxide (NO_2).

The air dispersion model assumed the excavator and crane used for port upgrades will be constantly emitting emissions from 7 am to 7 pm Monday to Saturday. To mitigate potential NO_2 exceedances, mobile cranes will be fitted with SCR emission control technology. The EIS states that SCR emission controls typically reduce NO_X emissions by 90 per cent. With the application of SCR emission controls, the nearby sensitive receptor will experience 61 $\mu g/m^3$ of NO_2, which is well within the air quality criteria.

Submissions received on the EIS documentation raised issues regarding the need for baseline air quality monitoring, in particular monitoring of NO_2 and fine particles ($PM_{2.5}$) at the Wharf Street apartments, as soon as possible. This will be conducted at berth and a location representative of the apartments on Wharf Street between Lake and Abbott Streets and the air quality dispersion model will be re-run.

Construction Mitigation Measures

In addition to the specific measures listed above, the CEMP will include standard mitigation measures, which include:

- dust and wind will be monitored on site and work that may generate dust will cease if strong winds occur
- all project personnel will receive training in air quality control practices
- water carts, sprinklers and sprats and dust screens will be used where appropriate to control dust emissions from exposed surfaces and dust generating activities at a frequency appropriate to conditions
- rumble grids and course aggregate will be installed at exit roads to prevent soil being deposited onto public roads
- manual cleaning of vehicles and roads will be conducted as required
- construction equipment, including dredging vessels, will be properly maintained to ensure exhaust emissions comply with relevant standards
- drop heights from trucks will be less than two metres
- truck loads are to be covered
- any complaints from the public are to trigger investigation by the operator to determine appropriate control measures
- waste will be segregated and collected regularly to control odours.

The CEMP describes the monitoring and corrective actions that would be implemented in the event of air quality complaints. Complaints will be recorded and responded to in a timely manner. Air quality monitoring for 12 months in accordance with the Environmental Protection (Air) Policy 2008 may be implemented as part of complaint resolution. The CEMP confirms the existing complaints procedure will be reviewed to ensure it is adequate to address any issues that may arise as a result of the Project.

Operational Impacts

Following completion of the Project, it is expected that 177 cruise ships, including 164 mega cruise ships will berth at the Port of Cairns in 2026. With the construction of Wharf 6, two mega class cruise ships will be able to berth simultaneously, a situation that already occurs and is likely to occur more often.

Associated with this increased cruise ship arrival is the associated increase in services to these cruise ships. This includes buses, taxis, private vehicles for passenger movement, delivery trucks and fuel tankers to service the cruise ships.

Sources of air pollutants during operations include:

- exhaust emissions from cruise ships traversing the channel and manoeuvring to the wharf
- exhaust emissions associated with transport of people to the cruise ship terminal
- fugitive emissions from the fuel storage tank
- various emissions from activities undertaken at the wharf to service the cruise ships
- odour emissions from waste removal from cruise ships.

Cruise Ships Exhaust Emissions

The RDEIS documentation found that ships emit high levels of fine particulates, observable as dark smoke from the combustion of marine diesel fuel. The International Maritime Organization (IMO) through enacting the International Convention for the Prevention of Pollution from Ships (Annex VI) seeks to control air quality impacts associated with shipping. Annex VI, regulation 14 mandates from 1 January 2020 that ships must use low sulphur fuel (0.5 per cent). Annex VI, regulation 14 is to be enforced by the Queensland Government by passing legislation. The Queensland Government is responsible for enforcing the low sulphur fuel mandate within three nautical miles of land, with the responsibility for meeting air pollution limits resting with ship operators. Although particulate filter controls and scrubbers are not mandated for ships, the requirement to use low sulphur fuel (0.5 per cent) post 1 January 2020 will lead to the installation of scrubbers on ships or fuel with 3.5 per cent sulphur content and scrubbers.

Low Sulphur Fuel

The RDEIS predicts cruise ships will meet the IMO low sulphur fuel mandate by installing scrubbers, based on uptake to date and difficulty obtaining low sulphur fuel. The EIS documentation reported the installation of scrubbers reduced particle emissions by 73 per cent and that 68 per cent of cruise ships have scrubbers installed. The air quality assessment for 2028 assumed that all cruise ships will be compliant with the IMO mandate, with 68 per cent of cruise ships having scrubbers installed and the remaining cruise ships using low sulphur fuel.

Ports North will conduct a survey of ship fuel consumption and fuel type while ships are berthed at the wharf, prior to the commencement of construction. This fuel survey will include at least cruise ships and tankers to assist in impact prediction modelling and management planning.

$PM_{2.5}$ and NO_2

The RDEIS documentation worst-case modelling concluded that mitigated operational activities at the wharf may result in exceedances of the air quality objectives for $PM_{2.5}$ and NO_2 at the worse affected SR C, Jack & Newel Apartments. SR C is located approximately 130 metres west of the wharf area. All concentrations of other pollutants are expected to be below the air quality objectives.

The EIS found when 100 per cent of cruise ships use scrubbers, the maximum concentration of $PM_{2.5}$ for a 24-hour averaging period would be 28 $\mu g/m^3$, which is slightly above the air quality criteria of 25 $\mu g/m^3$. $PM_{2.5}$ for a year averaging period would be 10 $\mu g/m^3$, which is marginally above the air quality criteria of 8 $\mu g/m^3$. The $PM_{2.5}$ objective was exceeded for one day in the modelled year when there was moderate south-east wind with neutral stability class and relatively high mixing height through the 24-hour day.

The EIS found when 100 per cent of cruise ships use scrubbers, the maximum concentration of NO_2 for a 1-hour averaging period would be 299 $\mu g/m^3$, which is above the air quality criteria of 250 $\mu g/m^3$. The NO_2 concentration was exceeded for ten hours in the modelled year between 6 pm to 7 am, when there was light south to south-east wind with low mixing height at approximately 50 metres.

In order to mitigate these exceedances, additional mitigation measures are provided below.

Odour Emissions from Waste Removal

The RDEIS predicts the odour emission from cruise ship waste removal would be similar to those from waste removal at land-based restaurants. To mitigate potential odour emission impacts, spillage of waste will be avoided and waste being removed will be covered. The RDEIS documentation found that with the implementation of these mitigation measures, odour from the waste removal is unlikely to cause nuisance at nearby sensitive receptors.

Operational Mitigation Measures

In order to mitigate the impacts from operation of the Port of Cairns, the MOMP includes the following mitigation measures:

- Cruise ship owners will be encouraged to implement regular maintenance and engine tuning, install catalytic converters to reduce emissions of nitrogen oxides and reduce idling time at berth before departure and after arrival.
- Efforts will be made to minimise standing losses, working losses and soils in fuel storage and dispensing activities.

Ports North will liaise with cruise ship companies, AMSA and DES to help ensure compliance with regulations regarding scrubbers on engines and use of low sulphur fuel, or equivalent, to achieve air quality emission standards while ships are berthed at the wharf.

12.3.7 Greenhouse Gas Emissions

12.3.7.1 Current Situation

The RDEIS documentation considered six gases listed in the Kyoto Protocol and National Greenhouse and Energy Reporting Regulations 2008, which included:

- carbon dioxide (CO_2)
- methane (CH_4)
- nitrous oxide (N_2O)
- hydrofluorocarbons (HFCs)
- perfluorocarbons (PFCs) and
- sulphur hexafluoride (SF_6).

The RDEIS documentation reported that no data is available for current greenhouse gas (GHG) emissions from the Cairns region. The GHG emissions emitted from current cruise shipping facilities at the Port of Cairns, which includes electricity usage and fuel oil use, do not trigger the *National Greenhouse and Energy Reporting Act 2007* (Cth) (NGER Act) and its reporting requirements. The RDEIS documentation used the National Greenhouse and Energy Reporting Scheme Measurement Technical Guidelines to estimate GHG emissions during the construction of the Project and operation of the Port of Cairns. To estimate GHG emissions impacts from cruise ships in the Port of Cairns, the EIS forecast medium and high projections of annual increases in cruise ships following Project completion for 2018 and 2028.

12.3.7.2 Impacts and Mitigation Measures

Construction Impacts and Mitigations

The EIS documentation found GHG emissions would be generated during construction through capital dredging operations, and fuel combustion in plant equipment used in construction. The RDEIS found the largest contributor of GHG emissions during construction will be fuel combustion from the TSHD.

The total GHG emissions from the construction phase are estimated to be 22.95 kilotonnes of CO_2 equivalent (ktCO2-e). The GHG emissions estimated to be emitted from construction activities do not trigger the NGER Act and its reporting requirements.

In order to mitigate potential GHG emissions, Ports North will:

- select dredging equipment with low emissions and maintain the engines
- undertake periodic energy and fuel audits to monitor energy and fuel use and implement reduction strategies
- provide training to drivers and employees to ensure fuel-efficient practices, such as turning off engines when not in use
- inspect plant equipment to ensure fuel efficiency.

Operational Impacts and Mitigations

The RDEIS documentation found GHG emissions would be generated during operation of the port through maintenance dredging operations from fuel combustion in tugs used to move vessels, and electricity use at port.

The EIS found the largest contributor of GHG emissions during operation will be fuel combustion from the dredge. The total GHG emissions from the operation of the port are estimated to be 0.97 tonnes CO2-e. The GHG emissions estimated to be emitted from operational activities do not trigger the NGER Act and its reporting requirements (required once emissions from a facility exceed a carbon dioxide equivalent (CO2-e) of 25 000 tonnes per annum).

In order to mitigate potential GHG emissions, Ports North will:

- select dredging equipment with low emissions and maintain the engines
- provide training or awareness programs to berthed ships on energy-efficient practices
- install energy efficient measures at the port, such as lighting controls and sensors
- identify opportunities to generate renewable energy at the port.

12.3.8 Dredge Material Delivery

This section evaluates key environmental impacts associated with delivery of dredge material from the dredging area to the Tingira Street DMPA and Northern Sands DMPA.

12.3.8.1 Overview of Dredge Delivery

The delivery of dredge material to the Tingira Street DMPA will require loading dredge material from the BHD to a barge. A tug boat will tow the barge to a proposed dredge barge access adjacent to Smiths Creek. A barge-mounted excavator will transfer dredge material to off-road haulage vehicles and deliver the dredge material to either of the two placement sites located within the Tingira Street DMPA.

Delivery of dredge material to the Northern Sands DMPA will require a TSHD to transport dredge material between the dredging area in Trinity Inlet and pump-out facility located offshore from Yorkeys Knob. The TSHD will moor at the pump-out facility, where dredge material will be pumped into the delivery pipeline for transport to the Northern Sands DMPA. The offshore segment of the pipeline will be submerged. The delivery pipeline will come ashore at the mouth of Richters Creek suspended on low earthen plinths. The delivery pipeline will cross Richters Creek and cane farms before entering a culvert where it transects the Captain Cook Highway. The delivery pipeline will terminate at the Northern Sands DMPA. Three booster

pumps are proposed to be placed along the delivery pipeline route to support the delivery of dredge material.

Assembly of the delivery pipeline will be undertaken at three 0.5-hectare laydown areas. One laydown area will be established at the Northern Sands site and two directly adjacent to the delivery pipeline corridor. These laydown areas are inland from and on the opposite side of Richters Creek to the Holloways Beach Environmental Education Centre. The delivery pipeline is proposed to be delivered to Cairns either by road transport or sea freight in segments typically up to 12 metres in length. The delivery pipeline segments will be transported by road to the laydown areas.

Following completion of the Project, disassembly of the delivery pipeline, storage of plant and equipment and general works will also be undertaken at the laydown areas.

Activities associated with the delivery of dredge material to the Tingira Street DMPA and Northern Sands DMPA could affect sensitive noise receptors, marine water quality and coastal processes, MSES, maritime safety, state and local roads and Aboriginal and Torres Strait Islander cultural heritage.

12.3.8.2 Current Situation

Matters of State Environmental Significance

The following NC Act-listed species may be found in Trinity Bay and Trinity Inlet:

- Australian snubfin dolphin (*Orcaella heinsohni*)
- Indo-Pacific humpback dolphin (*Sousa chinensis*)
- dugong (*Dugong dugon*)
- green turtle (*Chelonia mydas*)
- hawksbill turtle (*Eretmochelys imbricata*)
- flatback turtle (*Natator depressus*).

Ports North conducted surveys of the offshore segment of the delivery pipeline and the pump-out facility in August and September 2016. Surveys did not identify any seagrass and found only sparse benthic communities.

The onshore segment of the delivery pipeline is proposed to make landfall at Richters Creek mouth, which is within the Yorkeys Creek FHA. It spans 117 hectares and covers Yorkeys Creek and the downstream end of Richters Creek. The EIS documentation indicates that Richters Creek mouth could provide potential habitat for the beach stone-curlew (*Esacus magnirostris*), as surveys conducted for another project identified a breeding pair at this location.

Survey results also identified that vegetation at the mouth of Richters Creek and at delivery pipeline crossings along the creek includes mangroves, a melaleuca wetland, regulated vegetation and mapped essential habitat for the southern cassowary (*Casuarius casuarius johnsonii*). Ant plants (*Myrmecodia beccarii*) were also located in the mangroves along Richters Creek.

Water Quality and Coastal Processes

Marine Water Quality

The existing marine water quality within Trinity Inlet and Trinity Bay is characterised by naturally high turbidity levels, especially during periods of high rainfall and sustained winds and currents. The water within near-shore areas is shallow and characterised by muddy benthic sediments. In areas further offshore, background turbidity levels are considered low.

Surface Water Quality

Surface waterways in the vicinity of the onshore segment of the delivery pipeline include:

- the Barron River, which drains into Trinity Bay between the Cairns Airport and the township of Machans Beach
- the Thomatis/Richters Creek system, which forms a major distributary of the Barron River.

The Barron River and Thomatis/Richters Creek are typically subjected to fluctuating salinity levels due to a strong tidal influence, and receive run-off from a predominantly agricultural area.

Coastal Processes

The coastal environment traversed by the TSHD, pump-out facility and offshore segment of the delivery pipeline is considered a high-energy environment comprised of highly mobile sands influenced by wind, waves and currents, and are subject to regular natural disturbance.

Longshore sediment transport in the vicinity of the offshore segment of the delivery pipeline indicates that the beach system is very dynamic, particularly in response to sand supply and movements of the mouths of the Barron River, Richters Creek and Yorkeys Creek. The longshore sand transport regime is of relatively modest northward net movement, estimated to be less than 20,000 cubic metres each year.

Traffic and Transport

Maritime Transport

The Port of Cairns and Cairns Harbour are currently visited by cruise ships, commercial shipping vessels, navy vessels, tug boats, pilot boats and fishing and recreational vessels. Ports North manages operational vessel traffic through its operational management practices, protocols and plans and has operational jurisdiction within the Cairns Port limits. Shipping movements and navigation safety for maritime transport in the Port of Cairns and Cairns Harbour are managed by the RHM and MSQ.

Land-based Transport

Key roads in proximity to the onshore segment of the delivery pipeline and Northern Sands DMPA include the Captain Cook Highway, Holloways Beach Road and Yorkeys Knob Road. Captain Cook Highway is a state government-controlled road and the primary route servicing the Northern Beaches of Cairns. Holloways Beach Road and Yorkeys Knob Road are local roads that support movement of traffic from the local beach-side communities to the Captain Cook Highway.

Noise

Existing noise sources surrounding the proposed Northern Sands DMPA consist predominantly of road-traffic noise from the Captain Cook Highway. Insect and bird noise and intermittent jet aircraft landing at Cairns Airport are also existing noise sources. The EIS documentation identified private residences, Yorkeys Knob State School and the Holloways Beach Environmental Education Centre as the key sensitive receptors. All sensitive receptors are generally located between 400 metres to one kilometre from the proposed delivery pipeline.

The dominant noise sources surrounding the Tingira Street DMPA includes industrial noise from the Port of Cairns, birds, road traffic, recreational boating, forklifts, cranes and other plant operating on nearby industrial properties. As the area surrounding Tingira Street is predominantly industrial, by definition in the Environmental Protection (EPP) (Noise) Policy 2008, the only sensitive receptor is the Great Barrier Reef International Marine College, located approximately 160 metres from the site.

The EPP (Noise), prepared under the EP Act, aims to ensure that all reasonable and practicable measures are taken to protect environmental values from environmental harm; specifically, noise impacts from development. The EPP (Noise) provides acoustic quality objectives to be achieved at sensitive receptors.

Aboriginal and Torres Strait Islander Cultural Heritage

The EIS documentation did not confirm any places or artefacts with Aboriginal and Torres Strait Islander cultural heritage along the onshore segment of the delivery pipeline. However, the EIS documentation indicates there is a high potential for Aboriginal and Torres Strait Islander cultural heritage places and artefacts to be uncovered including middens, camp sites and scar trees in coastal areas.

12.3.8.3 Impacts and Mitigation Measures

Matters of State Environmental Significance

Yorkeys Creek Declared Fish Habitat Area

The delivery pipeline is proposed to cross the Yorkeys Creek declared FHA at the mouth of Richters Creek and upstream of Richters Creek. Approximately 0.32 hectares of the Yorkeys Creek FHA could be temporarily affected by the construction and placement of the delivery pipeline. The pipeline is proposed to be in place for six months.

The delivery pipeline could trap sand within the FHA at Richters Creek mouth, creating a possible barrier to fish passage. This would only be a temporary potential impact, given that the delivery pipeline would be in place for six months.

Ports North will regularly inspect the delivery pipeline at Richters Creek mouth to assess the volume of beach sand build-up and, if required, manually relocate the sand to the active beach using a small excavator.

Ports North is also committed to rehabilitating the vegetation cleared for the delivery pipeline once the pipeline has been decommissioned. Further rehabilitation details will be included in the finalised DMP, which will be subject to DES approval prior to construction commencing.

The CGER includes conditions regarding operational works in a declared FHA, operational works that is constructing or raising waterway barrier works and operational works within a coastal management district.

Ports North is required to obtain these approvals prior to construction commencing.

Marine Plants

The RDEIS documentation indicates that the delivery pipeline and pump-out facility may affect marine plants including benthic communities, as well as mangroves, a melaleuca wetland and ant plants.

Benthic communities

The EIS documentation reported that construction of the onshore segment of the delivery pipeline would directly impact 0.12 hectares of subtidal riverbank at the mouth of Richters Creek, which may contain benthic communities. The impact would be temporary and short-term (six months), as the delivery pipeline would be decommissioned once placement of dredge material at the Northern Sands DMPA is complete.

The CGER includes conditions regarding operational works approval for disturbance to marine plants.

Mangroves

Approximately 0.16 hectares of mangroves may be cleared at the proposed delivery pipeline crossings along Richters Creek. The impact area will be confirmed by Ports North during the detailed design stage of the Project.

Ports North is committed to rehabilitating the vegetation cleared for the delivery pipeline once the pipeline has been decommissioned. Further rehabilitation details are expected to be included in the finalised DMP. The EIS documentation reports that the cleared mangroves may take more than five years to rehabilitate to pre-disturbance habitat values. This is a significant residual impact to marine plants. Mangroves are also a MNES and impacts would be managed by DoEE.

Ports North will refine the delivery pipeline route during detailed design to avoid clearing mangroves as far as possible. Ports North will also avoid potential impacts during construction of the delivery pipeline and rehabilitate unavoidable impacts to mangroves after the delivery pipeline is decommissioned.

The CGER includes conditions regarding the operational works approval for disturbance to marine plants. The offset requirements for significant residual impacts to marine plants would be finalised during the detailed design stage of the Project, as part of the operational works approval for disturbance to marine plants.

Melaleuca Wetland

Approximately 0.14 hectares of melaleuca wetland situated at the mouth of Richters Creek is required to be cleared to construct the onshore segment of the delivery pipeline.

Ports North will rehabilitate the melaleuca wetland cleared for the delivery pipeline once the pipeline has been decommissioned. Further rehabilitation details will be included in the finalised DMP.

The RDEIS documentation reports that the cleared melaleuca wetland could take more than five years to rehabilitate to pre-disturbance habitat values. This is a significant residual impact to marine plants.

Ports North will refine the delivery pipeline route during detailed design to avoid clearing melaleuca wetland. Once the design is finalised, Ports North will confirm the impact of the delivery pipeline on the wetland and provide offsets for any significant residual impacts, if required.

The CGER includes conditions regarding the operational works approval for disturbance to marine plants. The offset requirements for significant residual impacts to marine plants would be finalised during the detailed design stage of the Project, as part of the operational works approval for disturbance to marine plants.

Ant Plant

Ant plants would be affected by construction of the onshore segment of the delivery pipeline. Approximately 0.27 hectares of coastal woodland and mangroves that provide ant plant habitat along Richters Creek are proposed to be cleared to construct the delivery pipeline.

As discussed in the marine plants section above, clearing mangroves would be regulated under the development permit for operational works for disturbance to marine plants. Furthermore, the DMP states that vegetation cleared for the delivery pipeline would be rehabilitated.

Ports North will undertake pre-clearance surveys within the delivery pipeline corridor to confirm the number of ant plants that may be affected.

To mitigate impacts to ant plants and to ensure there is no net loss of the species, Ports North will translocate all directly affected ant plants to suitable nearby habitat before any vegetation is cleared. The pre-clearance surveys will inform preparation of the translocation plan, which will be approved by DES before construction starts. The plan will include a monitoring program to verify translocation success. The DMP will be approved by DES prior to construction commencing.

Protected Wildlife

Terrestrial Wildlife

Beach Sone-Curlew

Potential breeding habitat for the beach stone-curlew may occur at Richters Creek mouth, where a breeding pair of beach stone-curlews was recorded during surveys for another project. The delivery pipeline is proposed to make landfall at this location and potentially impact 0.14 hectares of potential breeding habitat for the species, which is a significant residual impact under the EO Act.

Beach stone-curlews breeding at Richters Creek mouth could be temporarily impacted by constructing and decommissioning the onshore segment of the delivery pipeline. Noise generated from construction plant and equipment could also deter beach stone-curlews from using the area.

If breeding beach stone-curlews are recorded at Richters Creek mouth, Ports North will implement the threat abatement actions listed in the Species Recovery Information Gateway (SPRING) database. Actions listed in the SPRING database include:

- mapping habitat for the beach stone-curlew
- contributing to feral dog controls
- monitoring the effectiveness of management actions to reduce disturbance to beach stone-curlews
- increasing awareness of local residents regarding urban development impacts to beach stone-curlews.

Furthermore, Ports North has committed to avoiding negative impacts on the species by conducting works for the delivery pipeline at Richters Creek mouth outside of the species' breeding season, which occurs from September to February. The impact area will be confirmed during detailed design and offsets provided in accordance with the EO Act. Ports North will also rehabilitate the site once the delivery pipeline is decommissioned to ensure the return of the habitat values.

The CGER includes conditions associated with the dredging EA, stating the maximum extent for impacts to beach stone-curlew breeding habitat as a result of the Project. The CGER also made a recommendation that Ports North develop and deliver a management plan that provides a management framework to avoid and mitigate impacts of the Project on the beach stone-curlew and its habitat. Plans to deliver any required offsets should be included in the management plan.

Southern Cassowary

The RDEIS documentation reported that essential habitat for the southern cassowary is located at Richters Creek mouth. Constructing the delivery pipeline through Richters Creek mouth could require clearing of this habitat. Use of an existing cleared track that intersects the essential habitat is proposed to avoid clearing habitat.

During the detailed design stage, Ports North will undertake additional surveys to confirm the presence of essential habitat and the amount of vegetation required to be cleared for the delivery pipeline, if any. Clearance of the essential habitat is regulated under the VM Act and the NC Act.

Ports North will rehabilitate the essential habitat for the southern cassowary once the delivery pipeline has been decommissioned. Further rehabilitation details will be included in the finalised DMP.

Marine Wildlife

Artificial Lighting Impacts to Marine Turtles

The RDEIS documentation identified that marine turtles may nest in the harbour and infrequently along the northern beaches of Cairns. Marine turtles could become disoriented due to artificial lighting, particularly during nesting and hatching periods. Marine turtles may also be affected by light spill from the dredgers and the pump-out facility.

To avoid disorienting turtles that may be nesting or hatching in the harbour or at the northern beaches, Ports North will minimise light spill by using low wattage and/or directional light fixtures that do not conflict with security and safety requirements. Light levels from the dredging works will be limited to those lights that are necessary for the safe operation of the vessel and the health and safety of those onboard. These mitigation measures will be further detailed in the final DMP.

Vessel Strike Impacts to Marine Wildlife

Inshore dolphins, dugongs and turtles may be injured by interacting with moving vessels and dredgers during construction, operation and decommissioning of the Project.

Marine wildlife that swim near the water surface could interact with the tug boats and barge when they navigate from the shipping channel to the Tingira Street DMPA and when the TSHD sails to the pump-out facility. To ensure that the risk of vessel strike is minimised, Ports North will prepare and implement the DMP, which will include the following measures:

- ensure that vessel masters and spotters are adequately trained in marine mammal and sea turtle interaction procedures
- maintain a lookout for marine wildlife while the dredger operates
- maintain a 300-metre exclusion zone between the vessel and marine mammals, when they are sighted. In the event that a marine mammal is sighted, vessel speed and direction will be adjusted until the animal has moved further than 300 metres or has not been sighted for 15 minutes.

Ports North will also ensure that animal sightings and any relevant actions taken will be recorded, and that any incidents involving injured or killed animals will be immediately reported to relevant regulatory agencies.

Regulated Vegetation

Approximately 0.14 hectares of the ‘of concern’ regional ecosystem (part of the melaleuca wetland) would be cleared during construction of the delivery pipeline at the Richters Creek mouth.

The RDEIS documentation states that the delivery pipeline corridor is expected to be a maximum width of ten metres. To ensure impacts on regulated vegetation is minimised, Ports North will refine the delivery pipeline alignment to avoid vegetation clearing as far as possible.

In the instance that clearing regulated vegetation cannot be avoided, Ports North may be required to obtain a regulated vegetation clearing permit under the VM Act and Planning Act. If clearing is greater than ten metres wide, an offset may be required in accordance with the EO Act. This will be determined during detailed design and will be determined as part of the operational works approval for tidal works that would be issued by DSDMIP.

Water Quality and Coastal Processes

Water Quality

Historical data for both surface and marine water quality was collated and tabled in the RDEIS documentation including previous project assessments in 2013-2014 and data from maintenance dredging

water quality monitoring until 2013. Additional water quality data was collected in July 2016 (dry season) and March 2017 (wet season) and also presented in the RDEIS documentation to support existing baseline surface and marine water quality data relevant to project elements and activities.

Key water quality parameters tested included physico-chemical, total suspended solids and turbidity, photosynthetically active radiation, metals, nutrients, oil and grease. Baseline water quality data was also collected for the Barron River and the upper reaches of Thomatis/Richters Creek near the confluence with the Barron River and tabled in the RDEIS documentation. The data identified that median baseline turbidity values for both waterways already exceed the current WQOs set under the Environmental Protection Policy (Water) 2009 for turbidity in the Barron River Basin. Other indicators (dissolved oxygen, pH) were broadly consistent with WQOs. Urban stormwater flows are a key source of turbidity and pollution within the Barron River catchment.

Potential impacts to surface and/or marine water quality associated with the dredge material delivery, delivery pipeline and pump-out facility would include spill of dredge material or pipeline failure.

The RDEIS documentation assessed this potential impact as short-term and negligible, as standard dredge operational measures identified in the DMP would be implemented to minimise the likelihood of spills and delivery pipeline failure. The DMP also includes emergency planning and procedures in the unlikely event that a spill or delivery pipeline failure was to occur. The DMP will be approved by DES prior to construction of the Project.

Risks of delivery pipeline damage or rupture due to extreme weather events are considered unlikely as dredging and transporting dredge material would be scheduled only during the dry season when extreme weather events are less likely to occur. It is unlikely that dredging would continue during an extreme weather event for safety reasons.

The RDEIS documentation reported that while there is the potential for propeller wash to disturb sediments in shallower areas when the TSHD moves between the shipping channel and pump-out facility, numerical modelling results indicated that sediment plumes from propeller wash will be negligible.

The potential for impacts on marine water quality from transporting stiff clays to the Tingira Street DMPA are considered short-term and negligible with implementation of the on-site stormwater management and erosion and sediment control plan. Any minor or infrequent propeller wash from the tug boats and barges moving to and from Tingira Street DMPA would be consistent with current operations in this area. Potential impacts of this wash are considered to be negligible.

Any potential onshore water quality impacts associated with earthworks during the construction of the pipeline will be mitigated by implementing best practice erosion and sediment controls. As most of the delivery pipeline route is proposed along land used for existing cane farms, earthworks for access tracks are expected to be relatively minor. The RDEIS documentation concluded that the potential for increased turbidity in Richters Creek from delivery pipeline construction works will be short-term and negligible.

Coastal Processes

Coastal systems were considered in two categories – Trinity Bay and Inlet marine hydrodynamic and sedimentation processes, and Cairns littoral and beach system processes. Historic data sources informed a baseline understanding of coastal processes.

Hydrodynamic and regional tide modelling was undertaken and calibrated with tide level, pressure, conductivity and temperature data. Model outputs and analysis of predicted impacts are contained in the EIS documentation.

It is anticipated that the delivery pipeline would be in place temporarily for up to six months. No potential impacts to coastal processes are predicted beyond this period.

The RDEIS documentation reported that no permanent or long-term adverse impacts on coastal processes are likely to occur as a result of the delivery pipeline placement.

Without mitigation, the delivery pipeline could be a temporary barrier to local longshore sediment transport processes and may temporarily trap sand in offshore areas. To manage this impact, Ports North will regularly inspect the delivery pipeline at the mouth of Richters Creek and assess the volume of accumulated sand. In the instance that excessive amounts of sand have accumulated, a small excavator will be used to manually relocate the material to the beach. Ports North will also monitor the influence of any beach face instability to ensure that the integrity of the delivery pipeline is not compromised while the pipeline is in place.

The section of the submerged delivery pipeline in offshore areas is unlikely to trap fine-grain offshore sediment. Notwithstanding, Ports North will monitor for any bathymetric changes and identify any sediment accumulation at the pipeline in offshore areas.

The DMP, which will be approved by DES prior to construction commencing, will sufficiently address the risk of potential impacts resulting from delivering dredge material to the Northern Sands DMPA and Tingira Street DMPA.

Traffic and Transport

Land-based Transport

Ports North conducted a land-based traffic assessment using TMR's multicombination route mapping for Cairns City in accordance with the Guidelines for Assessment of Road Impacts of Development 2006 (GARID). The assessment considered potential impacts on the existing road network from traffic generated during the pre-construction, construction and decommissioning phases across the three laydown areas.

Traffic associated with the haulage of delivery pipeline segments to and from the pipeline construction laydown areas was found to be of particular significance in the assessment. The manoeuvrability and turning through intersections of B-double vehicles was further investigated through a Sidra analysis.

The road haulage of the delivery pipeline segments and associated plant equipment is anticipated to occur outside of peak traffic periods (7 am to 9 am and 4 pm to 6 pm) for two weeks during pre-construction and decommissioning. Haulage routes have a potential to cause temporary short-term impacts on the local and state government-controlled road networks.

Dredge delivery pipeline infrastructure and plant equipment is proposed to be delivered to the three laydown sites by 2.55-metre wide B-double trucks. The RDEIS documentation indicates that two of the laydown areas are likely to require access from local roads.

These included Holloways Beach Road to access the Yamaji property laydown area and Yorkeys Knob Road to access the Pappalardo property laydown area. Access to the Northern Sand Quarry laydown area would most likely occur from the Captain Cook Highway.

The RDEIS documentation concluded that the impact of project-related traffic generation associated with these project activities would not exceed the five per cent baseline under the GARID and would not trigger further assessment. The RDEIS documentation found the road network will be able to accommodate B-double truck movements including manoeuvring and turning and that transporting the delivery pipeline segments will not significantly impact the capacity of the road network.

To manage potential road impacts from the Project, the following measures will be implemented:

- temporary vehicle access will be constructed on Holloways Beach Road and Yorkeys Knob Road and traffic controllers will facilitate safe access and egress of heavy vehicles
- temporary access areas will be upgraded to address the Project's potential impacts and reduce risks associated with hauling delivery pipeline segments to the laydown areas.

Maritime Transport

The RDEIS documentation detailed that dredgers, tug boats and associated vessels have the potential to impact on vessel safety by accidently obstructing the navigation of other vessels accessing the port. Potential vessel interactions could occur when:

- installing, operating and decommissioning the pump-out facility and offshore section of the delivery pipeline
- transporting dredge material to the pump-out facility and to the Tingira Street DMPA
- transporting construction personnel and vessel supplies relating to the offshore section of the delivery pipeline
- manoeuvring dredging plant and barges
- surveying the navigation areas associated with the pump-out facility.

To manage vessel safety and avoid obstruction of navigation by other vessels, the Ports North will:

- prepare and implement a VTMP if deemed necessary by the RHM to manage potential marine traffic and safety issues from vessel operations and maritime works during all construction phases of the Project. The VTMP will include the implementation of mitigation measures designed to manage health and safety aspects from transporting dredge material to both DMPAs and will be approved by the RHM.
- maintain communication with vessel owners and MSQ to ensure optimum use of the shipping channel and inner port during all construction stages and decommissioning.

Signage will be erected on the bank of Richters Creek outlining depth information to mitigate any potential danger to boat users. Ongoing and timely communication will also be undertaken with relevant stakeholders. In accordance with the *Transport Operations (Marine Safety) Act 1994*, the RHM will issue a Standard for Marine Construction Activities within Cairns Harbour, which will detail requirements for vessels, operation and traffic control during construction of the Project.

Noise

Pipe Laydown Areas and Pump Locations

Ports North conducted background noise monitoring at sensitive receptors located near the pipe laydown area and proposed booster pump locations. Data was gathered in accordance with the DES Noise Measurement Manual (2013). The ICNG was used to develop noise level targets for the Project.

To assess potential noise impacts, best-case and worst-case scenarios were considered, where the best case assumes wind speeds of zero metres per second with 60 per cent humidity, while the worst case assumes wind speeds of two metres per second with 80 per cent humidity. The worst-case scenario is representative of a conservative assessment with potential impacts likely to be lower than predicted.

Noise associated with the movement of the tug boat and hopper barge to the Tingira Street DMPA was not included in the noise assessment. Noise generated by these activities is expected to be minimal and therefore is not expected to result in environmental nuisance. Vibration impacts associated with the delivery of dredge material were also considered minor.

Delivery Pipeline

Noise associated with the construction of the delivery pipeline will include noise generated from the pipe fabrication – drilling, cutting and lifting – and noise from dozers and excavators working along the pipeline route. Excavation work will be required to cut the sandbar at the Richters Creek mouth at Yorkeys Knob, and is expected to take up to a week to complete. Two 40-tonne excavators will be required.

From construction to decommissioning, the pipeline will be in place for approximately six months. Construction will be limited to standard construction hours (6.30 am to 6.30 pm Monday to Saturday), in accordance with the EP Act.

Only noise generated from the fabrication of the delivery pipeline on the Richters Creek land-based laydown site is predicted to comply with the construction noise level target of 42 Leq(15min)27 adjusted decibels (dB(A)) during both best-case and worst-case conditions. For all other activities, and in the absence of mitigation measures, noise levels are predicted to be higher than the noise targets at the nearest sensitive receptors.

Sensitive receptors located at Holloways Beach and Yorkeys Knob are likely to experience noise levels higher than the noise target during both best-case and worst-case conditions. The highest predicted noise level above the noise targets is at Morabito Road, Yorkeys Knob, where the delivery pipeline is proposed to run directly through the property.

Sensitive receptors are not expected to be subjected to the predicted noise levels for more than a few days, assuming a delivery pipeline construction rate of 200 metres per day.

To address the identified increases in noise levels associated with the construction of the delivery pipeline, Ports North will implement the following mitigation measures:

- construct temporary noise barriers or earth bunding around the pipe fabrication area
- communicate with stakeholders regarding dates and times when sandbar cutting and delivery pipeline construction and decommissioning work will be undertaken, and when such activities could be audible
- select lower noise plant (excavators and dozers)
- revise the noise assessment and investigate additional mitigation measures if the methods of construction and decommissioning or the location of the proposed delivery pipeline alignment is altered significantly.

Following finalisation of locations, Ports North will undertake site-specific noise assessments of the pump-out facility, delivery pipeline construction noise and booster pumps. A construction noise and vibration management plan will also be prepared for specific areas, which will include the mitigation measures outlined in the EIS documentation.

The CGER includes conditions regarding the Northern Sands DMPA, setting noise limits and requirements for noise monitoring to ensure that noise associated with the construction of the delivery pipeline is managed to avoid noise nuisance to sensitive receptors.

Pump-out Facility

TSHD pump-out will occur concurrently with the dredging program, 24 hours per day, seven days per week for 12 weeks. The pump-out facility is proposed to be located between 2.7 and 3.7 kilometres offshore from Yorkeys Knob.

Noise levels from the pump-out facility were considered along with noise from the booster pumps, as these will operate simultaneously. At the nearest sensitive receptors, noise levels produced from the pump-out facility and booster pumps would comply with the relevant noise level targets during best-case conditions.

Noise produced by the pump-out facility in isolation is expected to meet the night-time noise level targets. However, when combined with the predicted noise emissions from the booster pumps, increases in noise levels above targets may occur. Locating the TSHD as far offshore as practically possible to minimise noise levels to onshore receptors during pump-out is a possible mitigation measure.

Further, Ports North will conduct a site-specific noise assessment for the pump-out facility, once the TSHD has been selected and pump locations are known.

The CGER includes conditions regarding the Northern Sands DMPA, setting noise limits and requirements for noise monitoring to ensure that noise associated with the operation of the pump-out facility is managed to avoid nuisance at sensitive receptors.

Booster Pumps

Three booster pumps will be required to pump dredge material to the Northern Sands DMPA via the delivery pipeline, with one pump proposed to be located offshore and two on land. Booster pumps will be in operation 24 hours per day, seven days per week while the delivery pipeline is required for the Project, which is anticipated to be 12 weeks.

The assessment of potential noise impacts from booster pumps assumed that the booster pumps were attenuated, where the attenuation would achieve a noise reduction of 15 dB(A). The proposed attenuation includes:

- enclosing the engine with an acoustically robust enclosure with internal acoustic absorption
- fitting of industrial mufflers
- selecting the quietest available plant or over-specified plant (to allow lower operating speeds for the same throughput)
- enclosing the pump.

Noise generated by the operation of the booster pumps is predicted to be compliant at all sensitive receptors under best-case conditions. During worst-case conditions, noise levels above the relevant night-time noise target are expected at sensitive receptors.

Given the minor increases in noise levels above the targets, additional mitigation measures are likely to ensure that the relevant noise level targets are met. Altering the location of booster pumps to as far as practical from sensitive receptors is a potential mitigation measure. Further, Ports North will conduct a site-specific noise assessment of the booster pumps once the location and number of booster pumps is known to finalise mitigation measures.

The CGER includes conditions regarding the Northern Sands DMPA, setting noise limits and requirements for noise monitoring to ensure that noise associated with the operation of the booster pumps is managed to avoid nuisance at sensitive receptors.

Aboriginal and Torres Strait Islander Cultural Heritage

Aboriginal and Torres Strait Islander cultural heritage is protected under the ACH Act.

Constructing the delivery pipeline across Richters Creek may uncover Aboriginal artefacts or cultural heritage places. Yirrganydji (Irukandji) People #2 have a registered native title claim (QC2015/004) over parts of Cairns, including Trinity Inlet. The claim area includes part of the onshore segment of the delivery pipeline and part of the inner shipping channel.

The CEMP states that precautionary measures such as surveying the proposed delivery pipeline corridor, particularly at Richters Creek, will be undertaken to identify and manage potential impacts to Aboriginal and Torres Strait Islander cultural heritage places and artefacts. In the event that any Aboriginal and Torres Strait Islander cultural heritage is encountered, all construction and operation activities would cease, pending an inspection by a suitably qualified archaeologist and a representative from the relevant Aboriginal party.

Ports North is required to develop a CHMP in accordance with the ACH Act. Ports North has committed to developing a CHMP with the Yirrganydji (Irukandji) People #2 and any other relevant Aboriginal Party for whom cultural heritage sites or artefacts may be uncovered by the Project, prior to construction commencing.

12.4 Environmental Assessment

The Project's environmental assessment considered strategies to avoid, minimise, mitigate and manage environmental impacts. Strategies were informed by multiple studies of existing environmental values and constraints.

A formal risk assessment process first identified and assessed risks, which were used to develop tailored mitigation and management strategies. Risks were then assessed assuming the adoption of these project-specific management measures and best management practices. Of the 349 risks identified, residual risks following implementation of strategies were rated extreme (0), high (0), medium (8), low (122), negligible (208) and beneficial (11) risks. Most risks are considered temporary and reversible.

Management measures to mitigate these risks are identified in the following management plans:

- CMP
- DMP
- MOMP.

Low and negligible residual risks can be adequately managed by standard best practice management measures. For impacts with a risk rating of medium or higher, specific strategies have been developed.

Table 12.4: Medium Residual Risk Environmental Management

ENVIRONMENTAL IMPACTS	SUMMARY OF RESIDUAL IMPACT	RESIDUAL RISK WITH MITIGATION IN PLACE	MITIGATION AND MANAGEMENT
			STRATEGY SUMMARY
Coastal Processes	Increase of approximately two to six per cent to annual siltation and maintenance dredging requirements	Medium	The current maintenance dredging and disposal permit (including dredge quantity limit) remains applicable to June 2020. The increased maintenance dredging requirements will be addressed in the future application for a new permit and supporting management plan developed in accordance with relevant guidelines.
Water Resources	Lateral migration of saline water away from the dredge placement area causing impacts on water quality in the upper unconfined aquifer	Medium	A detailed monitoring and intervention strategy will be developed during the design and approval phase. The tailwater depth will be managed to reduce head pressure on the surface aquifer.
Terrestrial Ecology	Loss of small area of low-value semi-tidal wetland habitat on previously reclaimed land and Tingira Street DMPA	Medium	Mitigation of this risk not possible. The wetland value was always temporary as the DMPA area is designated industrial land in Ports North LUP.
Socio-Economic	Decreased number of ship arrivals in Yorkeys Knob in the short-term affecting income to Boat Club	Medium	The impact is short-term and offset by a predicted reversal by 2031, with a net increase in arrivals and consequent in income potential for the club.
Socio-Economic	Decreased number of ship arrivals in Yorkeys Knob in short-term affecting business and tourism operators	Medium	The impact is short-term and offset by a predicted reversal by 2031, with a net increase in arrivals and consequent increase in income potential for local business and tourism operators.
Socio-Economic	Minor and reversible loss of character of coastal area from establishment of pipeline and laydown areas	Medium	The impacts are temporary and reversible in nature. Screening and fencing will be installed around laydown areas.
Landscape and Visual	Visual intrusion of the delivery pipeline and associated infrastructure	Medium	The impacts are temporary and reversible in nature. A community engagement program will be developed to manage amenity impacts at the delivery pipeline landfall site at the mouth of Richters Creek. Laydown areas will be appropriately fenced and screened and feature low-impact lighting. Best practice environmental management will be adopted.

12.5 Key Environmental Management Strategies

Ports North proposes implementing the strategies outlined in Table 12.5 to avoid, minimise, mitigate and manage potential environmental impacts.

Table 12.5: Environmental Management Strategies

ENVIRONMENTAL IMPACT	ENVIRONMENTAL MANAGEMENT STRATEGIES
Land	Conduct ongoing and timely communications with relevant state and local government authorities, business operators, port tenants, residents and the boating community regarding the potential impacts, including disruption to commercial operations, recreational activities, and traffic conditions
	Adopt a minimum setback from the perimeter of Tingira Street DMPA and a batter profile to achieve the required factor of safety against instability of proposed profile
	Conduct community engagement to inform the public of the pipeline works, prepare them for the short-term intrusion, and reassure them that full restoration of the area will be undertaken
Nature Conservation Areas	Manage dredging procedures at the DMPA to limit water quality impacts from TSHD dredging and tailwater discharge into the Barron River within acceptable limits
	Conduct reactive monitoring programs for water quality and seagrass as well as tailwater and groundwater impacts from placement at the Northern Sands DMPA
	Convene an expert advisory panel or management group to oversee the reactive monitoring program and review effectiveness of water quality and ecological trigger values and response plans
	Undertake validation monitoring programs for seagrass, corals, dredge plumes and other impact predictions from the Revised Draft EIS
	Seek an approval of a FHA 'exchange' to accommodate a 9.2-hectare encroachment of proposed channel widening into the FHA area
Coastal Processes	Direct the dredge contractor to manually bypass excessive build-up of beach sand material from one side of the pipeline to the other to maintain coastal processes, should it be necessary
	Ensure that future updates to the LTDSDMP (also a LTMMP) for Cairns includes consideration of relocation of maintenance DMPA to the preferred Option 1A area, as components of the application for and resolution of future marine park and sea dumping permit process through consultation with the TACC and the GBRMPA
Marine Sediment Quality	Revise fuel handling and spill response procedures in the port's operational procedures to minimise the potential future risk to sediment quality from refuelling activities associated with the provision of IFO at the port
Marine Water Quality	Develop and implement a reactive water quality monitoring program for the Project
	Develop appropriate management controls to ensure that tailwater discharge complies with specified water quality criteria
	Ensure implementation of the megafauna management strategy provided in the DMP

ENVIRONMENTAL IMPACT	ENVIRONMENTAL MANAGEMENT STRATEGIES
Water Resources	Conduct geotechnical investigations along the alignment of the wall to identify unsuitable foundation materials for the wall, engineering design to consider foundation materials, and oversight of construction to ensure that the construction is adapted where necessary to ground conditions encountered on site
	Ensure that water level in the lake is minimised until sufficient dredged material has been placed in the lake to create a low permeability barrier between the saline water in the lake, and the surrounding aquifer
Marine Ecology	Conduct seagrass surveys within the channel footprint prior to capital dredging to confirm whether there are any potential direct impacts on seagrass
	Conduct a bathymetry survey of the channel and surrounds progressively and upon completion of dredging to minimise over-dredging and confirm final depths at the completion of the capital dredging campaigns
	Conduct a post-dredging seagrass monitoring program (and soft sediment benthos monitoring program) to identify any changes to communities because of the capital dredging program
	Ensure that capital dredging not be carried out in late spring and summer (November to February) to minimise potential impacts on marine ecological system functions
Terrestrial Ecology	Conduct a weed monitoring program to record the abundance of the weed species within the Northern Sands DMPA project area and Tingira Street DMPA (Should the monitoring record an increase in abundance or spread of the key weed species, this should trigger the requirement for a weed control program.)
	Ensure that any M. beccarii (ant plant) individuals that are to be directly impacted by pipeline installation and decommissioning works are translocated to suitable nearby habitat and monitored to determine success of translocation
	Ensure any new fences have a plain wire as a top strand, rather than barbed wire, to reduce the risk of entanglement to minimise impacts on P. conspicillatus (spectacled flying fox)
	Ensure that the threat abatement actions listed in the DEHP SPRING database will be implemented, should E. magnirostris (beach stone curlew) be recorded as breeding at the Richters Creek mouth area
Socio-Economic	Ensure that where feasible, construction plant, materials and machinery is screened behind fencing or located to minimise visual impacts
	Appropriate site security, fencing and signage should be utilised to mitigate any threats to public safety and wellbeing from pipeline construction/dismantling and dredging operations
	Pre-works consultation should take place with the Holloways Beach Environmental Education Centre to ascertain peak usage times in which works may be able to be amended if required
	A ‘submerged pipeline’ sign should be erected on the bank of Richters Creek for the period of the pipeline with depth information to mitigate any potential danger to boat users
	Ongoing liaison should take place with the Holloways Beach Environmental Education Centre to enhance the potential for future involvement of the centre in learning and monitoring opportunities

ENVIRONMENTAL IMPACT	ENVIRONMENTAL MANAGEMENT STRATEGIES
Noise	Program dredging near City Port during night-time hours, where practicable
	Consult with users of boat moorings near construction areas within the channel and near the wharf to manage the potential for noise impacts to these receptors
	Conduct a detailed noise assessment of the booster pump stations and pump-out locations, once the location and number of pump stations has been defined by the contractor, and the actual pump stations have been selected to determine if compliance with the construction noise limits can be achieved
	Limit piling activities to the typical construction hours (6:30 am to 6:30 pm, Monday to Saturday) unless approval is obtained from DEHP/local authority based on 'sufficient grounds' to justify construction outside these hours
Air	Ensure that the backhoe dredge and tugs will use marine diesel fuel to minimise particulate emissions
	Conduct a survey of cruise ship fuel consumption and fuel type, while berthed at the wharf to assist in impact prediction and management planning
	Ensure that cruise ships that do not have scrubbers on engines are required to use 0.5 per cent sulfur fuel oil, IFO, or marine diesel while berthed at the wharf in accordance with AMSA regulations by 1 January 2020
	Conduct scheduled monitoring of PM2.5 and NO_2 concentrations at a location representative of the apartments on Wharf Street between Lake and Abbott streets to inform revisions of impact modelling, mitigation and management planning
	Ensure that mobile cranes are to be fitted with SCR emission control technology
	Ensure that wharf construction dust management includes regular visual plume monitoring to inform use of high-pressure water sprays during truck loading
Landscape	Ensure that lighting of compounds and works sites is restricted to agreed hours and in accordance with a construction environmental management plan
	Ensure that, where feasible, construction plant, materials and machinery are screened behind fencing or located to minimise visual impacts
	Ensure that if light from construction compounds and cruise ships becomes a concern to wharf street residents, suitable management options are developed in consultation with cruise ship operators, as and when the need arises
Cultural Heritage	Ensure that an appropriately qualified marine archaeologist is contacted immediately if items of possible marine heritage are found during channel hydrographic surveys
	Engage a qualified archaeologist to monitor further works in this area should the proposed fuel line installation works encounter evidence of the old Malay town Ensure appropriate hold points and other measures are included for such occurrences in the contractor's construction management plan

ENVIRONMENTAL IMPACT	ENVIRONMENTAL MANAGEMENT STRATEGIES
Transport	Provide a traffic controller on the shared pedestrian area at the Cairns Cruise Liner Terminal during heavy pedestrian movements to increase safety and give buses and taxis priority, when required
	Manage access to and from Holloways Beach and Yorkeys Knob Road with traffic controllers and temporary pavement widening for safe access to the laydown sites
Waste	Ensure that construction waste is managed in accordance with best practice management procedures outlined in the contractor's environmental management plan
	Continue to work with booking agencies to promote opportunities to improve waste management for cruise ship generated wastes
	Provide information on likely flow volumes, trunk connection points and a network analysis to CRC to aid in the assessment of impacts to their existing infrastructure prior to finalisation of landside sewage reticulation design
	Ensure that internationally recognised signs (e.g. ISO signage) be used to aid international visitors and crew to meet AMSA and DOAWR requirements for their waste and to prevent mixing
GHG	Develop an ongoing GHG emissions inventory for the construction stage to monitor, report and identify opportunities to reduce emissions Implement reduction strategies as appropriate
	Minimise project GHG emissions through the Ports North environmental management system
Hazard and Risk	Manage project hazard and risks through implementation of the Ports North Risk Management and Internal Control Policy and Risk Management Framework
	Follow a safety-in-design process in accordance with the Australian Safety and Compensation Council's Guidance on the Principles of Safe Design for Work (2006)
	Implement health and safety management plans for all project phases
	Implement a traffic management plan for construction, operations and decommissioning to reduce risks associated with road transport
	Implement the VTMP, which will contain mitigation and management measures designed to reduce impacts from the dredging campaign
	Implement the MOMP to reduce the potential for negative impacts on the environment, vessel safety and operational efficiency with the changes in maritime operational activities (operational shipping) because of the Project
	Implement the current emergency management plan as well as associated plans and procedures to reflect hazards and risks associated with the Project, prior to the commencement of operations
	Conduct a magnetometer survey to reduce this risk and the associated likelihood of unexploded ordnance impacts during the dredging program
Cumulative Impacts	Manage any cumulative impacts through regular auditing of the dredge contractor's CEMP and implementation of the following management plans: ▪ CEMP ▪ DMP ▪ VTMP (if deemed necessary) ▪ MOMP.

CHAPTER 13
ECONOMIC ANALYSIS

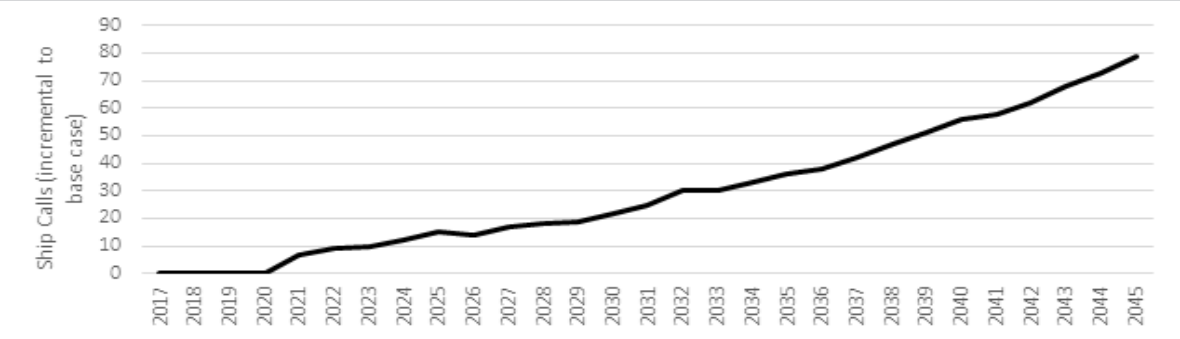
CHAPTER SUMMARY AND CONCLUSIONS:

- The economic analysis for the Project utilised CBA to assess the incremental economic benefits and costs of the Project to society. It drew on demand modelling forecasts conducted for the Base Case and Reference Project scenarios, with the central demand scenario for the Reference Project providing the Central Case (or best estimate) for the economic analysis.
- The Reference Project involves widening and deepening the channel at Trinity Inlet to allow larger cruise ships to enter the Port of Cairns. The Reference Project will also improve port access for other port users such as the Royal Australian Navy and increase the resilience of the port to weather events.
- Key findings of this economic analysis are summarised as follows:

Demand forecasts

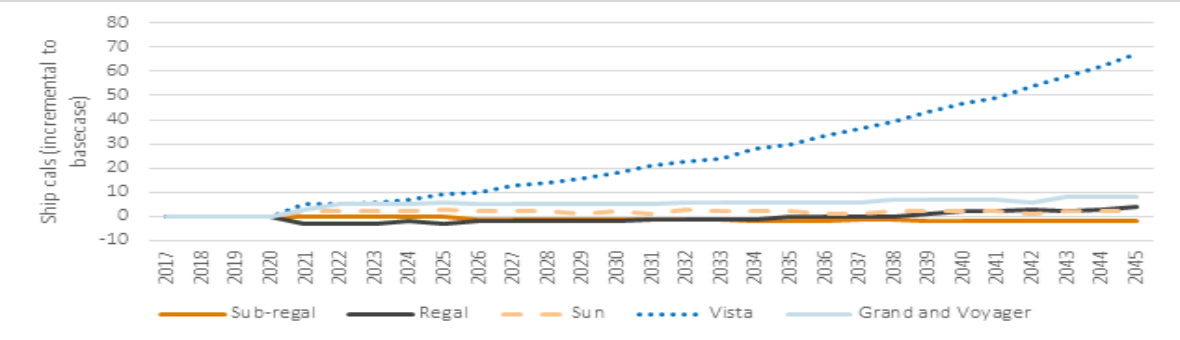
  - There is a forecast increase in total cruise ship calls in Cairns as a result of the Reference Project (see Figure A). Specifically, there is a step increase in ship calls into Trinity Inlet in 2020–21 driven by the Reference Project, which allows vista class vessels (including grand class vessels with the right dimensions) to access Trinity inlet. Total ship calls continue to grow faster relative to the Base Case as Trinity Inlet can capitalise on growing demand for larger vessels, which is in line with global cruising trends.

Figure A: Incremental Change in Cruise Ship Calls to Cairns (Relative to Base Case), Reference Project (Central Case)



  - There is also an increase in the mix of vessels as a result of the Reference Project, driven by increases in vista vessels, which the Reference Project is targeting (see Figure B).

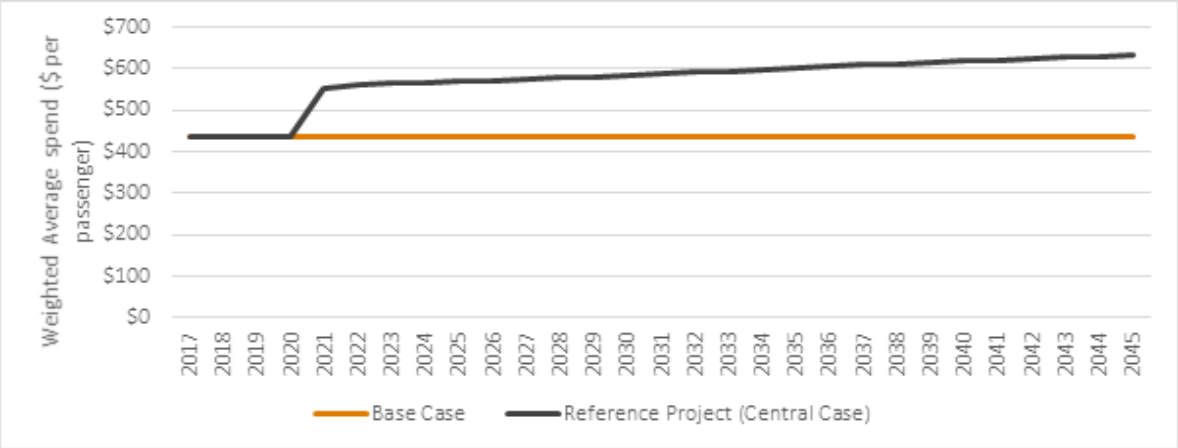
Figure B: Incremental Change in Cruise Ship Calls to Cairns (Relative to Base Case) by Vessel Type



Economic CBA findings

- The economic CBA measured the net economic benefits to Cairns and Queensland associated with the Reference Project, relative to the Base Case.
- As highlighted by the demand forecasts, the Reference Project allows the region to capitalise on growing demand for larger cruise vessels by enabling vista class vessels (and grand vessels with the right dimensions) to enter Trinity Inlet. This has a number of economic benefits including increased economic returns from additional cruise shipping expenditure in Queensland (primarily Cairns). The Project will enable more cruise ships and larger vessels to visit, and increase cruise operator's ability to develop new itineraries, with more transit visits and higher incremental spend by overnight visitors (cruise visitors and crew) arriving at Trinity Inlet predicted as a direct result of the Reference Project. Industry confirmed this as one of the key benefits of the Project during consultation.
- Visitor expenditure by cruise passengers from overseas and interstate (the main benefit of the Reference Project) is illustrated in Figure C for the Base Case and Reference Project.

Figure C: Cruise Passenger Expenditure (Real, $2017–18)



- The bulk of the economic benefits of the Reference Project (around 85 per cent of the total benefits) are driven by additional economic returns from cruise shipping-related expenditure in Queensland. These benefits are measured by the profit margin accruing to local businesses from additional cruise-related expenditure. Other benefits measured in this economic analysis include:
  - additional port financial revenue linked to additional cruise ship calls by vessel type
  - additional navy-related benefits through higher expenditure in the region.
- There could also be improved reliability for cargo movements as the Reference Project will better allow for siltation of the channel between maintenance dredging campaigns. Consultation with Ports North identified there could be benefits to cruise passengers that no longer have to be tendered of Yorkeys Knob as the larger vista class vessels go Trinity Inlet under the Reference Project. These savings are discussed qualitatively and not quantified in the CBA as they are small in nature.

- In summary, as illustrated in Table A, the economic analysis demonstrates that at a seven per cent real discount rate the Reference Project (Central Case) has a net present value of $10.7 million and a benefit cost ratio of 1.1.

Table A: Key CBA Results (P90), Reference Project (Central Case)

COST-BENEFIT ANALYSIS RESULTS (P90)			
ITEM	4% DISCOUNT RATE	7% DISCOUNT RATE	10% DISCOUNT RATE
PROJECT BENEFITS			
Total benefits	*$196,604,196*	*$124,793,612*	*$83,411,090*
PROJECT COSTS			
Total Costs	*$120,395,859*	*$114,060,690*	*$108,532,520*
Net Present Value	$76,208,337	$10,732,922	-$25,121,430
Benefit Cost Ratio	1.6	1.1	0.77

Source: Deloitte.

13.1 Purpose

This chapter documents the methodology and key assumptions adopted for the Project's economic analysis, as well as the review and data analysis undertaken for the economic CBA. It also includes the demand modelling forecasts conducted for the Base Case and Reference Project scenarios, with the central demand scenario for the Reference Project providing the Central Case (or best estimate) for this economic analysis.

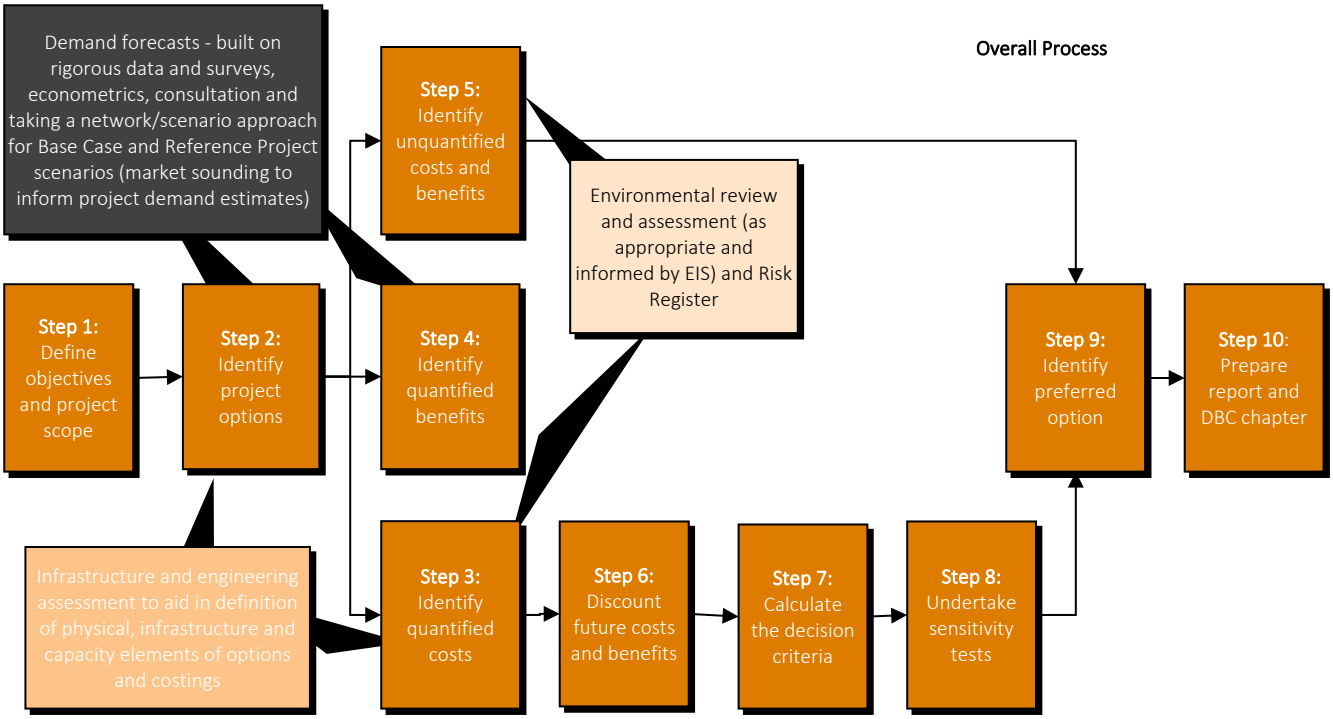
13.2 Approach

The approach for economic appraisal to support this DBC is underpinned by economic CBA, informed by cost estimates, a risk register and financial and social impacts. It is aligned to Building Queensland's DBC framework (see Figure 13.1). A key input into the economic analysis is the demand modelling forecasts were developed for the Base Case and Reference Project, as well as economic scenario analysis from a cruise shipping network perspective.

A two-phase approach to the economic appraisal was adopted, as detailed in this section:

9. establish a Base Case and identify potential options
10. identify benefits and costs.

Figure 13.1: Approach to the Economic Appraisal



13.2.1 Establish a Base Case and Identify Potential Options

From the outset of the Project, a Base Case was developed in consultation with Ports North, which confirmed the need for:

- **service need and demand analysis** – a rigorous data and demand modelling approach informed by forecasts for cruise ship vessel calls and taking into account port developments (including for Trinity Inlet and Yorkeys Knob in Cairns)
- **a system approach** – considering the port system as a network and taking into account potential impacts on Cairns through demand scenarios for other ports (for example, Brisbane acting as a feeder port and opening opportunities for regional ports, given capacity constraints in Sydney)
- **industry consultation** – consultation with industry including cruise operators, regional bodies and industry groups to ensure the economic CBA and demand analysis is well-grounded and reflective of global and national cruise market trends and drivers.

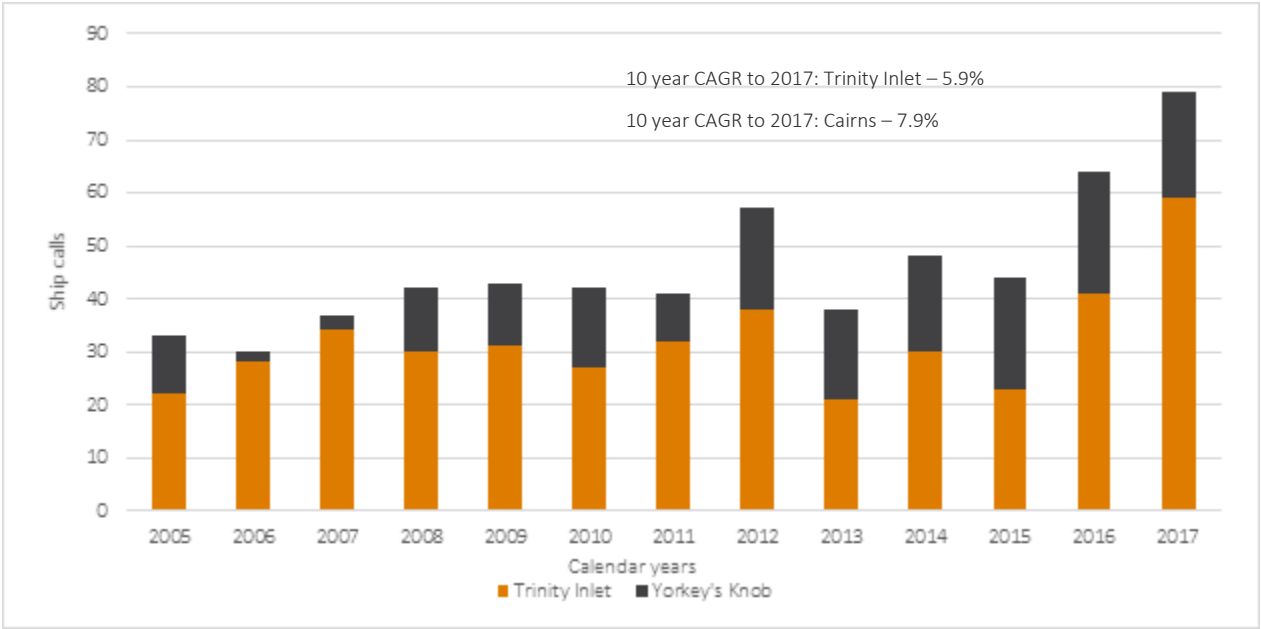
Specification of the Base Case i.e. 'do-minimum' or 'without project' case is essential to ensure a well-specified economic CBA and financial analysis. The Base Case assumes a normal level of operational activities and projected growth (based on the Base Case demand forecasts for vessel calls) into the future at the Port of Cairns, without the proposed Reference Project at Trinity inlet.

The characteristics of the Base Case are as follows:

- The customer base for cruise ship calls to the Port of Cairns grows over time, taking into account cruise ship demand (globally and regionally) and historical and forecast information on cruise ship schedules from Ports North.
- A level of maintenance works and ongoing operating costs will be required to maintain a normal level of operations. This includes ongoing maintenance dredging and other ongoing maintenance work to assets. The Ports North forward capital works program has been used to inform the development of the Base Case. This includes works such as the demolition of Wharf 6 and a new fendering system.

- Port fees and charges collected under a Base Case scenario for the financial analysis are assumed to grow in line with vessel calls growth.
- The evaluation period is set at 25 years after the completion of the Reference Project (channel widening and deepening at Trinity Inlet and Wharf 1 to 5 upgrade), which is anticipated to take two years.
- Demand for cruise ship calls in the Base Case is projected over the same timeframe as the financial evaluation. Chapter 5: Base Case outlines the demand forecasting methodology and findings for the Base Case. Demand modelling considered potential drivers of future demand such as capacity considerations and longer term steady state assumptions for ship vessel growth. Recognising the difficulty in forecasting industry demand over 30 years, sensitivity analysis was undertaken to ensure a robust analysis.
- Analysis of historical demand trends (including seasonally adjusted data for modelling purposes used in the Base Case demand forecasts) highlights positive long-run trend growth in the number of cruise ship calls in Cairns. Over the past 10 years to 2017, cruise ship calls to Trinity Inlet grew by around six per cent per annum, increasing to almost eight per cent for Cairns as a whole. Over the past 10 years, both Trinity Inlet and Yorkeys Knob have enjoyed strong trend growth rates (Figure 13.2).

Figure 13.2: Cruise Ship Calls to Cairns Broken Down by Port, Trinity Inlet and Yorkeys Knob, 2005 to 2017



Source: Data provided by Ports North.

Notes: Data is for calendar years.

13.2.2 Identify Benefits and Costs

Benefits identified include the following:

- Increased cruise-related expenditure and associated economic returns to tourism expenditure (from both passengers and crew) could be expected, noting the need to focus on incremental returns from cruise-related expenditure benefits (i.e. visitors that are new to Cairns and Queensland).
- The Project will improve access for other port users including the Royal Australian Navy and cargo movements. Other relevant benefits of peripheral infrastructure directly related to the Project were identified (e.g. potential spillovers to Yorkeys Knob, which operates as a system with Trinity Inlet), as well as potentially improved resilience of the port to adverse weather events. The channel widening and deepening will better allow for siltation of the channel between maintenance dredging campaigns.
- Cruise passengers who no longer have to be tendered off Yorkeys Knob could experience benefits (as the larger vista class vessels go to Trinity Inlet under the Reference Project).
- There are net financial revenues associated with port fees and incremental development opportunities.

Costs identified include:

- capital (upfront and periodic over the evaluation period), development costs, recurrent operating and maintenance costs, as well as any other relevant costs
- environmental costs related to dredging (although it should be noted that in the revised project case with smaller dredging, these costs are internalised due to policy requirements such as the SPD Act and reflected in project costing estimates).

13.2.3 Economic Methodology – Overview of Key Assumptions

The key assumptions used in the CBA are summarised in Table 13.1.

Table 13.1: Key Assumptions in the Cost-Benefit Analysis

CBA ASSUMPTIONS		
PARAMETER	**ASSUMPTION**	**SOURCE**
Price year	$2017–18	Financial analysis and project costings (QS) – P50 and P90
Evaluation period	2018 to 2045, which includes 25 years of operations for the Reference Project commencing in 2020–21	Consistent with financial analysis and data provided by Ports North
Indexation	Unit costs and parameter values indexed from the price year by the Consumer Price Index (CPI)	Australian Bureau of Statistics (ABS) (2017) and QT CPI data
Ship calls	Ship calls data provided for the period since January 2005 and including forward cruise ship schedules up to May 2020	Estimated based on data on cruise ship calls provided by Ports North
Demand – cruise ship passenger expenditure	Cruise-related expenditure by passengers and crew based on the 2014–15 and 2017 AEC demand surveys	Estimated building on findings of the demand study update conducted by AEC for the Project EIS
Demand – source of visitors	65.8% international (non-Queensland residents) 13.0% interstate (non-Queensland residents) 21.2% Queensland	Ports North Cruise Ship Passenger Survey conducted by AEC in March 2017

CBA ASSUMPTIONS		
PARAMETER	ASSUMPTION	SOURCE
Profit margin for cruise shipping expenditure	16.5% (applied to total estimated incremental cruise shipping expenditure to estimate economic returns to producers or 'producer surplus')	Australian Industry ABS 8155.0 and Ports North AEC Cruise Passenger Surveys 2014 and 2017

13.2.4 Economic Methodology – Conceptual Approach

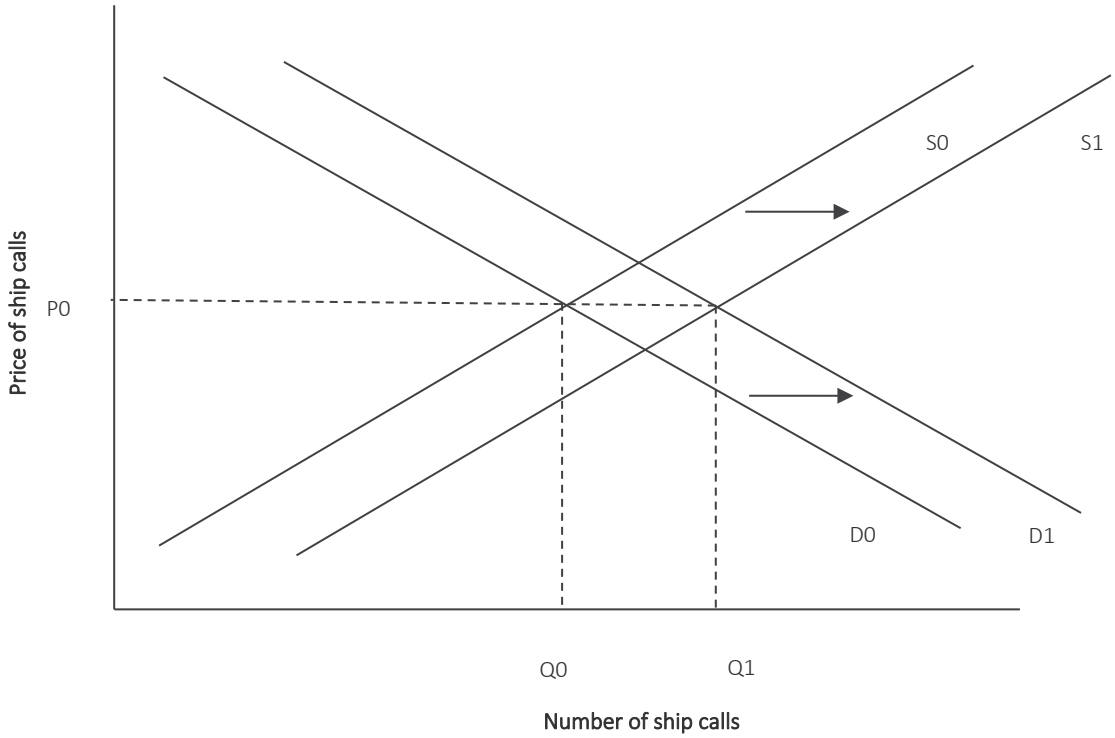
The Project increases the capacity of Trinity Inlet to receive larger vessels (i.e. vista class vessels and grand vessels with the right dimensions), with a deeper and wider channel to capitalise on growing demand for both the number of calls and type of vessels (as informed by demand forecasts).

Enabling larger vessels to enter Trinity Inlet, in turn, will increase overall ship calls in Cairns and cruise shipping-related expenditure in the region and state, as it increases the demand potential compared to the Base Case. This observation was supported by industry during consultation.

More onshore benefits could be expected due to the port's improved ability to provide transit visits, and increased overnight and longer length stays, resulting in higher average expenditure levels and passengers per annum over the evaluation period, all other things being equal (Figure 13.3 conceptualises these benefits).

The Project increases supply-side capacity (by widening and deepening the channel at Trinity Inlet to receive larger vessels) and, subsequently, the port's ability to capture increasing demand (in particular, for larger vessels mainly vista) for cruising as the global cruise industry grows. This increases the number of calls relative to the Base Case (in the main, also by relatively larger vessels) and in line with market trends and demand drivers for Cairns and globally.

Figure 13.3: Conceptual Approach for the Project – Changes in Supply and Demand for Cruise Shipping Activity (Stylised)

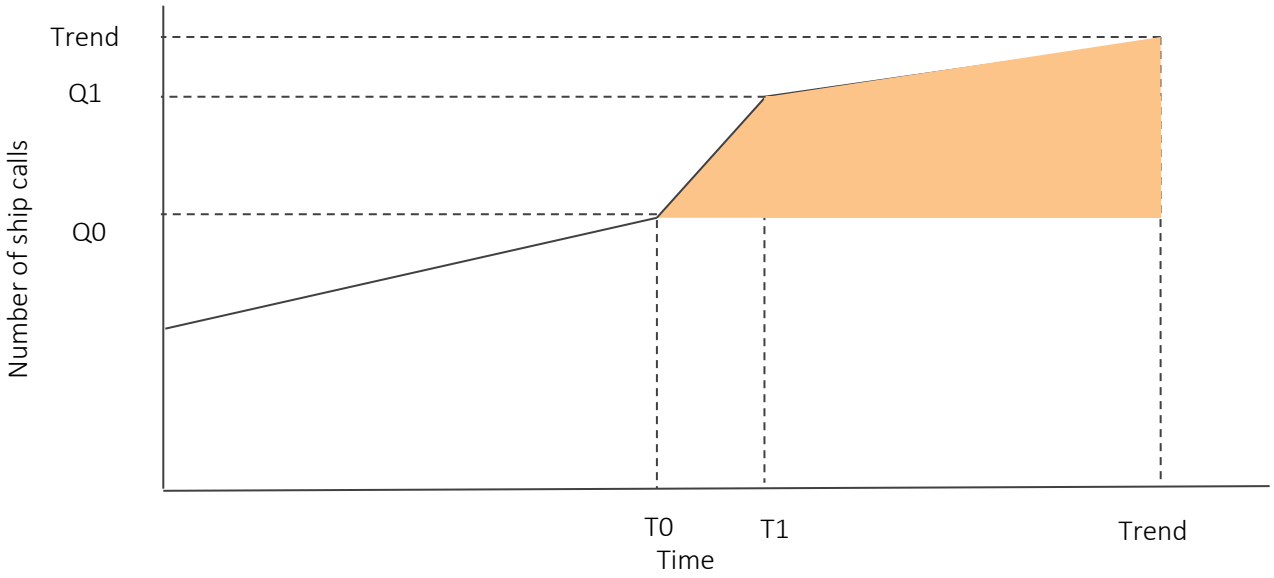


Source: Deloitte Access Economics.

The Project improves the port's ability to capitalise on growing opportunities for demand over the forecast period relative to the Base Case. The shaded area in Figure 13.4, which conceptualises these benefits, highlights an initial step-up in ship calls (i.e. to (Q0-Q1) at time T1) when the Project comes online and a higher long-term trend growth rate compared to the Base Case. This is due to the fact the Project will allow the port to capitalise on growing opportunities for larger vessels in the cruise market (which is reflected in forward global cruise orders for vistas). It should be noted that the step change in vista class vessels implicitly includes grand class vessels that have suitable dimensions to be accommodated at Trinity Inlet (but not mega class vessels).

Ports North has advised that currently the channel is 8.3 metres deep at lowest tide and sun class vessels can come in during these periods (sun vessels are circa. 8.3 metres). The Reference Project extends the depth to 8.8 metres. In effect, there are less constraints on grand class vessels in the project case when compared with sun class vessels in the Base Case. This CBA models the economic benefits associated with an incremental increase in vessels driven mainly by vistas and it implicitly factors in grand class vessels that can enter into Trinity Inlet. The Reference Project capitalises on the opportunity for larger vessels (vista class and some grand class) with a higher passenger capacity and has increased potential for higher average incremental passenger spend in the region.

Figure 13.4: Conceptual Approach – Growth in Ship Calls in Reference Project Relative to Base Case (Stylised)



The level of economic return from onshore expenditure increases in the Reference Project. This is expected to increase economic returns due to additional onshore tourism activity, which was highlighted by industry and by Ports North. The Reference Project enhances itineraries by allowing larger vessels to enter Trinity Inlet and increases the average length of stay of cruise visitors. This, in turn, increases transit opportunities and the average expenditure by cruise visitors arriving at Trinity Inlet.

A higher average spend profile is assumed only in the case of cruise visitor arrivals linked to increased visitation by larger vessels in the Project Case versus the Base Case. The assumption used to estimate incremental cruise-related expenditure for passengers and crew onshore expenditure is discussed in more detail in Section 13.2.5.

Base Case = Indicative average of all vessel types and reflective of historical shares of vessel types

Base Case = Average spend per visitor in Cairns/Queensland (indicative average of all vessel types) and informed by demand surveys for cruise-related expenditure

Reference Case = Larger vessels can now enter Trinity Inlet and the overall average size of vessels increases as a whole driven by growth mainly in larger vessels

Reference Case = Average spend per visitor in Cairns increases relative to the Base Case due to increased transit/increased visitor expenditure linked to the arrival of larger vessels as a result of the Reference Project

From a network perspective, both the Base Case and Reference Project will be potentially impacted by developments at other cruise ports including Brisbane and Sydney. Relevant scenarios will be explored to reflect these potential implications for the economic analysis as follows:

Possible but Unlikely scenario (a downside scenario relative to Central Case): Under this scenario, developments in competing ports potentially reduce the number of larger cruise ship calls into Cairns over the evaluation period. This represents a downside scenario to be evaluated. It has potential to eventuate but is unlikely due to capacity constraints in key ports such as Sydney, which offer potential for regional ports in Australia including Cairns. Incrementally, the increase in total ship calls is only marginally greater than the Base Case.

Optimistic scenario (an upside scenario relative to Central Case): Under this scenario, developments in complementary ports (e.g. Brisbane as a feeder port) increases the number of cruise ship calls into Cairns over the evaluation period. This represents an upside scenario to be evaluated. Industry consultations highlighted views that this scenario should be explicitly considered given the scope for innovative itinerary development across multiple ports including Brisbane.

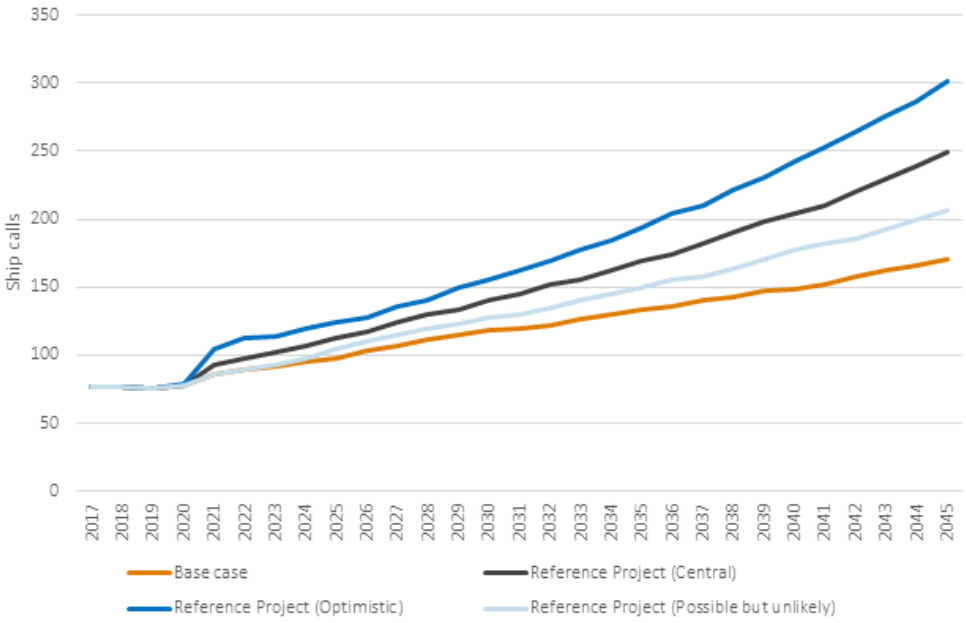
13.2.5 Economic Methodology – Demand Forecasts and Key Assumptions

13.2.5.1 Demand Forecasts

The incremental benefits associated with additional cruise ship calls to Trinity Inlet and Yorkeys Knob are based on the demand analysis that has forecast ship calls over the long term to 2045.

Potential future ship call demand scenarios were modelled including the Base Case and three Reference Project scenarios. These were developed to factor in the inherent uncertainty associated with forecasting future ship calls out to 2045. However, the focus of the CBA is the central demand forecast, which is considered the most likely of the three Reference Project scenarios. Forecast ships calls in the Base Case and Reference Project scenarios are shown in Figure 13.5.

Figure 13.5: Forecast Annual Growth in Cruise Ship Calls to Cairns, 2017 to 2045

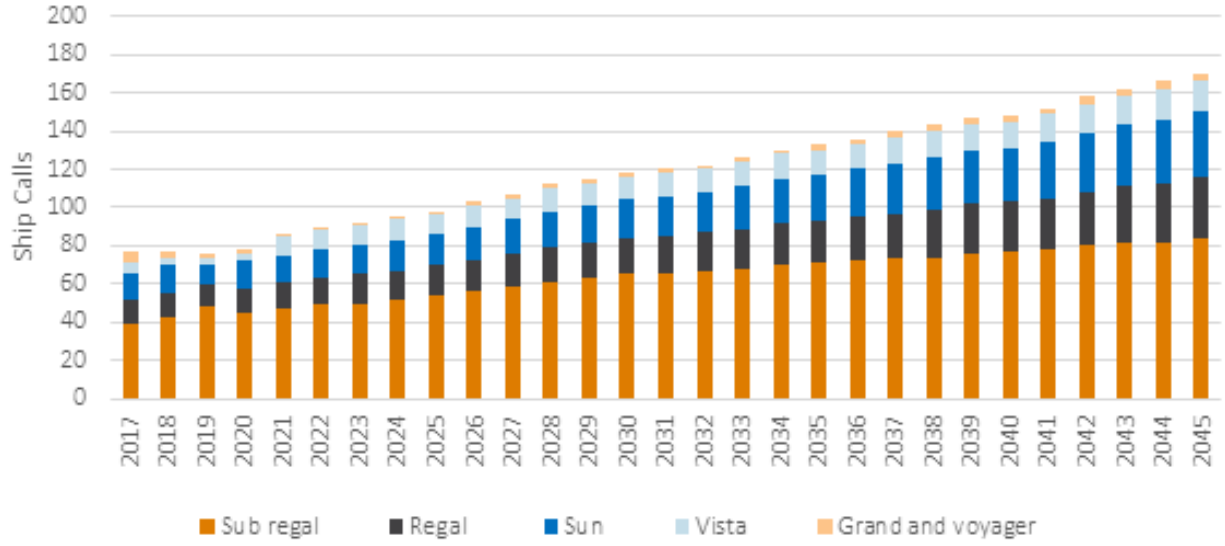


Notes: Forecasts have been rounded.

A primary consideration when developing demand forecasts is the main aim of the Project, which is to allow larger vista class vessels (and grand class vessels with the right dimensions) to access Trinity Inlet following channel widening and deepening.

The forecast for demand by vessel type in the Base Case is demonstrated in Figure 13.6. It highlights the large number of ship calls by sub-regal, regal and sun vessels. It also shows growth in the number of vista class vessels into Yorkeys Knob in the future, as larger cruise ships are unable to access Trinity Inlet in the Base Case.

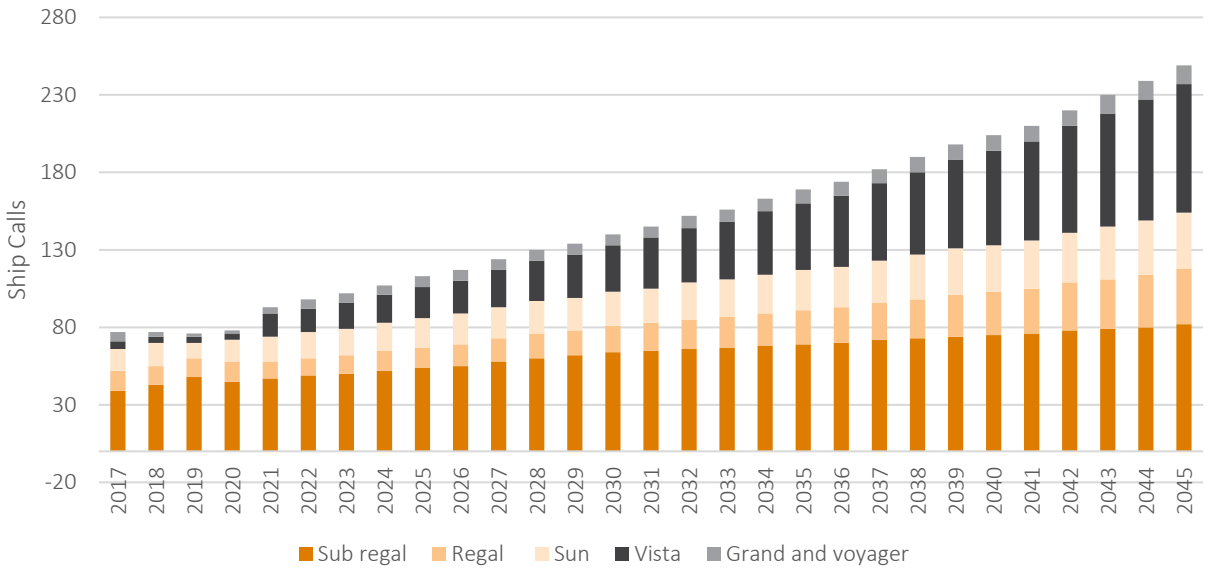
Figure 13.6: Base Case – Forecast Vessel Mix to 2045



Notes: Forecasts have been rounded. It should be noted that projections for vista class vessels implicitly include those grand class vessels that are 300 metres and below in length and have the right depth to fit into Trinity Inlet (some grand vessels are up to 310 metres and cannot enter).

Focusing on the Central Case, it can be seen that the bulk of future forecast vessel calls (Figure 13.7) is expected to be driven by vista class vessels. This reflects the Reference Project's aim to increase capacity at Trinity Inlet (and Cairns) to capitalise on growing demand for larger vessel classes (mainly vista class vessels). Industry consultation highlighted considerable potential for increased transit calls and visitor spend linked to larger cruise vessels. This is supported by growth in global forward cruise orders for larger vessels including vistas and also grand class vessels that have the right dimensions to enter Trinity Inlet as a result of the Project.

Figure 13.7: Reference Project (Central Case) – Forecast Vessel Mix to 2045



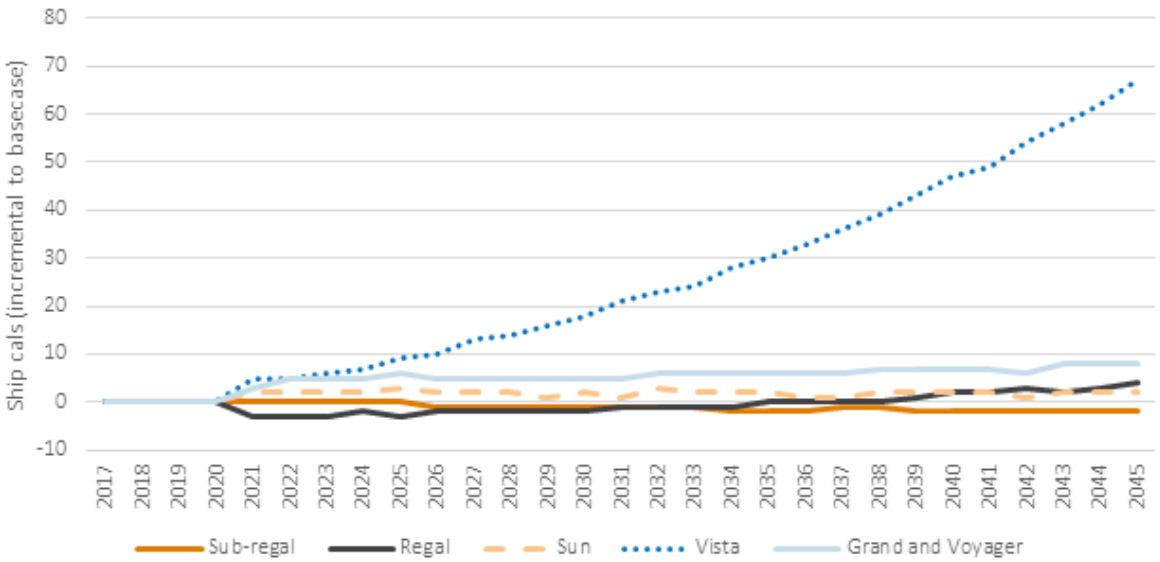
Notes: Forecasts have been rounded. It should be noted that projections for vista class vessels implicitly include those grand vessels that are 300 metres and below in length and have the right depth to fit into Trinity Inlet (some grand vessels are up to 310 metres and cannot enter).

Total ship calls into Trinity Inlet and Yorkeys Knob have been forecast (described in detail in Chapter 4: Service Need). The vessel mix has been adjusted to allow most of the future growth in ship calls to take place in the vista class (and grand class vessels with the right dimensions) into Trinity Inlet, with a small amount of spillover benefit to Yorkeys Knob. This is consistent with the project objectives and confirmed by consultations with Ports North.

The growth in incremental demand is driven by vista class vessels and grand class vessels with the right dimensions. This is evident by comparing the increase in vessels in the Reference Project (Central Case) to the Base Case shown in Figure 13.8. This highlights that the majority of the incremental increase in ships calls (to both Trinity Inlet and Yorkeys Knob) comprises vista class vessels (as well as grand vessels when the dimensions accommodate).

As highlighted in Figure 13.8, the incremental growth in other vessel classes is relatively limited, as the Reference Project will increase the port's capacity to accommodate future growth in vista class vessels.

Figure 13.8: Incremental Change in Vessel Numbers to 2045, Reference Project (Central Case)



Notes: Forecasts have been rounded. It should be noted that projections for vista class vessels implicitly include those grand vessels that are 300 metres and below in length and have the right depth to fit into Trinity Inlet (some grand vessels are up to 310 metres and cannot enter).

The growth in vista class vessels is supported by global forward orders. The cruise ship order book was used to analyse forward orders with a focus on cruise ships sailing in the Asian region and the world. The pattern of global forward orders reflects the intentions of cruise shipping operators.

Up to 2020, the largest share of forward orders is for sub-regal cruise ships, reflecting growth in adventure and boutique-type cruises. Incremental growth in sub-regal vessels (including many different types of cruise vessels) is largely unchanged due to the Reference Project.

Based on industry consultation and advice from Ports North, sub-regal vessel calls in the Base Case and Reference Project cases are adjusted to grow in line with Queensland's projected population growth[20] after 2030.

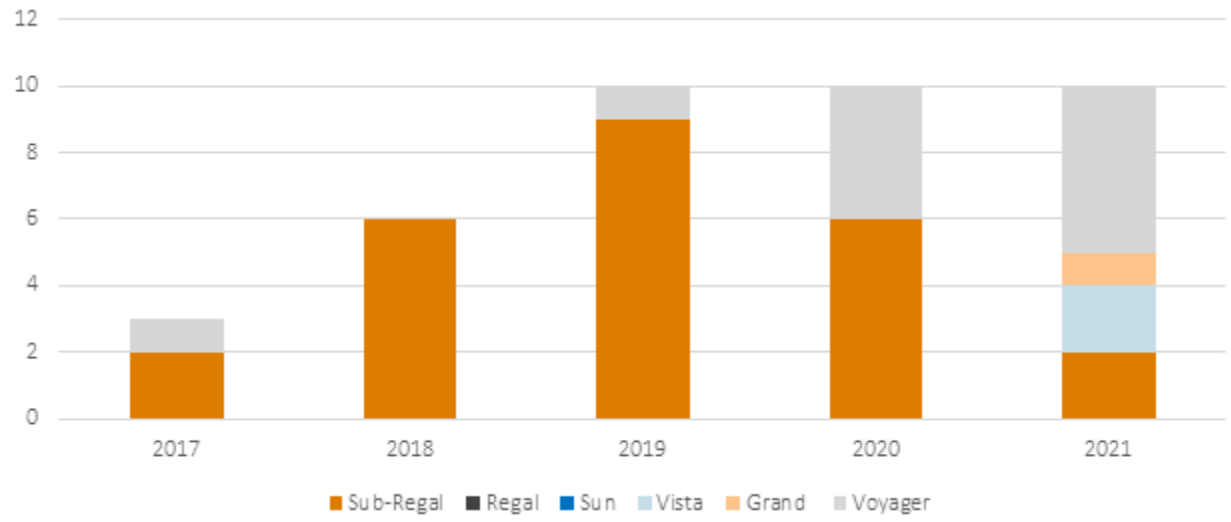
Widening and deepening the channel at Trinity Inlet to accommodate vista cruise ships will open up a new, untapped market. Vista vessels account for 20 per cent of forward orders in 2021, which underpins the forecast growth in vista vessels, with the Reference Project expected to come online in 2021 (see Figure 13.9).

Industry consultation confirmed that a 20 per cent step up in the number of cruise ship calls in 2021 in the Reference Project (Central Case) due to more vista class vessels is more likely than a ramp up over a couple of years.

This 20 per cent step-up factor is considered conservative as the Reference Project will also support some grand class vessels with the right dimensions (vista and grand class vessels together account for 30 per cent of the global forward order book in 2021). Furthermore, there is also some overlap between vista and grand class vessels, as some grand class vessels are between 270 and 300 metres in length. These grand class vessels are implicitly captured in the estimates of vista ship calls into Trinity Inlet in this analysis. This is considered a conservative assumption as the incremental passenger and crew spend is based on vista class ships with a lower capacity than grand class ships.

[20] Queensland Government population projections, 2015 edition.

Figure 13.9: Cruise Ships on Order - Global Forward Order Book



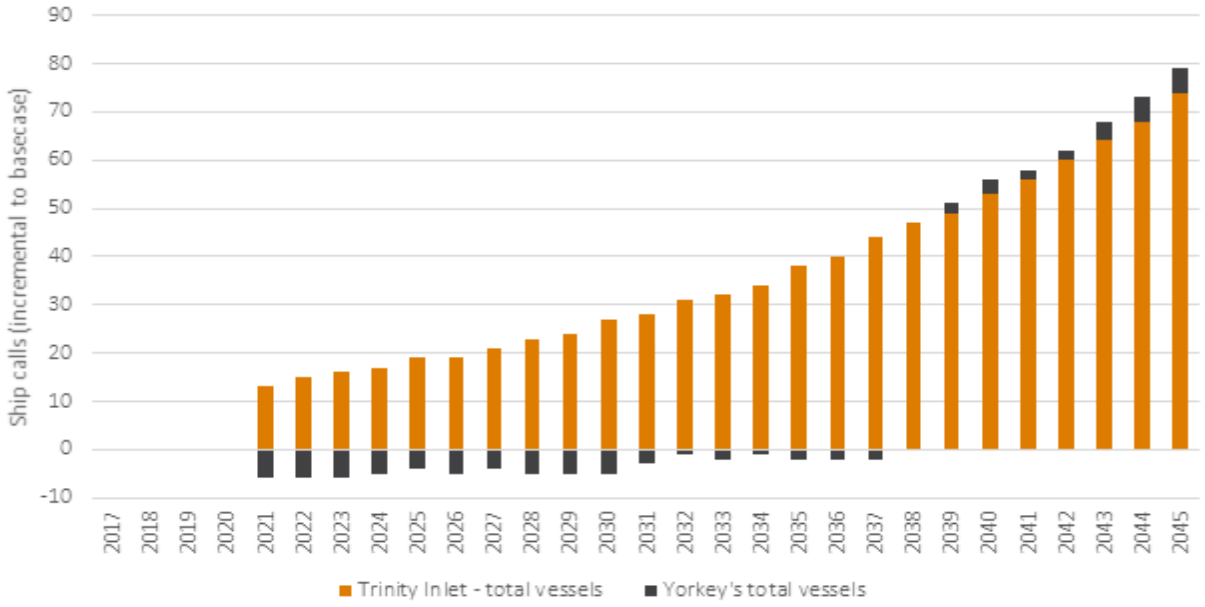
Source: Cruise Industry News – Cruise Ship Order Book.

A one-off step increase in cruise ship calls is not unprecedented. In 2016 and 2017, the Port of Cairns experienced a step increase in cruise ship calls driven, in the main, by an increase in sun class vessels and some sub-regals at Trinity Inlet. A homeporting trial also took place during this period (which will not continue in 2019 based on advice from Ports North). This translated to an increase of around 25 total vessel calls for Cairns as a whole, when comparing the average for the 2016 and 2017 calendar years (70 calls) to the average of the preceding five calendar years to 2015 (around 45 calls). It is evident that larger sun vessels have increased by an average of four per annum at Trinity Inlet to around 13.

History shows that a step increase in vessel calls is clearly possible and can be achieved through the Reference Project. The demand forecasts include a step change in total vessel calls of around 15 in 2021, primarily due to vista class vessels entering Trinity Inlet.

Incrementally, the majority of ship calls attributable to the Reference Project go into Trinity Inlet, with limited spillover benefits to Yorkeys Knob. This stems from the close proximity of Trinity Inlet and Yorkeys Knob. Historically, cruise ship calls to Yorkeys Knob have grown when cruise ship calls to Cairns have grown. The locations are complimentary and work as an interrelated system, with larger ships that cannot access Trinity Inlet anchoring off Yorkeys knob.

Figure 13.10: Incremental Change in Total Vessel Numbers in Trinity Inlet and Yorkeys Knob to 2045 as a Result of the Reference Project (Central Case)



When the Project comes online, there is a small decrease in Yorkeys Knob as vessels favour Trinity Inlet due to the improved facilities. However, over time there will be small spillover benefits to Yorkeys Knob as a result of improved port infrastructure capacity in Cairns. These spillover benefits are likely to be underestimated as data is not available to quantify the spillover benefits to other ports in the region such as Port Douglas. As a result, these estimates provide a conservative view of the spillover benefits to the port network.

The key assumptions in development of demand forecasts for the Base Case and Reference Project scenarios are provided in Table 13.2.

Table 13.2: Key Assumptions for Demand Model Forecasts

KEY DEMAND ASSUMPTIONS				
	2017 TO 2020	2021	2022 TO 2027	2028–2045
BASE CASE AND REFERENCE PROJECT SCENARIOS				
Base Case	Figures are based on cruise schedules for Ports North (2017–19). The estimate in 2020 uses the growth rate based on econometric analysis.	No step-up factor is applied in the Base Case.	Annual growth rates applied from the econometric analysis	2.5%
Reference Project (Central Case)		A step-up factor of 20% is applied to the number of cruise ship calls to Trinity Inlet in 2021. This is based on the global forward order book, which indicates that 20% of cruise ships on forward order in 2021 are vistas. The step-up is used to proxy growth in larger cruise ships into the Port of Cairns and in particular Trinity Inlet under the Reference Project.	Econometric growth rates applied taking into account additional vista growth	3.9% (1.4% point increment relative to Base Case)
Reference Project (Optimistic)		The step-up factor is the same as that applied in the Reference Project (Central Case) plus an allowance for additional ship calls due to the operations of Luggage Point and potential for enhanced itineraries and transit visits in this scenario.		4.6% (0.7% point increment relative to Central Case)
Reference Project (Possible but Unlikely)		A smaller step-up factor is applied based on a smaller share of vistas on the forward order book relative to the Reference Case. The step-up factor applied is around half the step-up factor applied in the Reference Project (Central Case).		3.3% (0.6% point increment relative to the Central Case)

Source: Deloitte Access Economics.

13.2.5.2 Comparisons with Other Demand Studies

The demand study conducted for this Project is underpinned by econometric analysis to forecast ship calls into the Port of Cairns. Four scenarios were developed capturing the range of potential forecasts in terms of ship calls – a Base Case forecast and demand forecasts for three Reference Project cases.

A demand study was also conducted in 2016 and looked at 16 different demand scenarios on future ship calls into Cairns. The 2016 projections were only developed out to 2031 rather than 2045 for the 2018 demand study supporting this Project.

Comparing the two studies, as shown in Table 13.3, shows broad consistency between the demand forecasts out to 2031. The difference in ship calls in 2017 reflects the actual data on cruise ship calls by Ports North. The 2018 demand forecasts broadly reconcile with the 2016 study out to 2031, even though the methodology for developing the forecasts is different. This is evident in the forecast level of cruise ship calls into Cairns for the most comparable scenarios.

The 2016 study also noted that the additional access to the Port of Cairns is estimated to increase mega class ship visits to Cairns by 20 per cent for regal, vista and grand class ships. This is broadly consistent with the assumptions of a step-up in the number of vista class vessels (and implicitly grand class vessels with vista dimensions) that has been applied to the Reference Project (Central Case). This is a key similarity with the latest set of demand forecasts developed in 2018.

Table 13.3: Comparison of Levels and Growth Rates in Ship Calls, 2018 and 2016 Demand Studies

	2017	2021	2031	CAGR (2017–31)
BAU - 2018	77	93	120	3.2%
BAU home porting - 2016	66	88	117	4.2%
Revised channel enhanced itineraries/transit - 2018	77	93	145	4.6%
Revised channel home porting - 2016	66	98	140	5.5%
Revised channel Luggage Point - 2018	77	105	163	5.5%
Revised channel Luggage Point - 2016	68	126	167	6.6%

A previous study was commissioned by Ports North in 2014 that considered the demand for cruise ship calls under the original channel widening and deepening project, which required 4,400,000 cubic metres of dredging. This included access by voyager class ships to Trinity Wharves, whereas the current Project does not allow access for this class of vessels. However, the 2016 demand study looked at the 2014 channel modifications. Specifically, this assumed the Brisbane International Cruise Terminal, homeporting and 2014 channel modifications. In the central scenario, ship calls were forecast to be 192 by 2031 under a medium demand projection. In the latest demand forecasts (2018) (that exclude voyager vessels) ship calls are forecast to reach 145 in the Reference Project (Central Case) by 2031.

13.2.5.3 Visitor Sources

Only visitors who are new to Queensland are assumed to be additional in the economic analysis. This includes predominantly international visitors and also interstate visitors. Based on the Ports North Cruise Ship Passenger Survey (2017), international visitors comprised 65.8 per cent and interstate passengers 13 per cent of total passengers on cruise ships calling into Cairns. Domestic residents are assumed to be a transfer of activity, due to expenditure switching. They are therefore not considered as incremental in this economic analysis.

13.2.5.4 Average Occupancy Rates

The average occupancy rate of cruise ships is assumed to be 95 per cent. This is considered a conservative assumption given the long-term average occupancy rate for one of the larger cruise operators in the world, Royal Caribbean has been over 105 per cent for the 10 years to 2017. Given this is considered a conservative assumption, sensitivity analysis was conducted for 105 per cent average occupancy rates. Furthermore, due to forward bookings, cruise occupancy rates are expected to be high as companies can start selling a couple of years ahead and can then yield management nearer cruise departure day.

13.2.5.5 Average Vessel Size and Passengers and Crew

The average vessel size in terms of passenger and crew capacity for each class of vessel is shown in Table 13.4. This data is based on analysis of the passenger and crew capacity of eight different vessels surveyed in 2017 that visited Cairn including Pacific Aria, Seven Seas Voyager, Crystal Symphony, Albatross, Legend of the Seas, Sun Princess, Norwegian Star and Arcadia.

Sensitivity analysis was also conducted on crew-related expenditure.

Scenario analysis of alternative demand forecasts is also provided in this chapter, which helps demonstrate how sensitive the economic results are to these key assumptions. This is important as the Cairns region may be successful in attracting larger vessels, with higher passenger and crew carrying capacity, in the future due to the Reference Project.

Table 13.4: Passenger and Crew Capacity by Vessel Type

VESSEL TYPE	PASSENGER CAPACITY (AVERAGE)	PASSENGER TO CREW RATIO (AVERAGE)	CREW CAPACITY (AVERAGE)
Sub-regal	1,500	1.6	958
Regal	2,000	2.1	941
Sun	2,000	2.1	941
Vista	2,388	2.3	1,035
Grand	3,100	2.3	1,343
Voyager	3,300	2.3	1,430

13.2.5.6 Cruise-related Expenditure

The average expenditure profile of both passengers and crew is reported in Table 13.5, based on the economic analysis conducted for the Project EIS. This has also been price updated to $2017–18 using the ABS CPI reported by QT and accessed in April 2018.

Table 13.5: Expenditure Assumptions, Average Passenger and Crew Visitors to Cairns

CRUISE-RELATED EXPENDITURE	INCREASED OVERNIGHT SPEND		AVERAGE VISIT TO TRINITY INLET (AVERAGE OF 1 AND 2 DAYS)	
CATEGORY	PASSENGER	CREW	PASSENGER	CREW
Shopping	$86.98	$173.20	$105.27	$173.20
Food and drinks	$105.00	$163.28	$74.28	$163.28
Organised tours	$566.11	$0.00	$207.70	$0.00
Entertainment/gambling	$2.92	$53.62	$31.19	$53.62
Transport	$38.05	$0.74	$7.67	$0.74

CRUISE-RELATED EXPENDITURE	INCREASED OVERNIGHT SPEND		AVERAGE VISIT TO TRINITY INLET (AVERAGE OF 1 AND 2 DAYS)	
CATEGORY	PASSENGER	CREW	PASSENGER	CREW
Other	$3.22	$2.13	$0.00	$2.13
TOTAL	**$802.28**	**$392.97**	**$426.11**	**$392.97**
TOTAL ($2017-18)	**$851.32**	**$406.45**	**$437.41**	**$404.39**

In this analysis, the following assumptions apply based on this data:

- **Base Case** – The average expenditure profile of cruise ship visitors to Cairns (proxied by Trinity Inlet, which accounts for the bulk of cruise ship calls to Cairns) is applied across all vessel types.
- **Reference Project (Central Case)** – The average expenditure profile is applied to the sub-regal, regal and sun vessel classes. Consultation with industry operators and Ports North highlighted the considerable potential for increased overnight visits (which increases expenditure in the region) as a result of the Project. Therefore, this assumption is applied to the larger vessel categories, which is driven mainly by the vista class vessels. A sensitivity analysis was also conducted where the average expenditure profile was benchmarked to the average spend per international visitor in the TNQ tourism region in the year to September 2017 ($1,204 per visitor). To factor in the downside, a lower expenditure profile was also conducted as part of the sensitivity analysis. This reflects industry feedback that there is considerable potential for cruise visitors to stay longer in the region and spend more as a result of the Project.

13.2.5.7 Profit Margin (Proxy for Producer Surplus from Additional Cruise-related Expenditure)

The economic returns for incremental cruise-related expenditure were calculated by applying the expenditure by category, mapped to ABS Australian industry profit margins at the ANZSIC one and two-digit levels. The results of this analysis are shown in Table 13.6, which shows an average industry profit margin of 16.5 per cent. This assumption is important when measuring net economic benefits.

Sensitivity analysis was also conducted on this variable using an alternative measure of 20 per cent. This figure was based on QT state accounts data for gross operating surplus and Queensland industry sales and service income, which was estimated to average around 20 per cent over the last decade.

Table 13.6: Estimation of Average Industry Profit Margin for Cruise-related Expenditure

	CAIRNS OVERNIGHT		AVERAGE VISIT TO TRINITY INLET (AVERAGE OF 1 AND 2 DAYS)	
CATEGORY	PASSENGER	WEIGHTED PROFIT MARGIN	PASSENGER	WEIGHTED PROFIT MARGIN
Retail trade	$86.98	0.50%	$105.27	1.14%
Food and beverage services	$105.00	0.93%	$74.28	1.24%
Scenic and sightseeing transport	$566.11	16.14%	$207.70	11.15%
Gambling	$2.92	0.05%	$31.19	1.10%
Transport	$38.05	0.52%	$7.67	0.20%
Other	$3.22	0.04%	$0.00	0.0%
Total	**$802.28**	**18.20%**	**$426.11**	**14.84%**
Weighted average	**16.5%**			

13.3 Quality Assurance Review

An independent peer review of the economic assessment has been completed to assure the soundness and appropriateness of the methodology, technical procedures, modelling logic and processes associated with the results. The review report included:

- a summary of the independent peer reviewer's findings, particularly in relation to the adequacy of documentation, methodology, key risks and uncertainties, assumptions and results
- a declaration of the peer reviewer's interest or conflict of interest.

The recommendations of the peer reviewer have been taken into account when finalising the economic CBA.

13.4 Benefits

The benefits of the Reference Project are summarised in Table 13.7, with further details provided in this section.

Table 13.7: Key Assumptions for Demand Model Forecasts

KEY BENEFITS	DESCRIPTION OF BENEFITS	KEY CONSIDERATIONS TO MEASURE BENEFITS
Monetised – Cruise shipping activity: additional economic returns from passengers and crew expenditure (profit margin of additional spend provides a proxy for producer surplus)	One of the main sources of benefits is the additional cruise shipping visitor activity in Cairns and Queensland as a result of an incremental increase in the number of passengers/crew driven by increased vessel calls (including by larger ships) longer stays in the region, increased visitor expenditure and transit visits. Only economic returns (proxied by profit margins to industries where cruise money is spent) are measured.	Additional annual returns from cruise visitor expenditure = Number of ship calls * average capacity of cruise ships (passengers and crew) * average load factor (passengers and crew) * % share of passengers that are international and interstate (i.e. new to Qld) * average expenditure per person (passenger and crew) * average margin of gross expenditure benefits (to estimate overall net benefits) This is also estimated based on the Reference Project increasing the ability of the port for transit and visitor expenditure (particularly due to larger vessels relative to Base Case).
Monetised – Additional financial revenue received by the port	Consultation with Ports North highlighted revenues received by the port from additional ship calls as a result of the Project.	This is fed into the economic analysis from the financial model. The details of these revenue streams are provided in the Chapter 14: Financial and Commercial Analysis.
Monetised – Benefits as a result of increased access for the navy	Consultation highlighted the potential for increased activity at the Port of Cairns as a result of increased navy expenditure in the region. Consultation also highlighted that the AEC study provided a suitable estimate for these benefits.	This has been estimated using the AEC economic analysis, which identified the potential benefits from increased navy-related expenditure in Cairns as a result of the Reference Project. Similar to the above, only economic returns to this additional expenditure will be estimated, consistent with the above approach and building off previous studies.

KEY BENEFITS	DESCRIPTION OF BENEFITS	KEY CONSIDERATIONS TO MEASURE BENEFITS
Qualitatively described – Any potential benefits including reliability or resilience benefits	The potential for other benefits such as reliability have been identified but consultation has also identified these are likely to be very small. Another potential benefit is improved transit times from more calls going to Trinity Inlet (which has better accessibility). The channel widening and deepening will better allow for siltation of the channel between maintenance dredging campaigns.	This is discussed qualitatively in the economic analysis as these are considered to be immaterial relative to other benefit streams and data and information does not support reliable monetisation. The other potential additional benefit for potentially improved transit times is also discussed qualitatively as information and data does not support reliable monetisation.

13.4.1.1 Cruise Shipping Returns

Cruise shipping returns are measured by applying the industry profit margin to the incremental expenditure of both passengers and crew in the Reference Project (Central Case) relative to the Base Case. An example of the calculations for cruise shipping returns for cruise-related passenger expenditure is provided for the Reference Project (Central Case) in Table 13.8.

Table 13.8: Incremental Cruise Shipping Expenditure and Cruise Shipping Returns (Real, $2017–18)

BENEFITS				
ITEM	2021	2025	2035	2045
PASSENGER EXPENDITURE (NOTE THE BELOW DOES NOT INCLUDE CREW EXPENDITURE)				
Base case expenditure	$50,322,066	$57,161,781	$78,405,237	$101,314,745
Reference case expenditure	$72,007,553	$92,383,907	$149,311,491	$238,470,760
Incremental expenditure	$21,685,487	$35,222,126	$70,906,254	$137,156,015
Incremental returns (16.5%)	**$3,581,507**	**$5,817,176**	**$11,710,655**	**$22,652,259**
PASSENGERS				
Base case passengers	115,045	130,682	179,248	231,623
Reference case passengers	129,897	161,293	247,999	377,297
Incremental passengers	**14,852**	**30,612**	**68,751**	**145,675**

13.4.1.2 Financial Revenue from Port Charges

Details on financial revenues as a result of the Reference Project are provided in Chapter 14: Financial and Commercial Analysis.

13.4.1.3 Navy-related Expenditure Benefits

In 2016 it was identified that the incremental direct navy-related expenditure at around $3 million per annum as a result of the Project. In this economic analysis, the average industry profit margin is applied to estimate net benefits. This is also assumed to grow at 3.6 per cent per annum from 2021 onwards. Deeper channel access to HMAS Cairns creates the potential for the navy's largest ships (HMAS Canberra and HMAS Adelaide) to berth in Cairns. There is also the potential for large foreign navy ships to berth for rest and relaxation after joint naval exercises. The investment logic mapping also identified potential for the Project to facilitate increased Australian Defence Force capability in FNQ in the future.

13.5 Costs

Key inputs for the Base Case and Reference Project costs were informed by the outputs of the financial commercial model, including operating costs, and quantity surveyor and engineering inputs, including capital costs (P50 and P90). As required by Building Queensland frameworks, the economic CBA was conducted for both P50 and P90 costings for the Project, including capital and operating costs. Details on project costings are provided in Chapter 14: Financial and Commercial Analysis. It should be noted that any potential environmental costs have been assumed to be internalised as part of the project costings and policy requirements for the Project – and the revised EIS reflects reduced dredging.

13.6 Cost-Benefit Analysis Results

The key economic CBA results are shown for the Reference Project (Central) scenario (or best estimate of benefits and costs) for both P90 capital costings (Table 13.9) and P50 capital costings (Table 13.10).

Table 13.9: Key CBA Results (P90), Reference Project (Central Case)

COST-BENEFIT ANALYSIS RESULTS (P90)			
ITEM	4% (REAL)	7% (REAL)	10%(REAL)
PROJECT BENEFITS			
Total benefits	$196,604,196	$124,793,612	$83,411,090
PROJECT COSTS			
Total costs	$120,395,859	$114,060,690	$108,532,520
Net present value	$76,208,337	$10,732,922	-$25,121,430
Benefit cost ratio	1.6	1.1	0.77

Source: Deloitte Access Economics.

Table 13.10: Key CBA Results (P50), Reference Project (Central Case)

COST-BENEFIT ANALYSIS RESULTS (P50)			
ITEM	4% (REAL)	7% (REAL)	10% (REAL)
PROJECT BENEFITS			
Total benefits	$196,755,121	$124,884,678	$83,468,952
-PROJECT COSTS			
Total costs	$110,775,593	$104,896,325	$99,781,229
Net present value	$85,979,528	$19,988,352	-$16,312,276
Benefit cost ratio	1.8	1.2	0.84

The economic CBA findings highlight that the NPV is positive and the BCR is greater than one at the seven per cent real discount rate. The incremental benefits of the Reference Project are largely driven by increased cruise shipping returns (see **Error! Reference source not found.**).

Furthermore, the bulk of the incremental cruise-related passenger returns in Cairns and Queensland are driven by passenger-related expenditure (Figure 13.11). This includes expenditure on retail trade, food and beverage services, scenic and sightseeing transport, gambling, transport and other items of expenditure.

Figure 13.11: Economic Returns from Cruise Shipping-related Expenditure, Base Case and Reference Project (Central), $2017–18 (Real)

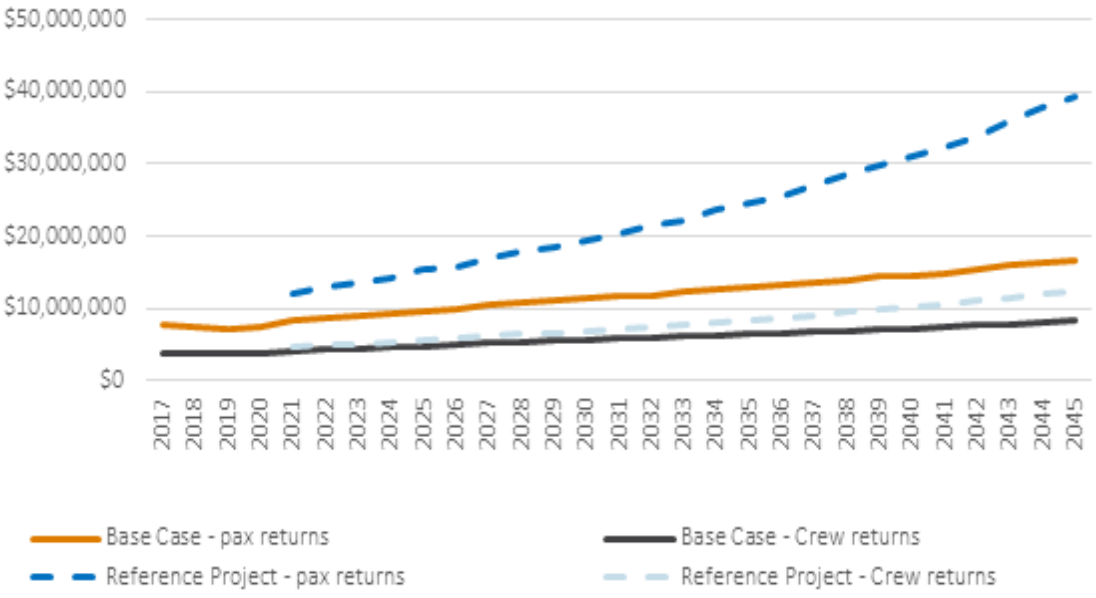


Table 13.11: Summary of Incremental Costs and Benefits for Reference Project (Central) $2017–18 (Real) – Financial Years

COST-BENEFIT ANALYSIS RESULTS (P90)									
	2018	2019	2020	2021	2025	2030	2035	2040	2045
INCREMENTAL COSTS (UNDISCOUNTED)									
Total incremental costs	$0	$46,068,763	$78,576,240	$240,564	$153,294	$172,131	$198,118	$233,571	$283,144
INCREMENTAL BENEFITS (UNDISCOUNTED)									
Incremental cash flow	$0	-$46,068,792	-$78,576,395	$4,827,478	$8,010,702	$11,021,895	$16,162,743	$22,984,920	$31,270,984

A summary of the incremental costs and benefits is presented in Table 13.11, highlighting undiscounted cash flows of the Reference Project (incremental to the Base Case) yearly over the period 2018 to 2021, then in five-year increments from 2025 to 2045. It shows a negative cash flow in the first two years (2019 and 2020) representing the capital investment. After this initial investment and from 2021, the benefits start to come online and the incremental cash flow grows out to 2045.

13.7 Sensitivity Analysis

The sensitivity analysis for the P90 (Table E.3) and P50 (Table 13.13) consider how a variation in the following key variables would affect the NPV and BCR:

- capital expenditure (-10% and +10%)
- profit margin (15% and 20%)
- average occupancy rate (90% and 105%)
- increased and decreased passenger spend ($681 and $1204)
- navy benefits (-100% and +50%)
- crew benefits (-10% and +10%).

The findings demonstrate that, across the range of sensitivities, the Reference Project has a positive NPV and BCR greater than one. The results are particularly sensitive to the increased passenger spend and movement in the profit margin.

Table 13.12: Sensitivity Analysis of CBA Results for Reference Project (Medium), P90, $2017–18 (@7%)

SENSITIVITY ANALYSIS			
ITEM	**LOW**	**CENTRAL CASE**	**HIGH**
CAPITAL EXPENDITURE	**-10%**	**CENTRAL**	**10%**
NPV	**$21,668,560**	**$10,732,922**	**-$202,716**
BCR	1.2	1.1	0.998
Profit margin	**15%**	**16.5% Central**	**20%**
NPV	$463,226	$10,732,922	$34,341,233
BCR	1.0	1.1	1.3
Average occupancy rate	**90%**	**95% Central**	**105%**
NPV	$5,270,732	$10,732,922	$21,657,303
BCR	1.05	1.1	1.2
Increased passenger spend*	**$681**	**$851 Central**	**$1204**
NPV	-$10,988,100	$10,732,922	$55,725,046
BCR	0.9	1.1	1.5
Navy benefits	**-100%**	**Central**	**+50%**
NPV	$2,610,824	$10,732,922	$14,793,971
BCR	1.02	1.1	1.13
Crew benefits	**-10%**	**Central**	**+10%**
NPV	$3,609,710	$10,732,922	$17,856,134
BCR	1.03	1.1	1.2

*Notes: * It is assumed that average overnight passenger spending increases to the regional average spend per international visitor.*

Table 13.13: Sensitivity Analysis of CBA Results for Reference Project (Medium), P50, $2017–18 (@7%)

SENSITIVITY ANALYSIS			
ITEM	LOW	CENTRAL CASE	HIGH
Capital expenditure	**-10%**	**Central**	**10%**
NPV	$30,081,681	$19,988,352	$9,895,024
BCR	1.3	1.2	1.1
Profit margin	**15%**	**16.5% Central**	**20%**
NPV	$9,718,656	$19,988,352	$43,596,663
BCR	1.1	1.2	1.4
Average occupancy rate	**90%**	**95% Central**	**105%**
NPV	$14,526,162	$19,988,352	$30,912,733
BCR	1.1	1.2	1.3
Increased passenger spend*	**$681**	**$851 Central**	**$1204**
NPV	-$1,732,670	$19,988,352	$64,980,476
BCR	1.0	1.2	1.6
Navy benefits	**-100%**	**Central**	**+50%**
NPV	$11,866,254	$19,988,352	$24,049,401
BCR	1.1	1.2	1.2
Crew benefits	**-10%**	**Central**	**+10%**
NPV	$12,865,140	$19,988,352	$27,111,564
BCR	1.1	1.2	1.3

*Notes: * It is assumed that average overnight passenger spending increases to the regional average spend per international visitor.*

13.8 Scenario Analysis

In addition to the economic analysis of the Reference Project (Central Case), two other potential demand scenarios for cruise shipping at Cairns have been considered:

- Possible but Unlikely scenario (downside scenario relative to the Central Case)
- Optimistic scenario (upside scenario relative to the Central Case).

The results for each case for the P90 (Table 13.14) and P50 costings (Table 13.15) are presented for a range of discount rates. The optimistic scenario has a higher NPV and BCR, driven by increases in the number of cruise ship calls into Cairns. Conversely, the results indicate that the benefits produced by the Possible but Unlikely case are not high enough to justify the costs (except when using a four per cent discount rate under the P50). This is due to the lower number of larger cruise ships that call into Cairns under this case as a result of the Reference Project.

During consultation, cruise operators highlighted the importance of integrating the Port of Cairns with other feeder ports such as Brisbane. Integration would increase the opportunity to improve and diversify schedules. Cruise operators also mentioned that the development of the Brisbane International Cruise Terminal at Luggage Point potentially increases the opportunity for transit and increased expenditure by cruise visitors to the region.

In the CBA, the effect of Luggage Point is implicitly included in the Base Case, as it is scheduled to begin operations in the next couple of years regardless of the Project. Likewise, the Project is going ahead independent of Luggage Point, with the Project enabling a greater capture of the larger size cruise ship market (e.g. vista class and some grand vessels).

In the Reference Project (Central Case), Luggage Point is implicitly included and this is captured in the step up in the growth rate for vista vessels (and implicitly some grand class vessels). The step up in growth rates of cruise ships into Cairns is mostly associated with the global market but it also captures future closer integration between Cairns and Brisbane, which this class of cruise vessels will also facilitate.

In the Reference Project (Optimistic) a step-up factor is included for Luggage Point. This takes into account increased future integration and reflects the belief of cruise operators that Sydney (which currently accepts the largest number of cruise ship calls) will experience capacity constraints in the future. In this scenario, expanded capacity in Brisbane (i.e. development of Luggage Point) would attract more ships to Brisbane and lead to greater integration with the Port of Cairns as the channel widening and deepening attracts a new class of vessels to that region. In the Possible but Unlikely case, Luggage Point is implicitly included.

Its inclusion in both the Base Case and the Reference Project case means Luggage Point's effect is incremental in the CBA. It is also considered marginal, with majority of the project benefits attributable to the capture of a higher share of the global cruise market to the Cairns region.

Table 13.14: Scenario Analysis Findings, Demand, P90, $2017–18

COST-BENEFIT ANALYSIS RESULTS (P90)			
ITEM	4% REAL	7% REAL	10% REAL
NPV			
Reference Project (Medium)	$76,208,337	$10,732,922	-$25,121,430
Reference Project (Optimistic)	$192,520,756	$85,859,821	$26,152,551
Reference Project (Possible but Unlikely)	-$4,941,101	-$40,639,924	-$59,454,988
Reference Project (Medium)	1.6	1.1	0.8
Reference Project (Optimistic)	2.6	1.8	1.2
Reference Project (Possible but Unlikely)	0.96	0.6	0.45

Source: Deloitte Access Economics.

Table 13.15: Scenario Analysis Findings, Demand, P50, $2017–18

COST-BENEFIT ANALYSIS RESULTS (P50)			
ITEM	4%	7%	10%
NPV			
Reference Project (Medium)	$85,979,528	$19,988,352	-$16,312,276

COST-BENEFIT ANALYSIS RESULTS (P50)			
ITEM	4%	7%	10%
Reference Project (Optimistic)	$202,463,320	$95,216,283	$35,024,341
Reference Project (Possible but unlikely)	$4,682,680	-$31,475,079	-$50,704,459
Reference Project (Medium)	1.8	1.2	0.8
Reference Project (Optimistic)	2.8	1.9	1.4
Reference Project (Possible but unlikely)	1.04	0.70	0.49

Source: Deloitte Access Economics.

13.9 Vessel mix for Trinity Inlet and Yorkeys Knob

Table 13.16 and Table 13.17 show the forecast vessel calls for Trinity Inlet (split into vessel type) under the Base Case and the Reference Project based on demand forecasts developed for the Reference Project. Table 13.18 and Table 13.19 show the forecast vessel calls for Yorkeys Knob (split into vessel type) under the Base Case and the Reference Project based on demand forecasts developed for the Reference Project. More detail on the demand forecast methodology can be found in Chapter 5: Base Case.

Table 13.16: Base Case Vessel Calls to Trinity Inlet 2017 to 2045

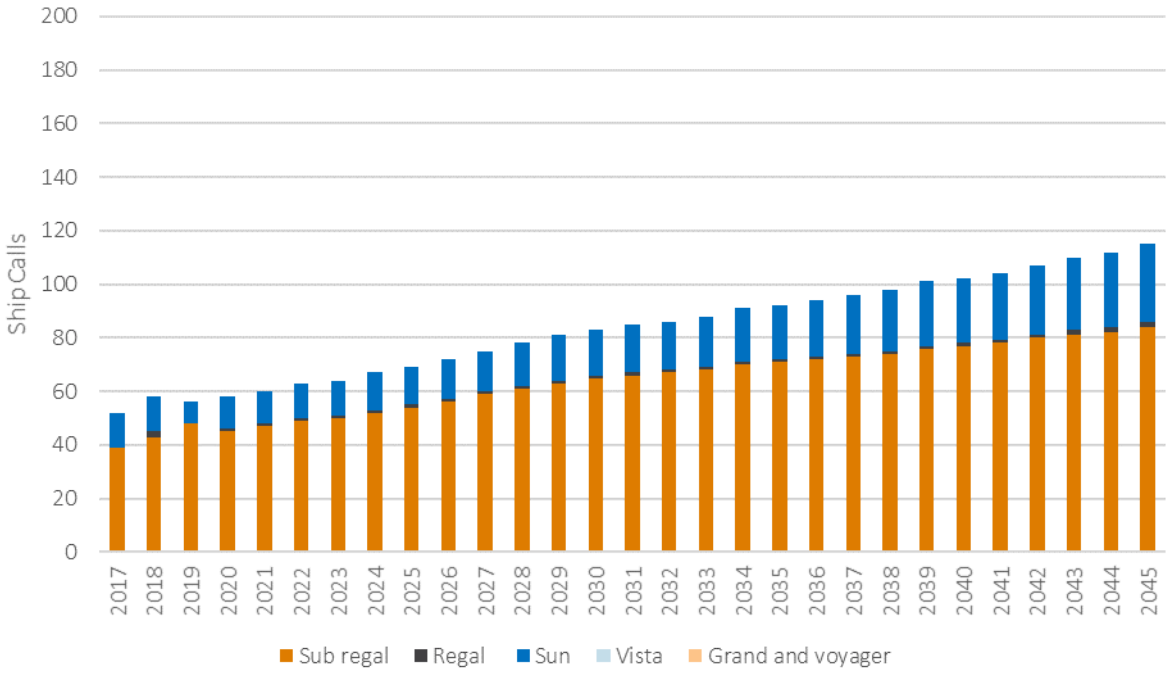


Table 13.17: Vessel Calls to Trinity Inlet, CSDP Reference Project, 2017 to 2045

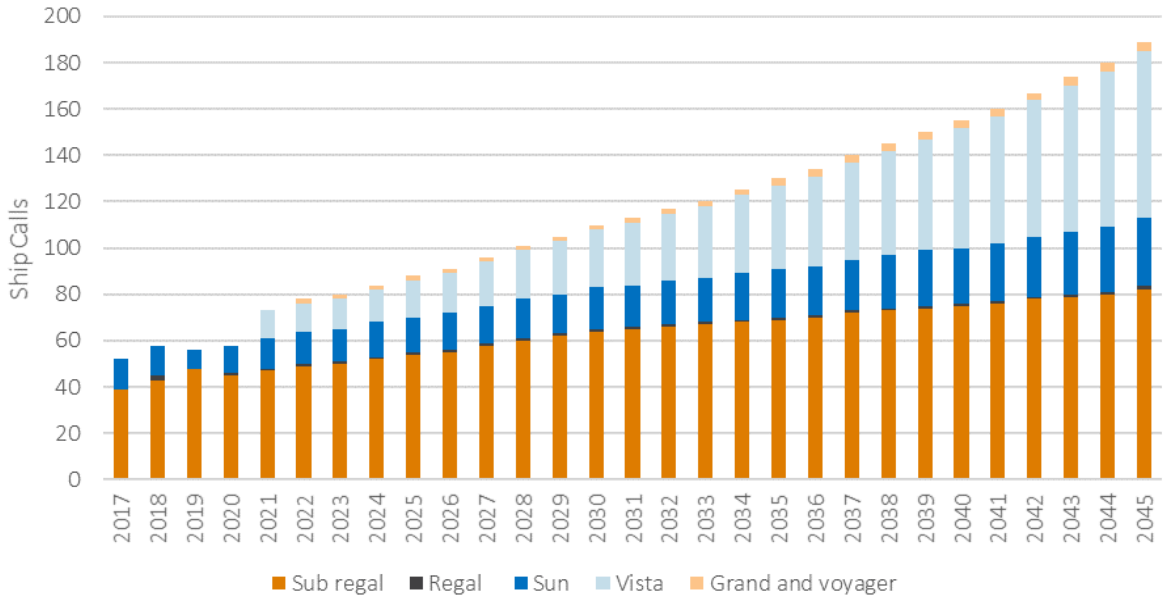


Table 13.18: Base Case Vessel Calls to Yorkeys Knob 2017 to 2045

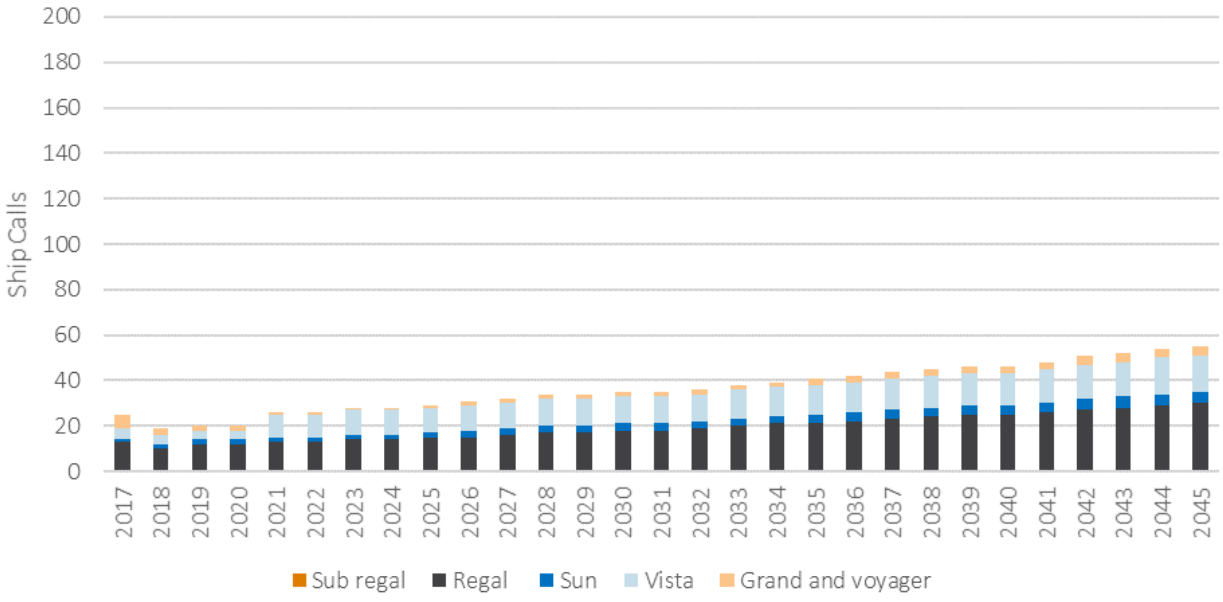
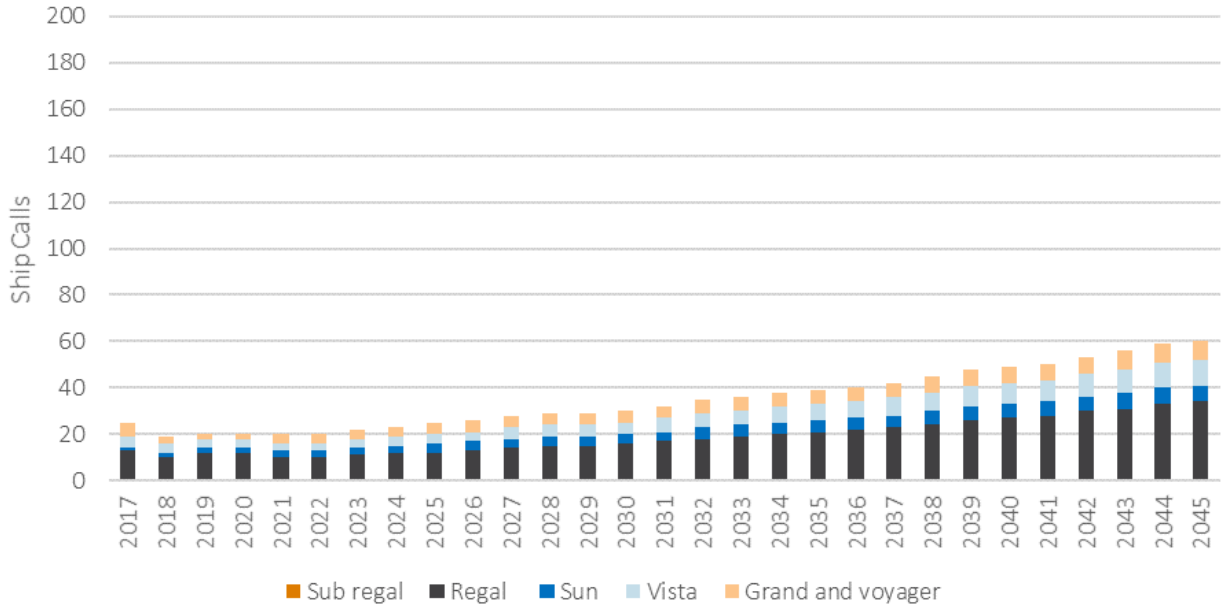


Table 13.19: Vessel Calls to Yorkeys Knob, Reference Project, 2017 to 2045



CHAPTER 14
FINANCIAL AND COMMERCIAL ANALYSIS

CHAPTER SUMMARY AND CONCLUSIONS:

- The financial analysis examined the financial impacts of the Base Case and the Reference Project over a 27-year evaluation term (two years for construction and 25 years for operations) for a central case demand scenario.
- The Base Case is defined as a do minimum scenario, involving the demolition of Wharf 6, ongoing maintenance dredging and wharf maintenance and operations. Further information is provided in Chapter 5: Base Case. The net cash inflow of the Base Case over the 27-year evaluation term is $77.3 million (nominal, unadjusted).
- The Reference Project considers the impact of three proposed work packages:
  - Dredging and Spoil Placement Works
  - Bund Construction Works
  - Wharf Infrastructure and Services Upgrade Works.
- The net cash inflow of the Reference Project is $49.9 million (nominal, unadjusted). However, the net position becomes an outflow of $13.7 million (FNPV, unadjusted) when the impact of discounting is considered.
- The net cash inflow of the Reference Project is $27.4 million (nominal, unadjusted) lower than that of the Base Case.
- All cash flows have been risk-adjusted using probabilistic modelling. Total risk-adjusted (P90) net cash flow position of the Reference Project is ($49.4 million) (net cash outflow) in financial net present value (FNPV, P90) and $8.9 million (net cash inflow) (nominal, P90). These are respectively $89.2 million and $64.9 million lower than the net cash flow positions of the Base Case.
- The difference in net cash flows between the project options is largely driven by the intensive capital works required under the Reference Project, which accounts for approximately 70 per cent of total project costs based on the unadjusted values (FNPV). In comparison, capital costs required under the Base Case are considered minimal at approximately five per cent of total project costs based on the unadjusted values (FNPV).
- Over the life of the Project, maintenance dredging is projected to be the most significant ongoing cost under both Reference Project and Base Case.
- The revenue generated from cruise shipping activities is not sufficient to fund the capital costs required in the first two years of the evaluation period of the Reference Project. However, on an unadjusted basis it will be sufficient to offset the ongoing costs from FY2021 onwards.

Table A: Summary of Net Cash Flow Positions for the Base Case and Reference Project (P90)

NET CASH FLOW (P90 RISK-ADJUSTED)						
NET CASH FLOW	REAL ($ MILLION, $ YEAR)		NOMINAL ($ MILLION)		FNPV ($ MILLION)	
	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT
Revenue	84.8	129.7	127.7	199.6	72.9	110.4
Capital Costs	(1.6)	(123.1)	(1.6)	(127.6)	(1.6)	(122.7)
Ongoing Costs	(37.5)	(46.0)	(53.7)	(65.5)	(32.8)	(40.2)
NET CASH FLOW	**47.0**	**(37.3)**	**73.8**	**8.9**	**39.8**	**(49.4)**

Note: The risk-adjusted subtotals and totals presented in the above table do not equal the sum of the individual line items. Aggregating the individual line items inappropriately overestimates risk-adjusted values on the subtotal and total levels, as it assumes that that each cost line item has experienced an unfavourable outcome.

Table B: Summary of Net Cash Flow Positions for the Base Case and Reference Project (P50)

NET CASH FLOW (P50 RISK-ADJUSTED)						
NET CASH FLOW	REAL ($ MILLION, $ YEAR)		NOMINAL ($ MILLION)		FNPV ($ MILLION)	
	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT
Revenue	86.3	131.5	129.9	202.4	74.2	112.0
Capital Costs	(1.6)	(113.3)	(1.6)	(117.5)	(1.6)	(112.9)
Ongoing Costs	(36.6)	(44.5)	(52.5)	(63.4)	(32.2)	(39.3)
NET CASH FLOW	**48.9**	**(25.6)**	**76.6**	**22.1**	**41.2**	**(39.6)**

Note: The risk-adjusted subtotals and totals presented in the above table do not equal the sum of the individual line items. Aggregating the individual line items inappropriately overestimates risk-adjusted values on the subtotal and total levels, as it assumes that that each cost line item has experienced an unfavourable outcome.

14.1 Purpose

This chapter outlines the financial impact of the Base Case and the Reference Project.

The financial analysis incorporates all revenue and costs associated with construction and operation of the Base Case and Reference Project over the evaluation period and quantifies the estimated cash flows and FNPV.

This chapter outlines:

- the financial analysis approach
- key assumptions and data sources
- the revenue, capital and ongoing costs (whole-of-life) of the Reference Project
- the value of the risk adjustments and the subsequent net risk-adjusted cash flows
- sensitivity and scenario analysis.

14.2 Approach

This financial analysis has been undertaken in accordance with Building Queensland's BCDF and QT's PAF to arrive at the unadjusted and risk-adjusted FNPV for the Base Case and the Reference Project. The high-level approach of the financial analysis is as follows:

- Discussions and workshops were undertaken with Building Queensland, Ports North and Project Team advisors to identify and agree on all relevant revenue and cost items, key assumptions and other inputs.
- Financial results were calculated in nominal, real, and FNPV terms based on the assumptions and inputs identified.
- Using Monte-Carlo analysis, risk-adjusted financial results were calculated to account for the potential financial impact of the quantitative risks identified as part of the risk management assessment at a P50 and P90 confidence level.
- Sensitivity analysis was performed on the unadjusted revenue and cost drivers.
- Scenario analysis was performed on the high and low demand scenarios.
- An independent peer review was conducted by BDO Australia to ensure all modelling methodology, assumptions and outputs are reasonable and appropriate. The final version of this chapter incorporates the key recommendations arising from the peer review.

This financial analysis does not consider the impact of the Reference Project on other ports in the broader Cairns region, such as Yorkeys Knob for example. This is explored in detail in Chapter 13: Economic Analysis. This financial analysis focuses on ascertaining the financial impact of the Reference Project to Ports North (as a government-owned corporation). This is differentiated from the economic analysis, which focuses on the economic welfare of the community.[21]

14.3 Assumptions and Limitations

The assumptions adopted to forecast the whole-of-life cash flows for the Reference Project have been developed in collaboration with Ports North. This section provides an overview of the assumptions used to calculate the FNPV for each option.

Should the assumptions and inputs change, the results of the financial analysis will also change. A sensitivity analysis has been undertaken in Section 14.6 to model the potential impact to the net cash flow of the Reference Project as a result of changes in key assumptions.

[21] http://buildingqueensland.qld.gov.au/wp-content/uploads/2016/12/Detailed-Business-Case-2.1.pdf

14.3.1 General Assumptions

Table 14.1 provides an overview of the general assumptions that apply to both the Base Case and the Reference Project. The source of each assumption is also provided.

Table 14.1: General Assumptions and Inputs

GENERAL ASSUMPTIONS AND INPUTS		
ITEM	**ASSUMPTION**	**SOURCE**
MODEL DATES		
Model start date	1 July 2018	Deloitte, as agreed by Building Queensland
Construction period	2 years	Deloitte, as agreed by Building Queensland
Operations period	25 years	Deloitte, as agreed by Building Queensland
Model end date	30 June 2045	Deloitte, as agreed by Building Queensland
INDEXATION		
Capital costs (construction) escalation	Refer to Table 14.2	QTRIP, TMR
Operating costs escalation	CPI: 2.25% in FY19 and 2.50% p.a. thereafter	2.25% is the forecast inflation rate for FY19 in the 2017–18 Queensland Budget Mid-Year Fiscal and Economic Review. 2.5% represents the mid-point of the Reserve Bank of Australia's target band, consistent with the Government Indexation Policy.
Maintenance Costs escalation	CPI: 2.25% in FY19 and 2.50% p.a. thereafter	2.25% is the forecast inflation rate for FY19 in the 2017–18 Queensland Budget Mid-Year Fiscal and Economic Review. 2.5% represents the mid-point of the Reserve Bank of Australia's target band, consistent with the Government Indexation Policy.
Lifecycle costs escalation	CPI: 2.25% in FY19 and 2.50% p.a. thereafter	2.25% is the forecast inflation rate for FY19 in the 2017–18 Queensland Budget Mid-Year Fiscal and Economic Review. 2.5% represents the mid-point of the Reserve Bank of Australia's target band, consistent with the Government Indexation Policy
DISCOUNT RATE		
Cost of government funding	3.61%	The discount rate was provided by QTC via QT, and represents the five-year average rate for QTC generic 10-year bonds as at 30 April 2018.

Table 14.2: Capital Costs Escalation Rates

CAPITAL COSTS ESCALATION RATES									
	FY19	**FY20**	**FY21**	**FY22**	**FY23**	**FY24**	**FY25**	**FY26**	**FY27**
Escalation Rate	2.17%	2.37%	2.41%	3.07%	3.06%	2.94%	2.67%	2.67%	2.67%

Source: Building Queensland, informed by QTRIP.

The escalation rates applicable to project costs have been provided by TMR and are the same as the rates per the Queensland Transport and Roads Investment Program (QTRIP). The rates vary year to year and range between 2.17 per cent to 2.37 per cent throughout the project construction period from FY19 to FY20.

The nominal discount rate of 3.61 per cent represents the cost of government funding. The rate represents the five-year average of QTC's generic 10-year bonds as at 30 April 2018. The projected nominal cash flows are discounted to 1 July 2018.

Project costs (capital and ongoing) have been modelled on an annual basis. For the purposes of calculating the FNPV, cash flows have been assumed to occur at period end.

14.3.2 Revenue Assumptions

Revenue considered and modelled in the financial analysis of the Base Case and Reference Project comprise of:

- cruise ship revenue
- security revenue.

Revenue arising from cargo ships has not been considered in this financial analysis. Unlike cruise shipping, cargo ship demand is driven by demand for the carried goods and not by the capacity of the Trinity Inlet. Australian Navy ships also berth at the Port of Cairns. However, no revenue will be collected from navy ships as tonnage fees and other charges are not applicable to the navy.

The analysis does not consider any revenue associated with cruise ships docking at Yorkeys Knob as Ports North does not receive this revenue.

Table 14.3 sets out the revenue assumptions and inputs used in the financial analysis, which have been provided by and agreed with Ports North (unless indicated otherwise). These assumptions are applicable to both the Base Case and the Reference Project.

Table 14.3: Revenue Assumptions and Inputs

REVENUE ASSUMPTIONS AND INPUTS		
ITEM	**ASSUMPTION / UNIT**	**SOURCE**
Demand volumes	# of ship calls under the central case demand scenario	Deloitte Demand Analysis
Share of homeporting, transit and overnight vessels for the Base Case and Reference Case	▪ 10% homeporting ▪ 40% transit ▪ 50% overnight	Ports North
CRUISE SHIPPING REVENUE – HOMEPORTING, TRANSIT AND OVERNIGHT VESSELS		
REVENUE / METRE (HOMEPORTING)		
All ships	$154.77/m (excl. GST) [22]	Ports North
REVENUE / METRE (TRANSIT)		
Sub-regal class ship	$83.83/m (excl. GST)	Ports North
Regal class ship	$94.87/m (excl. GST)	Ports North
Sun class ship	$90.67/m (excl. GST)	Ports North

[22] Revenue per metre for homeporting/turnaround ships have been calculated based on the sub-regal class ship's ship length.

REVENUE ASSUMPTIONS AND INPUTS		
ITEM	ASSUMPTION / UNIT	SOURCE
Vista class ship	$96.68/m (excl. GST)	Ports North
Grand class ship	$116.40/m (excl. GST)	Ports North
REVENUE / METRE (OVERNIGHT)		
Sub-regal class ship	$146.95/m (excl. GST)	Ports North
Regal class ship	$157.99/m (excl. GST)	Ports North
Sun class ship	$153.79/m (excl. GST)	Ports North
Vista class ship	$159.80/m (excl. GST)	Ports North
Grand class ship	$179.52/m (excl. GST)	Ports North
SHIP LENGTHS		
Overnight	212m	Ports North
Sub-regal class ship	219m	Ports North
Regal class ship	245m	Ports North
Sun class ship	261m	Ports North
Vista class ship	285m	Ports North
Grand class ship	289m	Ports North
SECURITY REVENUE		
Security revenue	$4,482 / ship (excl. GST)	Ports North

The revenue forecast of the financial analysis is primarily driven by the revenue rate (i.e. revenue per metre) associated with cruise shipping revenue and ship lengths measured in metres. The revenue rates have been calculated by Ports North based on the cruise shipping revenue rates for homeporting, transit and overnight vessels. The revenue rates generated by homeporting vessels represent the average revenue from tonnage dues, passenger levies and screening fees. The revenue rates generated by transit and overnight vessels represent the average revenue from tonnage dues and passenger levies. Overnight vessels are assumed to remain in port for a longer duration (i.e. over 24 hours) compared to transit vessels, and will therefore incur higher tonnage dues, which is partly driven by the length of stay (hours) for each ship.

Revenue rates have been calculated based on Ports North's fees and charges schedule as at January 2018.[23] Revenue rates consider the following:

- Tonnage dues – charges paid by the vessel operator to Ports North for the usage of the port, which includes berthage. For large vessels over 50 metres in length (i.e. cruise ships), tonnage dues are calculated based on the length of the vessels and the length of stay of vessels in hours.
- Passenger levies – charges paid by vessel operator to Ports North for each transiting or embarking/disembarking passenger.
- Screening fees (security revenue) – charges paid by the vessel operator to Ports North per visit for passenger vessel screening.

[23] https://os-data-2.s3-ap-southeast-2.amazonaws.com/portsnorth-com-au/bundle19/ports_north_charges_2018_-_incl_excl_gst.pdf

Security revenue includes revenue collected for security services provided for berthed cruise ships, which is calculated on a per ship basis.

14.3.3 Capital Costs Assumptions

Capital costs include costs[24] that can be capitalised relating to the design, construction and implementation of the Base Case and Reference Project. Capital costs were informed by a cost plan developed by the technical advisor.

The demolition of the existing Wharf 6 is planned under the Base Case. The capital costs to demolish Wharf 6 were provided by Ports North. In addition to demolition costs, there are also other costs incurred at the preliminary stages of the Project. Approximately $4.2 million has been incurred for the preparation of the EIS for the Project. However, for the purposes of this analysis the costs related to the EIS are treated as sunk costs in nature, and hence not considered as part of the project cash flow in this analysis. On the other hand, costs incurred to prepare this DBC are not considered sunk costs in nature, and are included in the capital cost estimate as Pre-incurred Project Costs. This cost is also applicable to the Reference Project.

As noted in Chapter 15: Delivery Model Analysis, the capital element of the Reference Project will be delivered in three different packages, being:

- Dredging and Spoil Placement Works
- Bund Construction Works
- Wharf Infrastructure and Services Upgrade Works.

This financial analysis provides capital costs for the design, construction and implementation of the Reference Project separately for each of the three packages.

Capital cost estimates are based on cost estimates provided by the technical advisors in March 2018. Capital costs are expected to be incurred from FY2019 to FY2020 (i.e. construction period).

Table 14.4 outlines the cost types relevant to the Base Case.

Table 14.4: Capital Cost Types under the Base Case

CAPITAL COST TYPES RELATED TO EACH WORK PACKAGE
COST TYPES
Wharf Infrastructure – Demolition
Pre-incurred Project Costs

Table 14.5 outlines the various cost types associated with each of the three work packages under the Reference Project.

Table 14.5: Capital Cost Types under the Reference Project

CAPITAL COST TYPES UNDER THE REFERENCE PROJECT
COST TYPES
DREDGING AND SPOIL PLACEMENT CAPITAL COST TYPES
Design and Project Management

[24] Costs are capitalised or expensed as per Queensland Treasury's Non-Current Asset Policies NCAP 1.

CAPITAL COST TYPES UNDER THE REFERENCE PROJECT
COST TYPES
Mobilisation / Demobilisation
Installation and Site Establishment
Dredging
Site Clearance
Spoil Placement
Environmental Treatments and Offsets
BUND CONSTRUCTION CAPITAL COST TYPES
Preliminary Costs
Earthworks
Temporary Sheet Piling
Balancing Pipes and Spillway
BUND CONSTRUCTION CAPITAL COST TYPES
Demolition
Construction – Dolphins
Construction – Deck
Construction – Beams
Construction – Piles
Construction – Joints
Construction – Bollards
Construction – Piling Rig
Construction – Access Platforms and Walkways
Navigational Aids and Service Upgrades
Monitoring and Offsets
Site Management and Overheads
Other Costs
OTHER
Pre-incurred Project Costs

14.3.4 Ongoing Costs Assumptions

Ongoing costs represent the costs associated with the ongoing maintenance and asset upgrades of the port infrastructure that are attributable to cruise shipping operations. Maintenance costs attributable to other aspects of the port's operations (e.g. cargo shipping operations) are excluded in this financial analysis as only revenue associated with cruise ships have been considered. All ongoing costs estimates have been provided by Ports North.

A summary of the ongoing cost types that are applicable to both the Base Case and Reference Project is provided in Table 14.6. The majority of ongoing cost types are applicable to both the Base Case and

Reference Project. Key differences between the Base Case and Reference Project are the inclusion of the following costs under the Reference Project:

- maintenance and lifecycle costs of fenders
- maintenance costs of the bund
- additional maintenance dredging costs associated with the expanded channel.

These costs are not relevant to the Base Case as construction of fenders and the bund are specific to the scope of the Reference Project.

Table 14.6: Ongoing Cost Types

ONGOING COST TYPES
ITEM
OPERATIONS
Port Operating Costs
Staff Costs
Other Costs
MAINTENANCE
Dredging
Wharves
Fenders
Bund
LIFECYCLE
Wharves
Fenders

Port operating costs represent incidental costs incurred when a ship uses the port and is moored. These include:

- fencing and signage fees
- security inspections and patrols.

These costs are considered attributable to the operations of the wharf infrastructure. Port operating costs are variable in nature and are incurred on a per ship basis. Other costs comprise of miscellaneous security costs, such as closed-circuit television costs, incurred to maintain the operations of the wharf.

Lifecycle costs relate to asset refresh costs for the wharf and fender infrastructure. Consistent with QT's Non-Current Asset Policies (NCAP 1)[25], these costs cannot be capitalised as they do not improve the condition of the asset beyond its originally assessed standard of performance or capacity.

Annual channel maintenance dredging occurs in Trinity Inlet. The dredging facilitates trade in and out of the Port of Cairns and is required by all maritime users including cruise. Maritime revenue is an appropriate measure of channel activity and usage. Based on a review of the user activity, the non-cruise activity equates to 90 per cent of the overall activity and therefore contributes to 90 per cent of the existing dredging costs.

[25] https://s3.treasury.qld.gov.au/files/ncap-1-recognition-of-assets.pdf

Based on an annual cost of $2.5 million, the non-cruise users fund $2.25 million of the dredging costs and it is proposed that this funding contribution should continue going forward. The cruise ship activity is approximately 10 per cent, which equates to approximately $0.250 million per annum. This applies to both the Base Case and Reference Project. All additional maintenance dredging costs required to maintain the larger channel created by the Project have been allocated to the Reference Project.

Annual general maintenance and recurring lifecycle maintenance on Wharves 1 to 6 in the Port of Cairns is to allow the use of the wharf for both maritime usage (some of which is cruise) and commercial activities on the deck. Wharf revenue is an appropriate measure of activity and usage. Based on a review of the revenues, the non-cruise activity equates to 50 per cent of the overall activity and therefore contribute to 50 per cent of the existing wharf costs. The balance of the costs is to be contributed by cruise therefore in the Base Case and Reference Project ongoing maintenance at Wharves 1 to 6 is approximately 50 per cent of the overall costs. This equates to an average long-term annual general and lifecycle maintenance cost of approximately $0.3 million per annum. This applies to both the Base Case and Reference Project.

14.4 Financial Net Present Value (FNPV)

14.4.1 Approach

The unadjusted FNPV represents the net financial impact to government in present dollars from an internal financing perspective. It is calculated as the projected cash-flow profile (i.e. net of revenues and costs) generated from the Reference Project over its lifetime. This takes into consideration the revenues generated by the Project, capital costs and ongoing costs. By calculating the net-cash-flow balances in each year and discounting these at an appropriate rate, an unadjusted FNPV is produced for the Reference Project. The FNPV calculated in this subsection does not take into account the risk profiles of the cash flows.

14.4.2 Revenue

Table 14.7 summarises the projected total revenue generated for both the Base Case and the Reference Project over the life of the Project.

Table 14.7: Total Revenue Over the Life of Project (Unadjusted)

TOTAL REVENUE OVER THE LIFE OF PROJECT (UNADJUSTED)						
REVENUES	REAL ($ MILLION, $ YEAR)		NOMINAL ($ MILLION)		PV ($ MILLION)	
	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT
TOTAL	87.0	132.6	131.0	204.0	74.8	112.9

The Reference Project is expected to generate an additional $38.2 million (PV) or $73.0 million (nominal) compared to the Base Case in total revenue. This additional benefit is mainly driven by the increase in cruise ship demand resulting from the increased capability of the channel and port infrastructure to handle larger cruise ships.

Figure 14.1 illustrates the revenue profile in nominal terms associated with the Reference Project over the project period. Under the Reference Project, revenue is expected to experience a one-off increase in FY2021 as the capacity of the channel is expanded following the completion of capital works in FY2020. Revenue then increases at a higher rate annually compared to the Base Case due to an increase in cruise ship demand from FY2021 onwards.

Figure 14.1: Revenue of the Base Case and Reference Project Over the Life of Project (Nominal, Unadjusted)

14.4.3 Value Capture

Value capture opportunities were considered in the context of the Reference Project as part of this financial analysis. An assessment has been undertaken in line with the BCDF following the four-step process of:

- identifying beneficiaries and benefits
- estimating value uplift
- identifying relevant value-capture mechanisms
- evaluating mechanisms.

14.4.3.1 Identifying Beneficiaries and Benefits

The primary benefit associated with the Reference Project is the increased passenger traffic through the Cairns Cruise Liner Terminal.

The Cairns Cruise Liner Terminal currently houses Hemingway's in its restored Shed 2 that spans 1,400 square meters by way of an operating lease between Ports North and Hemingway's. Hemingway's is an immediate beneficiary of the Reference Project as it will benefit from increased passenger traffic at the Cairns Cruise Liner Terminal by way of increase in revenue.

Other retail and hospitality operators will also benefit from the Reference Project through the increase in tourism in the region.

14.4.3.2 Estimating Value Uplift

The benefits enjoyed by other operators in the Cairns region due to the increase in tourism are indirect in nature. A study of this has been undertaken as part of the Economic Analysis in Chapter 13.

14.4.3.3 Identifying Relevant Value Capture Mechanisms

For business operators in the Cairns region, a possible method of capturing the value created by the Reference Project is by way of a special purpose levy imposed on all business operators in the region. Levies collected may then be allocated by the government to fund the Reference Project. This mechanism is akin to the tax increment financing approach that is widely used in the United States.

14.4.3.4 Evaluation of Mechanisms

The value capture mechanism identified above has been assessed against the principles of:

- efficiency
- equity
- fairness
- materiality
- sustainability.

Equity and fairness are the key issues of consideration in relation to value capture of benefits derived by business operators in the Cairns region. There is a reputation risk to the government if the value capture mechanism is not administered appropriately. In the context of the Reference Project, it is difficult to achieve equity by imposing a levy on businesses given it is not practical to isolate the additional revenue attributable to the Reference Project against additional revenue as a result of organic growth or other corporate and marketing strategy. A uniform rate would likely be applied to businesses within the same sector if a levy mechanism is adopted. This may not amount to fair treatment across all businesses as it is difficult to ensure that businesses in the same sector are able to derive the same degree of benefit from the Reference Project. Finally, in order to implement the levy mechanism, a district which specifies the area that the levy will apply needs to be determined. The boundary determined will need to be considered in-depth to avoid overextending to areas where benefits are not derived or vice versa to ensure fair treatment to the Cairns community as a whole.

14.4.4 Capital Costs

Table 14.8 provides a high-level summary of the capital costs estimated to be incurred by the Reference Project. Capital costs are incurred over the construction period from FY2019 to FY2020.

Table 14.8: Total Capital Costs (Unadjusted)

TOTAL CAPITAL COSTS (UNADJUSTED)						
CAPITAL COSTS	REAL ($ MILLION, $ YEAR)		NOMINAL ($ MILLION)		PV ($ MILLION)	
	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT
TOTAL	1.6	89.3	1.6	92.6	1.6	89.0

Capital costs under the Base Case are related to Demolition Costs associated with Wharf 6. Other than Demolition Costs and Pre-incurred Project Costs, no other capital costs are required under the Base Case.

Required capital works are significantly more intensive for the Reference Project compared to the Base Case. Capital costs under the Reference Project are mainly driven by costs associated with the Dredging and Spoil Placement Works package, which accounts for 64 per cent of total capital costs in PV terms. This is compared to the Wharf Infrastructure and Services Upgrade Works and Bund Construction Works packages, which represent 28 per cent and seven per cent of total capital costs, respectively.

A detailed breakdown of capital costs related to three work packages under the Base Case and Reference Project is outlined in Table 14.9 to Table 14.11.

Table 14.9: Dredging and Spoil Placement Works Capital Costs Summary (Unadjusted)

DREDGING AND SPOIL PLACEMENT WORKS TOTAL CAPITAL COST (UNADJUSTED)						
CAPITAL COSTS	REAL ($ MILLION, $ YEAR)		NOMINAL ($ MILLION)		PV ($ MILLION)	
	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT
TOTAL	-	56.8	-	58.9	-	56.6

Table 14.10: Bund Construction Works Capital Costs Summary (Unadjusted)

BUND CONSTRUCTION WORKS TOTAL CAPITAL COST (UNADJUSTED)						
CAPITAL COSTS	REAL ($ MILLION, $ YEAR)		NOMINAL ($ MILLION)		PV ($ MILLION)	
	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT
TOTAL	-	6.4	-	6.6	-	6.4

Table 14.11: Wharf Infrastructure and Services Upgrade Works Capital Costs Summary (Unadjusted)

WHARF INFRASTRUCTURE AND SERVICES UPGRADE WORKS TOTAL CAPITAL COST (UNADJUSTED)						
CAPITAL COSTS	REAL ($ MILLION, $ YEAR)		NOMINAL ($ MILLION)		PV ($ MILLION)	
	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT
TOTAL	0.8	25.4	0.8	26.4	0.8	25.3

14.4.5 Ongoing Costs (Whole-of-Life)

Table 14.12 outlines the ongoing whole-of-life costs of the Base Case and the Reference Project.

Table 14.12: Total Ongoing (Whole-of-life) Costs (Unadjusted)

TOTAL ONGOING COSTS (UNADJUSTED)			
ONGOING COSTS	REAL ($ MILLION, $ YEAR)	NOMINAL ($ MILLION)	PV ($ MILLION)
	REF. PROJECT	REF. PROJECT	REF. PROJECT
OPERATIONS			
TOTAL	12.5	18.6	10.8
MAINTENANCE			
TOTAL	19.2	25.3	17.6

TOTAL ONGOING COSTS (UNADJUSTED)			
ONGOING COSTS	REAL ($ MILLION, $ YEAR)	NOMINAL ($ MILLION)	PV ($ MILLION)
	REF. PROJECT	REF. PROJECT	REF. PROJECT
LIFECYCLE			
TOTAL	11.0	17.6	9.1
TOTAL ONGOING COSTS	**42.7**	**61.5**	**37.5**

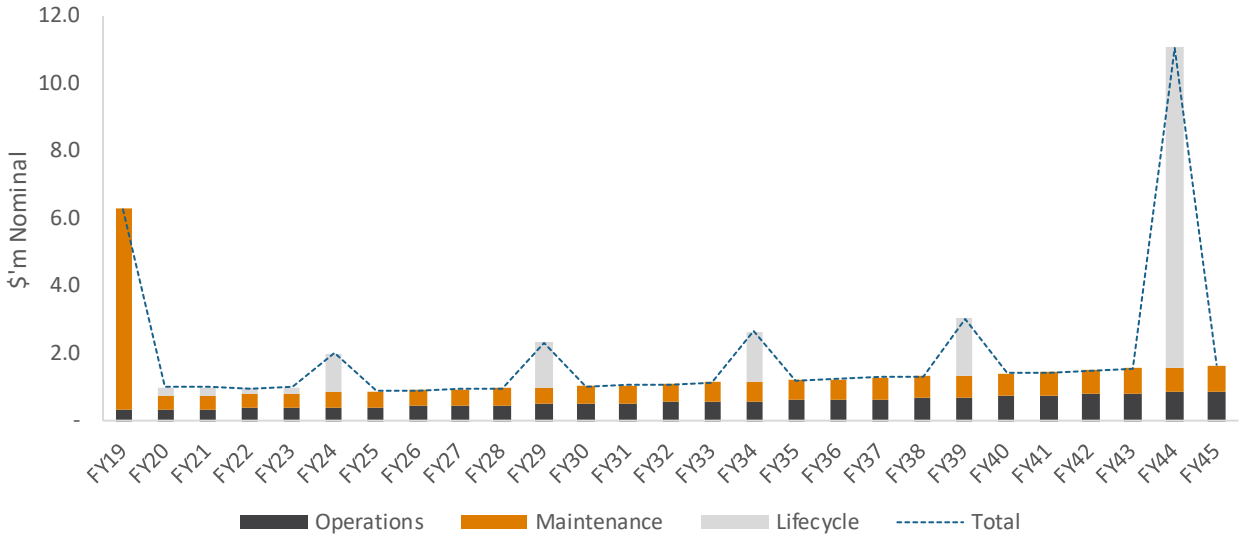
Total ongoing costs under the Reference Project are $5.5 million and $9.4 million higher than the Base Case over the 27-year evaluation period in PV and nominal terms, respectively.

Ongoing costs are significantly driven by Maintenance Dredging Costs, which represent approximately 30 per cent of total ongoing costs under both the Base Case and Reference Project. The whole-of-life Maintenance Dredging Costs under the Reference Project is higher than the Base Case by $1.7 million and $2.8 million in both PV and nominal terms.

Other significant ongoing costs include lifecycle costs related to the wharf infrastructure. However, there is minimal difference in costs and their timing between the Base Case and Reference Project in lifecycle costs for wharf infrastructure.

Figure 14.2 illustrates the ongoing costs profiles over the entire period of the Reference Project compared to the Base Case total in nominal terms.

Figure 14.2: Total Ongoing Costs Over the Life of Project (Nominal, Unadjusted)



14.4.6 Total FNPV

The net cash flows of the Base Case and Reference Project i.e. total revenue net of capital and ongoing costs are summarised in Table 14.13.

Table 14.13: Net Cash Flow Over the Life of Project (Unadjusted)

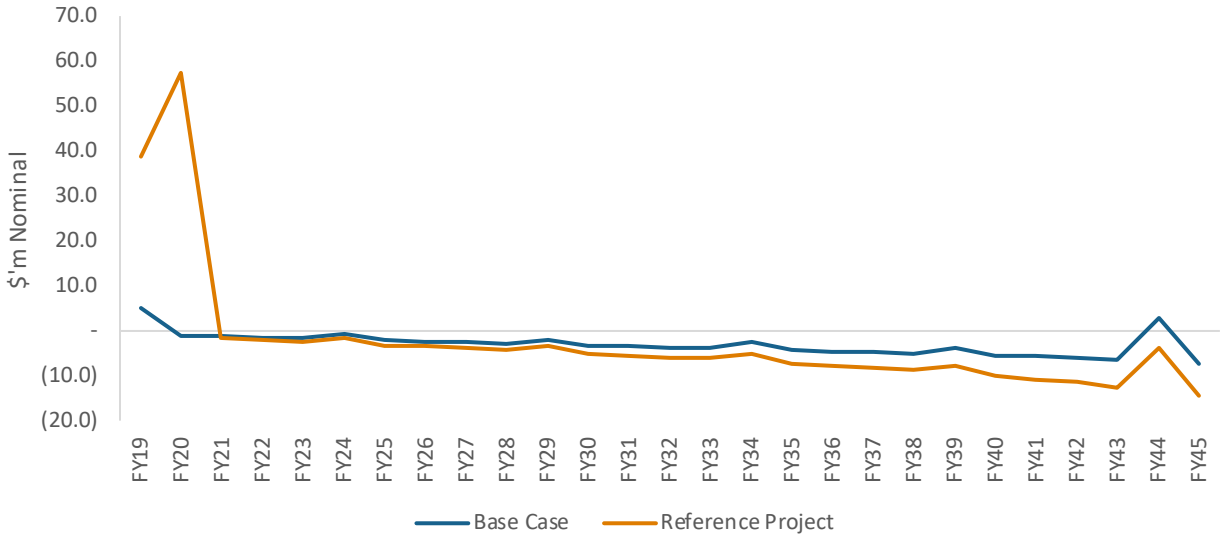
NET CASH FLOW (UNADJUSTED)						
NET CASH FLOW	REAL ($ MILLION, $ YEAR)		NOMINAL ($ MILLION)		PV ($ MILLION)	
	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT
NET CASH FLOW	49.1	0.5	77.3	49.9	41.3	(13.7)

Both project options are expected to generate net cash outflows on a total basis over the life of the Project. The FNPV of the Reference Project is an outflow of $13.7 million. This is $55.0 million lower than the net present inflow of $41.3 million under the Base Case. This is primarily driven by capital costs required under the Reference Project, which is $87.4 million higher than the Base Case in PV terms. The difference in capital costs is partly offset by the difference in revenue, where the Reference Project is expected to generate an additional $38.1 million (PV) in revenue compared to the Base Case.

A net inflow position is forecasted for the Reference Project in nominal terms. The difference in net cash flows between the Reference Project and Base Case is lower in nominal terms, due to the impact of escalation on revenue. In comparison, capital costs under the Reference Project were impacted by escalation to a much lesser degree as they are incurred in the early years of the evaluation period.

The net cash outflow in nominal terms is illustrated in Figure 14.3. Outflows are expressed in positive values and inflows in negative values for illustrative purposes.

Figure 14.3: Net Cash Outflow Over the Life of Project per Year (Nominal, Unadjusted)



Compared to the Base Case, the Reference Project requires additional investment of $27.4 million (nominal) over the life of the Project. This is mainly driven by the higher capital costs required in the first two years of the project period.

From the whole-of-life perspective, total ongoing costs for the Reference Project over the project life is higher than the Base Case by $5.5 million (PV) and $9.4 million (nominal). However, this is offset by the higher revenue expected under the Reference Project, which is $38.1 million (PV) and $73.0 million (nominal) higher than the Base Case. Figure 14.5 illustrate that the Reference Project is able to generate net cash inflow positions from FY2021 onwards following the construction period from FY2019 to FY2020. As illustrated in Figure 14.4, revenue is sufficient to cover the lifecycle costs in all years from FY2020 except for FY44 under the Base Case.

Figure 14.4: Revenue Compared to Ongoing Costs Under the Base Case (Nominal, Unadjusted)

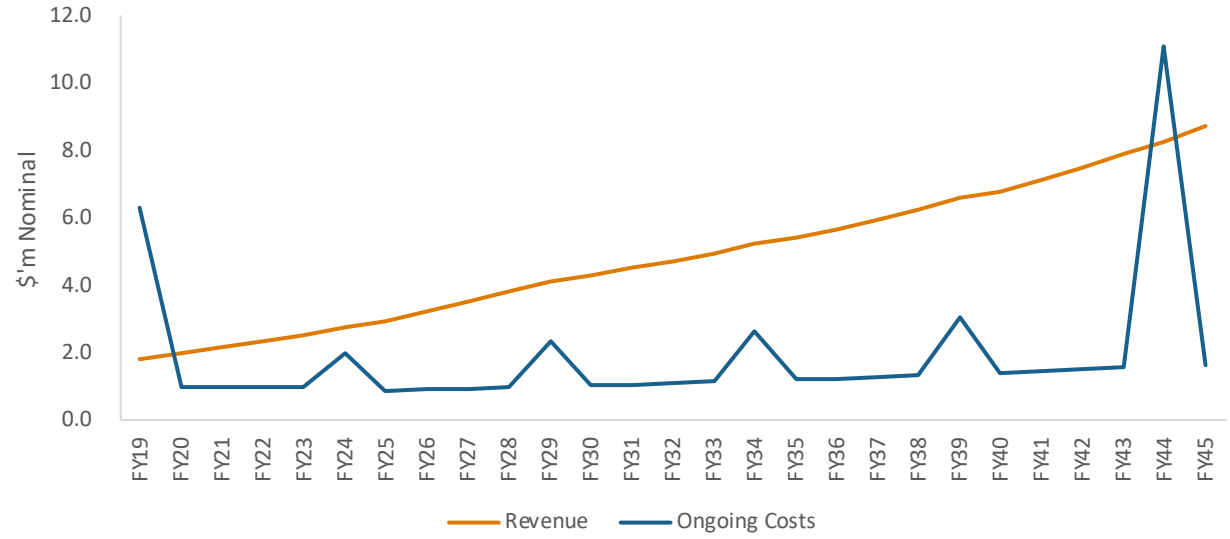
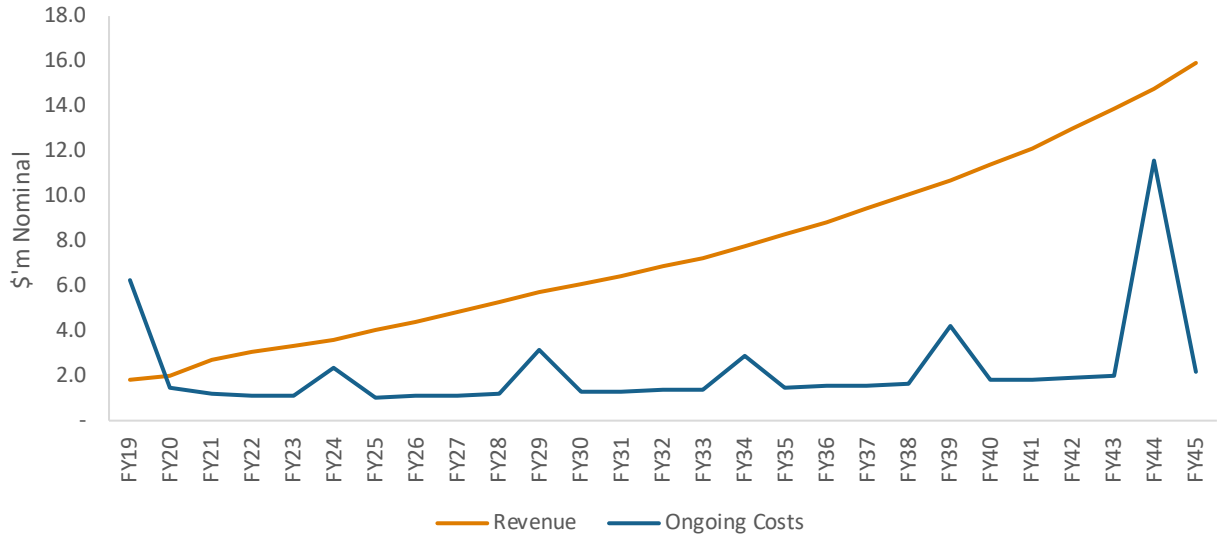


Figure 14.5: Revenue Compared to Ongoing Costs Under the Reference Project (Nominal, Unadjusted)



14.5 Risk-adjusted Financial Net Present Value

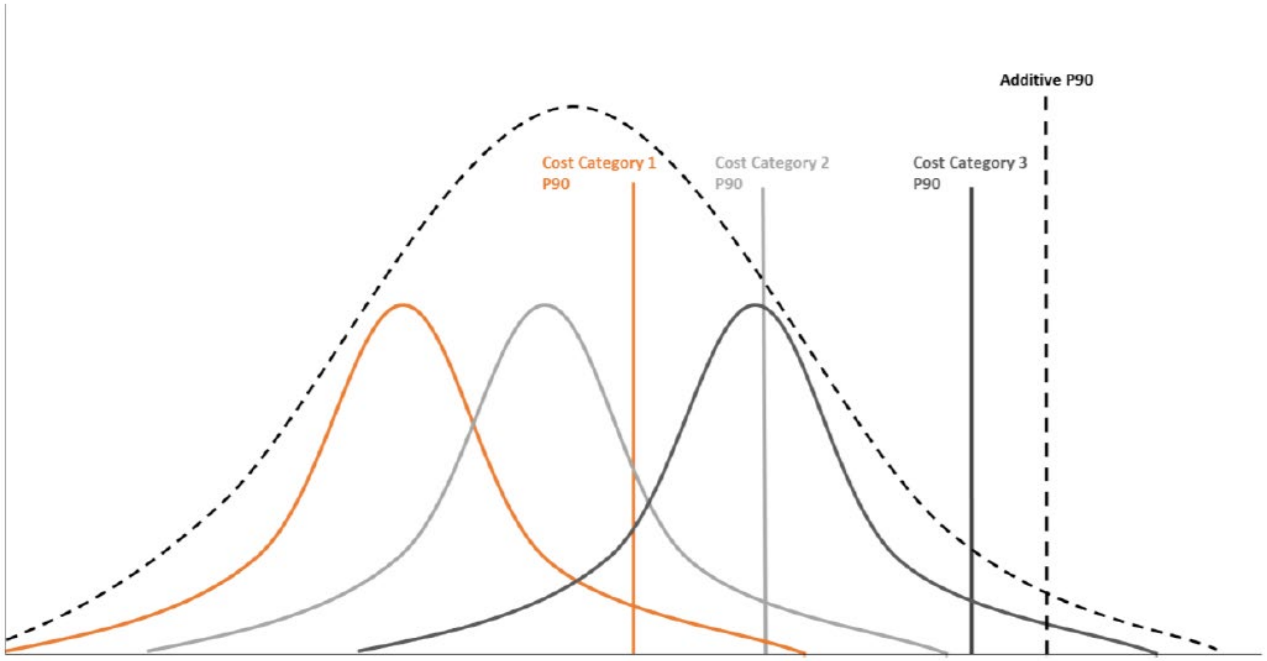
Calculation of the FNVP is driven by assumption-based inputs. There is a risk that the calculated core costs are understated due to the variability of actual results. The combination of the likelihood of risks occurring and their consequences determines the materiality of the risk, and hence the level of impact and the need for mitigating strategies. Risks are categorised into inherent and contingency risks, and are discussed further in Section 14.5.1.

To determine the risk-adjusted FNPV, a Monte-Carlo simulation was run based on the risk assessment inputs, using 10,000 iterations. This produced a P90 and P50 result where 90 per cent and 50 per cent of the expected outcomes fall below these figures.

It should be noted that the risk-adjusted subtotals and totals reported in the tables within this section will not equal the sum of the relevant line items within the tables. Aggregating the risk-adjusted values of individual line items will result in an overestimation of the subtotals and totals. Accordingly, the Monte-Carlo simulation was run at the subtotal and total levels in addition to the disaggregated level for each individual line item to arrive at the appropriate risk-adjusted values.

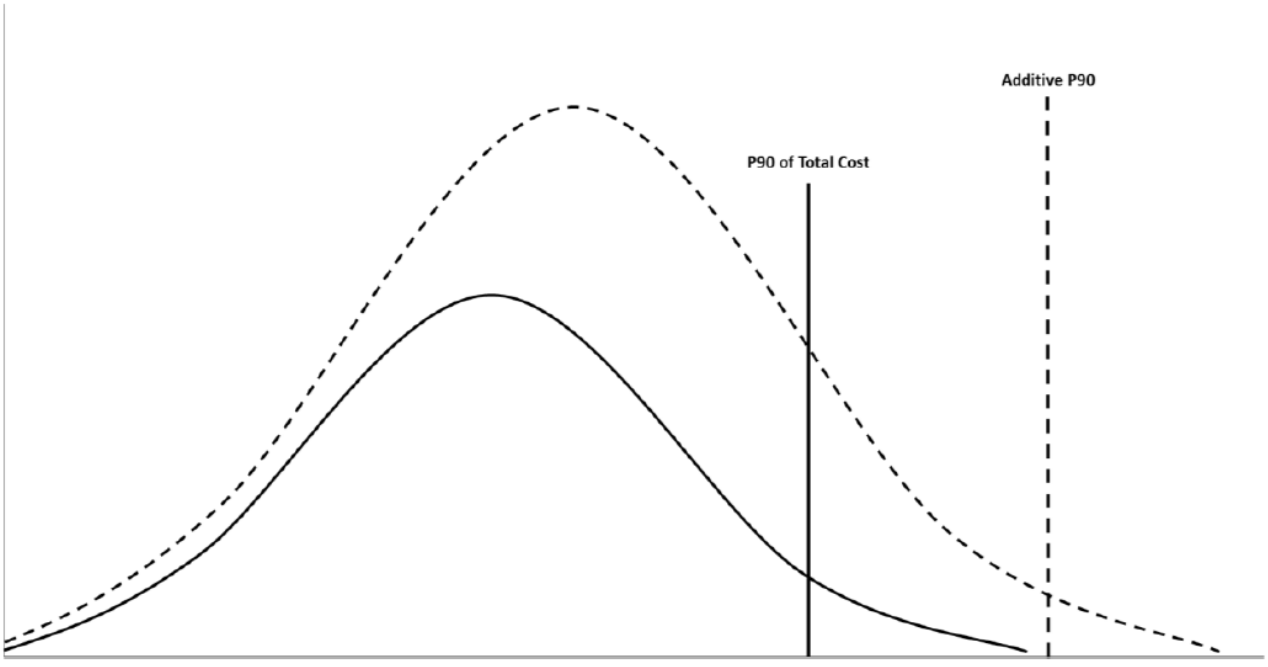
Figure 14.6 is an illustrative example, which graphically demonstrates the addition of P90 costs of individual line items. It shows the P90 values of each line item (post-simulation) aggregated to produce an overarching additive curve. The additive curve assumes that each cost line item has experienced an unfavourable outcome (P90 is close to the worst-case result), resulting in a total additive cost that is greater than P90 of the total project distribution, as demonstrated in Figure 14.7.

Figure 14.6: Illustrative Example of Aggregating P90 Values of Individual Line Items to Arrive at a P90 Total



Note: The above figure is an illustrative example only. The same logic is applicable to P50 values.

Figure 14.7: Comparison of Additive P90 to P90 of Total Cost (Illustrative Only)



Note: The above figure is an illustrative example only. The same logic is applicable to P50 values.

14.5.1 Risk Assessment

14.5.1.1 Inherent Risks (Planned Risks)

As part of the risk management process, a quantification of inherent risks associated with capital costs was undertaken for the Reference Project. The risks had been assessed in line with Ports North's Risk Management Framework.

Inherent risks relate to revenue, capital costs, and ongoing costs. For capital costs, this relates to uncertainty of cost estimates provided by the Quantity Surveyor as part of the cost plan. A three-point estimate indicating the minimum, most likely and maximum risk cost estimate have been provided for each line item identified within the cost plan. A Monte-Carlo simulation is then undertaken based on the three-point estimates for each line item to arrive at a risk-adjusted (P90 and P50) total cost estimate for the Reference Project. A similar approach is undertaken to derive the risk-adjusted values for revenue and ongoing costs.

14.5.1.2 Contingent Risks (Unplanned Risks)

Contingent risks are identified events with the potential to cause cost blowouts or program delays that could negatively impact the delivery of the Project. This relates primarily to capital costs. These risks differ from inherent risks in that there are two discrete probabilities, i.e. the event either occurs (resulting in a cost consequence with its own underlying distribution) or does not occur. It is therefore necessary to consider both the probability of occurrence and the three-point observations, which describe the distribution of the consequence.

Contingent risks were identified through a workshop with key stakeholders. The risk of occurrence has been modelled in Monte-Carlo using a Bernoulli distribution, which is a special case of the binomial distribution in which there is only one trial with a known probability of occurrence. This function evaluates to either a one or zero, meaning that the impact of the risk will either be completely accounted for or excluded from each iteration of a simulation.

14.5.2 Risk-adjusted FNPV – Revenue

Table 14.14 and Table 14.15 outline the risk-adjusted revenue generated at the P90 and P50 levels for both the Base Case and the Reference Project over the life of the Project.

Table 14.14: Total Revenue Over the Life of Project (P90 Risk-adjusted)

TOTAL REVENUE OVER THE LIFE OF PROJECT (P90 RISK-ADJUSTED)						
REVENUES	REAL ($ MILLION, $ YEAR)		NOMINAL ($ MILLION)		PV ($ MILLION)	
	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT
TOTAL (P90)	84.8	129.7	127.7	199.6	72.9	110.4

Note: The risk-adjusted subtotals and totals presented in the above table do not equal the sum of the individual line items. Aggregating the individual line items inappropriately overestimates risk-adjusted values on the subtotal and total levels, as it assumes that that each cost line item has experienced an unfavourable outcome.

Table 14.15: Total Revenue Over the Life of Project (P50 Risk-adjusted)

REVENUE OVER THE LIFE OF PROJECT (P50 RISK-ADJUSTED)						
REVENUES	REAL ($ MILLION, $ YEAR)		NOMINAL ($ MILLION)		PV ($ MILLION)	
	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT
TOTAL (P50)	86.3	131.5	129.9	202.4	74.2	112.0

Note: The risk-adjusted subtotals and totals presented in the above table do not equal the sum of the individual line items. Aggregating the individual line items inappropriately overestimates risk-adjusted values on the subtotal and total levels, as it assumes that that each cost line item has experienced an unfavourable outcome.

Revenue under the Reference Project remains favourable relative to the Base Case in both P90 and P50 risk-adjusted values. Risk-adjusted FNPV – Capital Costs

Summaries of the risk-adjusted capital costs (P90) are provided in Table 14.16.

Table 14.16: Total Capital Costs Over the Life of Project (P90 Risk-adjusted)

TOTAL CAPITAL COSTS (P90 RISK-ADJUSTED)						
PROJECT COSTS	REAL ($ MILLION, $ YEAR)		NOMINAL ($ MILLION)		PV ($ MILLION)	
	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT
TOTAL (P90)	1.6	123.1	1.6	127.6	1.6	122.7

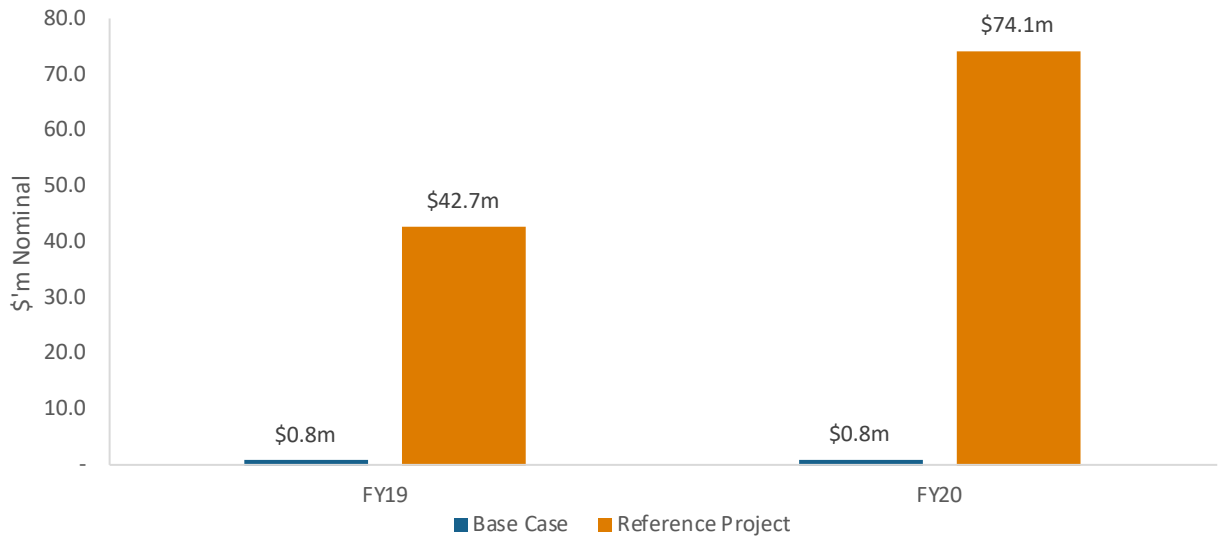
Note: The risk-adjusted subtotals and totals presented in the above table do not equal the sum of the individual line items. Aggregating the individual line items inappropriately overestimates risk-adjusted values on the subtotal and total levels, as it assumes that each cost line item has experienced an unfavourable outcome.

Table 14.17: Total Capital Costs Over the Life of Project (P50 Risk-adjusted)

TOTAL CAPITAL COSTS (P50 RISK-ADJUSTED)						
PROJECT COSTS	REAL ($ MILLION, $ YEAR)		NOMINAL ($ MILLION)		PV ($ MILLION)	
	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT
TOTAL (P50)	1.6	113.3	1.6	117.5	1.6	112.9

Note: The risk-adjusted subtotals and totals presented in the above table do not equal the sum of the individual line items. Aggregating the individual line items inappropriately overestimates risk-adjusted values on the subtotal and total levels, as it assumes that that each cost line item has experienced an unfavourable outcome.

Figure 14.8: Total Capital Costs for the Base Case and Reference Project Over the Life of Project (Nominal, P50)



14.5.3 Risk-adjusted FNPV – Ongoing Costs

Summaries of the risk-adjusted capital costs (P90) are provided in Table 14.18 and Table 14.19.

Table 14.18: Total Ongoing Costs Over the Life of Project (P90 Risk-adjusted)

IMPACT OF RISK ADJUSTMENT ON UNADJUSTED CAPITAL COSTS (P50)						
PROJECT COSTS	REAL ($ MILLION, $ YEAR)		NOMINAL ($ MILLION)		PV ($ MILLION)	
	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT
TOTAL (P90)	37.5	46.0	53.7	65.5	32.8	40.2

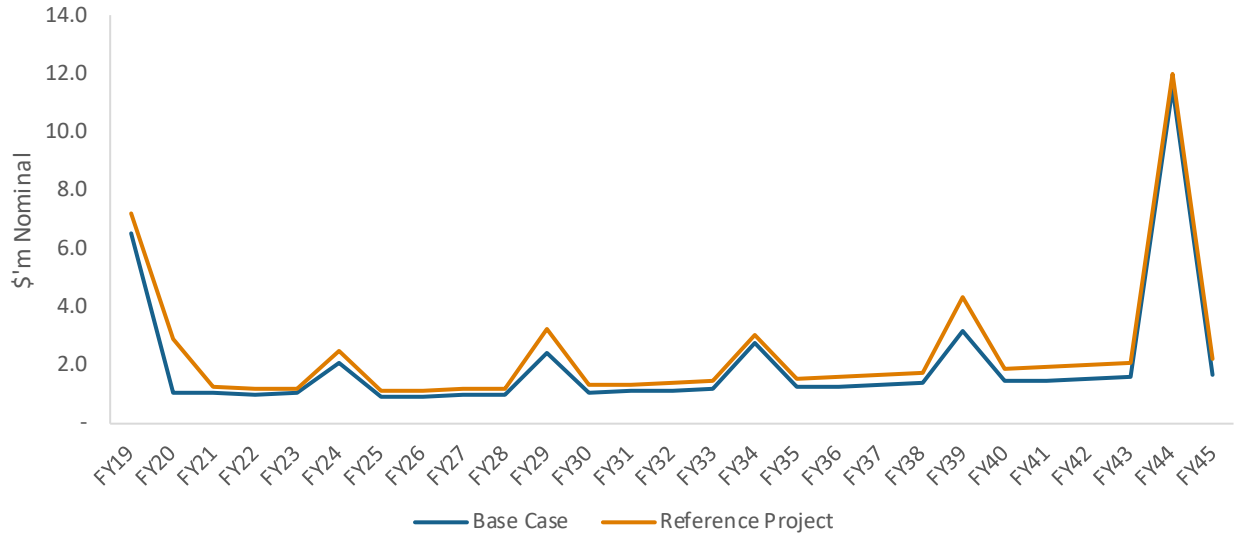
Note: The risk-adjusted subtotals and totals presented in the above table do not equal the sum of the individual line items. Aggregating the individual line items inappropriately overestimates risk-adjusted values on the subtotal and total levels, as it assumes that that each cost line item has experienced an unfavourable outcome.

Table 14.19: Impact of Risk Adjustment on Unadjusted Ongoing Costs (P90)

IMPACT OF RISK ADJUSTMENT ON UNADJUSTED ONGOING COSTS (P90)						
PROJECT COSTS	REAL ($ MILLION, $ YEAR)		NOMINAL ($ MILLION)		PV ($ MILLION)	
	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT
RISK-ADJUSTED ONGOING COSTS (P90)	37.5	46.0	53.7	65.5	32.8	40.2

Figure 14.9 provides a view of the cash flow profiles of the Base Case and Reference Project, illustrating there is no material difference in ongoing costs on an annual basis between the two options over the life of the Project.

Figure 14.9: Ongoing Costs of the Base Case and Reference Project Over the Life of Project (Nominal, P90)



The analysis and conclusions based on P50 risk-adjusted values are similar to that of P90 values.

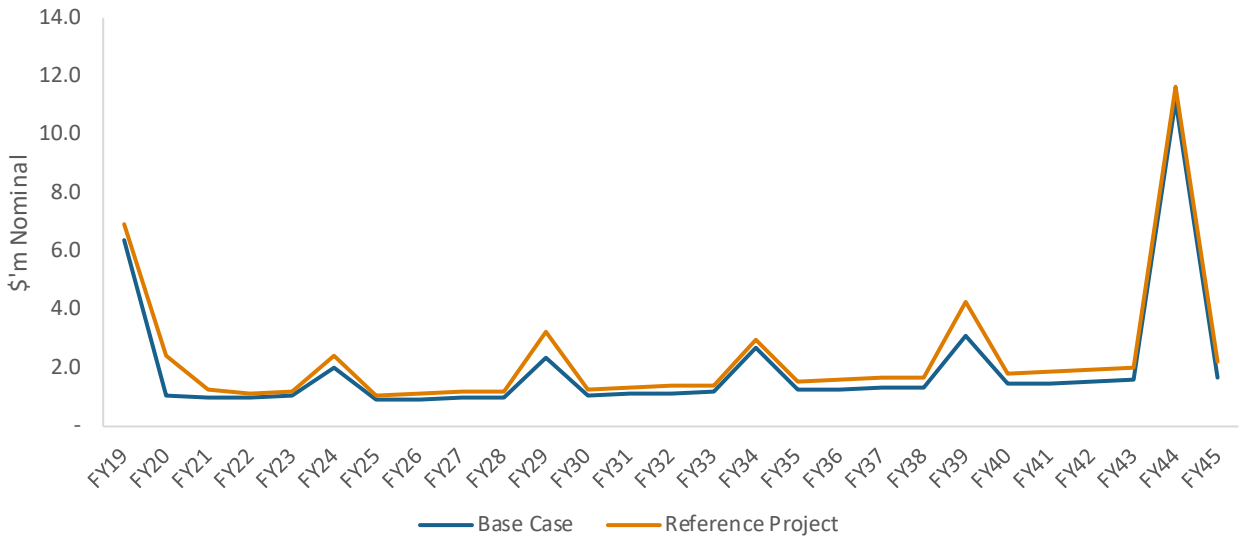
Table 14.20: Total Ongoing Costs Over the Life of Project (P50 Risk-adjusted)

TOTAL ONGOING COSTS (P50 RISK-ADJUSTED)						
PROJECT COSTS	REAL ($ MILLION, $ YEAR)		NOMINAL ($ MILLION)		PV ($ MILLION)	
	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT
TOTAL (P50)	36.6	44.5	52.5	63.4	32.2	39.3

Table 14.21: Impact of Risk Adjustment on Unadjusted Ongoing Costs (P50)

IMPACT OF RISK ADJUSTMENT ON UNADJUSTED ONGOING COSTS (P50)						
PROJECT COSTS	REAL ($ MILLION, $ YEAR)		NOMINAL ($ MILLION)		PV ($ MILLION)	
	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT
RISK-ADJUSTED ONGOING COSTS (P50)	36.6	44.5	52.5	63.4	32.2	39.3

Figure 14.10: Ongoing Costs of the Base Case and Reference Project Over the Life of Project (Nominal, P50)



14.5.4 Risk-adjusted FNPV – Net Cash Flow

The risk-adjusted net cash flows related to the Reference Project i.e. total of capital and ongoing costs are summarised in Table 14.22 to Table 14.25.

Table 14.22: Net Cash Flow Over the Life of Project (P90 Risk-adjusted)

NET CASH FLOW (P90 RISK-ADJUSTED)						
NET CASH FLOW	REAL ($ MILLION, $ YEAR)		NOMINAL ($ MILLION)		PV ($ MILLION)	
	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT
NET CASH OUTFLOW	47.0	(37.3)	73.8	8.9	39.8	(49.4)

Note: The risk-adjusted subtotals and totals presented in the above table do not equal the sum of the individual line items. Aggregating the individual line items inappropriately overestimates risk-adjusted values on the subtotal and total levels, as it assumes that that each cost line item has experienced an unfavourable outcome.

Table 14.23: Impact of Risk Adjustment on Unadjusted Net Cash Flow (P90)

NET CASH FLOW (P90 RISK-ADJUSTED)						
NET CASH FLOW	REAL ($ MILLION, $ YEAR)		NOMINAL ($ MILLION)		PV ($ MILLION)	
	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT
RISK-ADJUSTED Net Cash Flow (P90)	47.0	(37.3)	73.8	8.9	39.8	(49.4)

The Reference Project requires additional cash outflow of $89.2 million (PV) compared to the Base Case over the entire Project life. This difference is mainly driven by the significant capital costs required under the Reference Project, whereas the Base Case requires minimal capital costs. At the P90 risk-adjusted level compared to the unadjusted level, the net cash flow decreased by $41.0 million under the Reference Project in nominal terms, compared to $3.5 million under the Base Case. The disparity between the impact arising from risk adjustment is driven by risks associated with capital works required under the Reference Project.

Figure 14.11 illustrates the risk-adjusted net cash flow profile of the Base Case and Reference Project over the project life. Compared the Base Case, the Reference Project has significantly higher cash flow requirements during construction.

Figure 14.11: Net Cash Outflow of the Base Case and Reference Project Over the Life of Project (Nominal, P90)

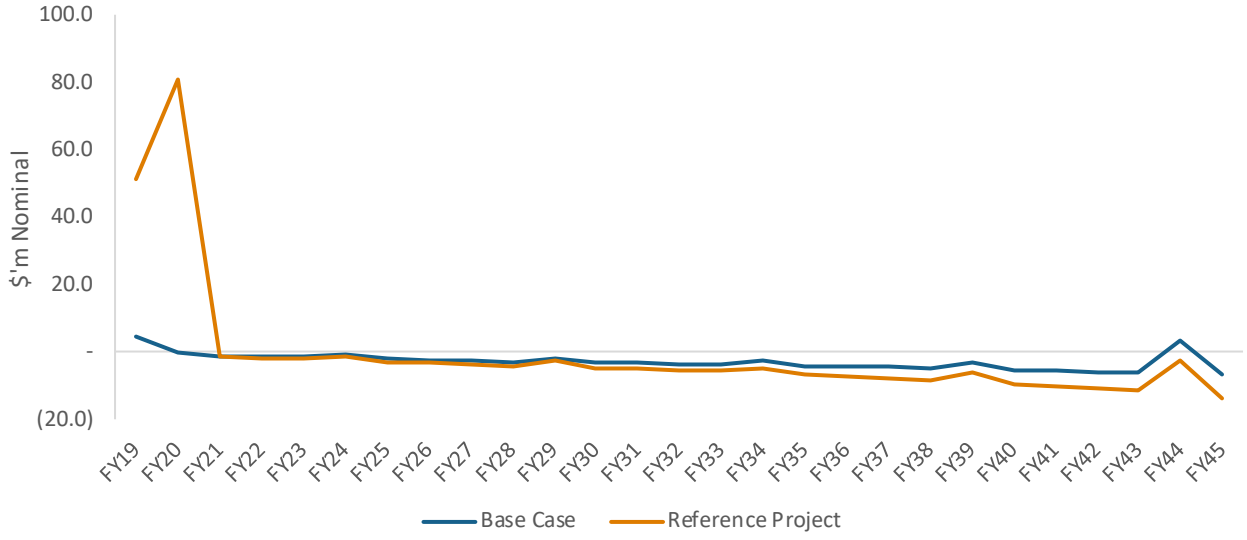


Table 14.24: Net Cash Flow Over the Life of Project (P50 Risk-adjusted)

NET CASH FLOW (P50 RISK-ADJUSTED)						
NET CASH FLOW	REAL ($ MILLION, $ YEAR)		NOMINAL ($ MILLION)		PV ($ MILLION)	
	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT
NET CASH OUTFLOW	48.9	(25.6)	76.6	22.1	41.2	(39.6)

Note: The risk-adjusted subtotals and totals presented in the above table do not equal the sum of the individual line items. Aggregating the individual line items inappropriately overestimates risk-adjusted values on the subtotal and total levels, as it assumes that that each cost line item has experienced an unfavourable outcome.

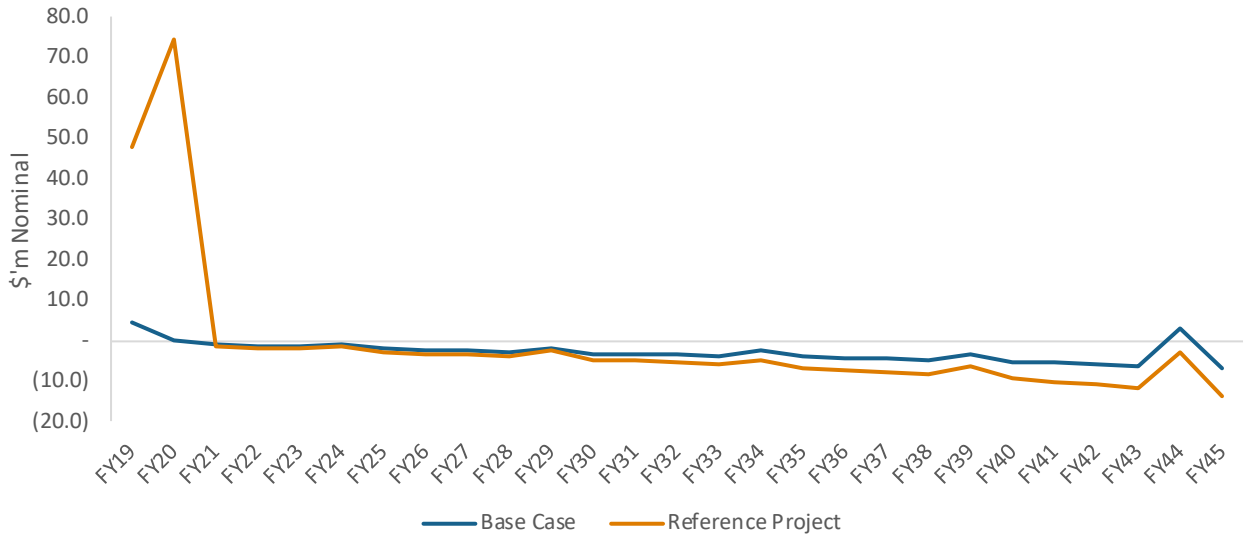
Table 14.25: Impact of Risk Adjustment on Unadjusted Net Cash Flow (P50)

IMPACT OF RISK ADJUSTMENT ON UNADJUSTED NET CASH FLOW (P50)						
NET CASH FLOW	REAL ($ MILLION, $ YEAR)		NOMINAL ($ MILLION)		PV ($ MILLION)	
	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT
RISK-ADJUSTED Net Cash Flow (P50)	48.9	(25.6)	76.6	22.1	41.2	(39.6)

Compared to the unadjusted net cash flow, P50 risk-adjusted net flow is $27.8 million and $0.7 million lower for the Reference Project and Base Case respectively in nominal terms. Compared to P90 risk-adjusted net cash flow, the P50 values are $13.2 million and $2.8 million higher, respectively.

The cash flow profile under P50 level of certainty is similar to the profile under P90.

Figure 14.12: Net Cash Outflow of the Base Case and Reference Project Over the Life of Project (Nominal, P50)



14.6 Sensitivity Analysis

Sensitivity analysis has been performed for the Reference Project to assess the cost impact under a range of alternative assumptions that are outlined in Table 14.26.

Table 14.26: Sensitivity Analysis

SENSITIVITY ANALYSIS	
TESTS	DESCRIPTION
20. Lifecycle Costs Escalation Rate +/- 10.0%	Escalation rates applicable to lifecycle costs are increased or decreased by 10%
21. Maintenance Costs Escalation Rate +/- 10.0%	Escalation rates applicable to maintenance costs are increased or decreased by 10%
22. Operations Costs Escalation Rate +/- 10.0%	Escalation rates applicable to operations costs are increased or decreased by 10%
23. Capital Costs Escalation Rate +/- 10.0%	Escalation rates applicable to capital costs are increased or decreased by 10%
24. Revenue Unit Rates +/- 10.0%	Cruise ship revenue rates (i.e. $ /m) are increased or decreased by 10%
25. Discount Rate +/- 1.0%	The discount rate (i.e. 3.65%) is adjusted +/- 100 basis point
26. Removal of homeporting	Demand and revenue associated with homeporting is removed
27. New vessel charges	New vessel charges are introduced to regal, vista and grand vessel classes

14.6.1 Removal of Homeporting (Sensitivity Analysis 7)

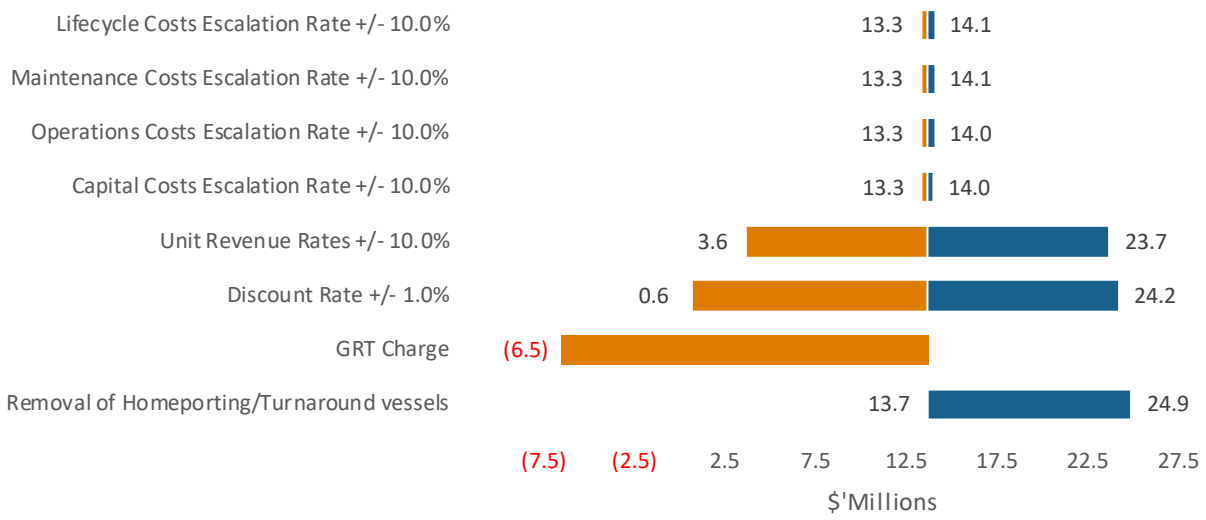
P&O Cruises (P&O) recently announced that its vessels Pacific Aria and Pacific Eden will no longer be homeporting in the Port of Cairns from 2019. Although revenue from homeporting vessels account for 10 per cent of the total number of vessels porting in Cairns throughout the project life (as noted in Table 14.3), an analysis has been included in this sensitivity analysis to model the impact to revenue and the FNPV of the Reference Project should the Port of Cairns be deprived of all of its homeporting/turnaround vessels. This represents the worst-case scenario in which the loss of homeporting revenue is not compensated with further increases in overnight or transiting ships.

14.6.2 New Vessel Charges (Sensitivity Analysis 8)

The significant investment in the channel and port infrastructure will benefit the cruise industry as a whole. Therefore, there is potential opportunity to derive additional financial return for usage of the port. This sensitivity analysis Introduces a new channel charge for vessels that are not currently able to access the port due to restrictions of the existing channel and infrastructure. This charge is calculated based on the gross registered tonnages (GRT) of vessels (GRT charge).

Figure 14.13 provides a summary of the sensitivity analysis, which uses the unadjusted net cash outflow (NPV) of $13.7 million as the base. For illustrative purposes, figures presented in negative values represent cash inflow, whereas positive values indicate outflows.

Figure 14.13: Sensitivity Analysis Outputs for the Reference Project (NPV, unadjusted)



The key points to be highlighted from Figure 14.13 above include:

- The introduction of the GRT Charge, which is calculated based on the gross registered tonnage and length of stay of vessels will have the largest positive impact of $20.2 million, bringing net cash flows from a $13.7 million outflow to a $6.5 million inflow.
- If the port loses all of its revenue from homeporting it will result in the largest negative impact on net cash outflows by increasing outflows by $11.3 million to $24.9 million.
- An increase of 10 per cent revenue rates will improve net cash outflow by $10.1 million from $13.7 million to $3.6 million. On the other hand, a decrease in revenue rates by the same magnitude will result in increase in net cash outflow by $10.1 million to $23.7 million.
- An increase or decrease of one percentage point in the discount rate will decrease net cash outflow by $13.0 million or increase by $10.6 million.
- An increase or decrease of 10 per cent in the escalation rate applied on ongoing costs have relatively low impact on project NPV ranging between +$0.3 million to -$0.4 million. The similar impact on all ongoing cost types is expected as they are not significantly different in total values over the project life in real terms and are subject to the same escalation rates.
- A 10 per cent increase or decrease in the escalation rate applicable to capital costs will increase or decrease cash flow by $0.3 million. Given the total value of capital costs, the impact of escalation is relatively low compared to ongoing costs due to the timing of cash flows related to capital costs, which are incurred in the first two years of the evaluation period.

14.7 Scenario Analysis

In addition to sensitivities, scenario analysis has also been performed to model the financial impact to the Reference Project under scenarios where cruise ship demand is high and low relative to the demand levels in the financial model. The demand levels in each scenario were developed using econometrics in the Economic Analysis in Chapter 13. Table 14.27 outlines the description of each of the scenarios throughout the evaluation period. The three demand levels are discussed in greater detail in Chapter 13.

Table 14.27: Reference Project Demand Scenarios

REFERENCE PROJECT DEMAND SCENARIOS				
	2017 TO 2020	2021	2022 TO 2027	2028 TO 2045
Medium case (Central Case)	Figures are based on cruise schedules for Ports North (2017–19). The estimate in 2020 uses the growth rate based on econometric analysis.	A step-up factor of 20% is applied to the number of cruise ship calls to Trinity Inlet in 2021. This is based on the global forward order book, which indicates that 20% of cruise ships on forward order in 2021 are vista-class vessels. The step-up is used to proxy growth in larger cruise ships into the Port of Cairns and in particular Trinity Inlet under the Reference Project.	Econometric growth rates applied taking into account additional vista growth	3.9%
High (optimistic) case		The step-up factor is the same as that applied in the Central Case plus an allowance for additional ship calls due to the operations of Luggage Point and potential for enhanced itineraries and transit visits in this scenario.		4.6% (0.7% point increment relative to Central Case)
Low (possible but unlikely) case		A smaller step-up factor is applied based on a smaller share of vistas on the forward order book relative to the Reference Project. The step-up factor applied is around half the step-up factor applied in the central case.		3.3% (0.6% point increment relative to the Central Case)

Table 14.28 provides a summary of the results of the scenario analysis presented in unadjusted values.

Table 14.28: Scenario Analysis Results (Unadjusted)

SCENARIO ANALYSIS RESULTS (UNADJUSTED)			
	LOW	CENTRAL CASE (MEDIUM) (BASE)	HIGH
NPV			
Net Cash Flow	(32.5)	(13.7)	2.5
NOMINAL			
Net Cash Flow	13.8	49.9	81.6
REAL			
Net Cash Flow	(22.1)	0.5	20.0

In NPV terms, only the high demand scenario will result in a net cash inflow of $2.5 million, which is higher than the outflow positions under the central and low demand scenarios by $16.2 million and $35.0 million respectively. This is driven by the increase of $16.9 million in revenue, which is partially offset by a marginal increase in ongoing costs. Conversely, a low demand scenario will increase net cash outflow by $18.8 million in NPV terms.

The net cash flow positions are positive under all three scenarios in nominal terms. The improvement in net cash outflow under the high demand scenario is $31.7 million in nominal terms, which is 96 per cent higher than the improvement observed in NPV terms. This is because the heightened cruise ship numbers in the outer years of the evaluation period are exacerbated by the effect of escalation on revenue. Similarly, the impact to net cash outflow under the low demand scenario is intensified in nominal terms, which is expected to result in a decrease of $36.1 million in net cash flow over the evaluation period.

14.8 Cost and Revenue Estimation Review

An independent peer review of the cost estimate has been undertaken to evaluate the reasonableness and appropriateness of the approach and results of the financial analysis.

14.9 Public Sector Comparator

The public sector comparator is a financial estimate of the risk-adjusted net cash flow position of a project to the government using a traditional delivery method. The public sector comparator represents the most likely and efficient form of public sector delivery of the Reference Project and serves as a benchmark against which decision-makers can compare private sector bids for projects when delivered under a PPP delivery.

As the preferred delivery model of the Reference Project is a traditional delivery method (refer to Chapter 15: Delivery Model Analysis), a public sector comparator is not required to be separately reported.

14.10 Analysis Summary

Table 14.27 and Table 14.28 summarise the results of this financial analysis by presenting the projected net cash flow positions with a P90 and P50 levels of certainty for both the Reference Project and Base Case.

Table 14.29: Summary of Financial Analysis (P90 Risk-adjusted)

SUMMARY OF FINANCIAL ANALYSIS (P90 RISK-ADJUSTED)						
FINANCIAL ITEM	REAL ($ MILLION, $2018)		NOMINAL ($ MILLION)		PV ($ MILLION)	
	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT
REVENUE						
TOTAL REVENUE	*84.8*	*129.7*	*127.7*	*199.6*	*72.9*	*110.4*
CAPITAL COSTS						
TOTAL CAPITAL COSTS	*(1.6)*	*(123.1)*	*(1.6)*	*(127.6)*	*(1.6)*	*(122.7)*
ONGOING COSTS						
TOTAL ONGOING COSTS	*(37.5)*	*(46.0)*	*(53.7)*	*(65.5)*	*(32.8)*	*(40.2)*
NET CASH FLOW	**47.0**	**(37.3)**	**73.8**	**8.9**	**39.8**	**(49.4)**

Note: The risk-adjusted subtotals and totals presented in the above table do not equal the sum of the individual line items. Aggregating the individual line items inappropriately overestimates risk-adjusted values on the subtotal and total levels, as it assumes that that each cost line item has experienced an unfavourable outcome.

Table 14.30: Summary of Financial Analysis (P50 Risk-adjusted)

SUMMARY OF FINANCIAL ANALYSIS (P50 RISK-ADJUSTED)						
FINANCIAL ITEM	REAL ($ MILLION, $2018)		NOMINAL ($ MILLION)		PV ($ MILLION)	
	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT	BASE CASE	REF. PROJECT
REVENUE						
TOTAL REVENUE	*86.3*	*131.5*	*129.9*	*202.4*	*74.2*	*112.0*
CAPITAL COSTS						
TOTAL CAPITAL COSTS	*(1.6)*	*(113.3)*	*(1.6)*	*(117.5)*	*(1.6)*	*(112.9)*
ONGOING COSTS						
TOTAL ONGOING COSTS	*(36.6)*	*(44.5)*	*(52.5)*	*(63.4)*	*(32.2)*	*(39.3)*
NET CASH FLOW	**48.9**	**(25.6)**	**76.6**	**22.1**	**41.2**	**(39.6)**

Note: The risk-adjusted subtotals and totals presented in the above table do not equal the sum of the individual line items. Aggregating the individual line items inappropriately overestimates risk-adjusted values on the subtotal and total levels, as it assumes that that each cost line item has experienced an unfavourable outcome.

The Reference Project is projected to result in a net cash outflow position of $49.4 million (PV, P90 risk-adjusted). However, it is expected to generate a net cash inflow of $8.9 million in nominal terms due to the impact of escalation on annual surplus during the operations period over the evaluation term. Compared to the Base Case, the net cash flow position over the evaluation term is $89.2 million and $64.9 million lower under the Reference Project in PV and nominal terms respectively. The difference in cash flow requirement between Reference Project and Base Case is largely due to the requirement for intensive capital investment

to expand the Trinity Inlet channel and upgrade the wharf infrastructure and associated services under the Reference Project. Total capital costs amount to $122.7 million (PV, P90 risk-adjusted) or $127.6 million (nominal, P90 risk-adjusted) under the Reference Project. In contrast, a total $1.6 million over the entire project life is required in capital costs under the Base Case.

The Reference Project is expected to generate surpluses over the operation period of the Project from FY2021 onwards.

CHAPTER 15
DELIVERY MODEL ANALYSIS

CHAPTER SUMMARY AND CONCLUSIONS:

- To identify a procurement method that delivers the greatest potential value for money (VfM) outcomes for the Reference Project to government, an evaluation methodology was developed in accordance with the Queensland Government's PAF and Building Queensland's DBC Guidance and Template.
- This process involved a workshop with key stakeholders to identify, review and evaluate the procurement and delivery options for the Reference Project. The workshops were attended by representatives from Building Queensland, Ports North, AECOM, QT and Deloitte.
- Consideration of the key characteristics of the Reference Project resulted in three discrete work packages for the Reference Project being identified, specifically:
  - Dredging and Spoil Placement Works
  - Bund Construction Works
  - Wharf Infrastructure and Services Upgrade Works.
- A public private partnership (PPP) suitability assessment examined the viability of PPP options to deliver the work packages. It determined that limited value could be generated through a PPP model compared to traditional delivery models.
- Further assessment was then undertaken to determine a suitable traditional delivery model for the Reference Project. This involved:
  - shortlisting potential traditional delivery models for each work package
  - establishing appropriate VfM criteria and weightings for each shortlisted delivery model
  - assessing shortlisted delivery models against the VfM criteria to identify the preferred delivery model for each work package.
- Following the approach described above, construct only and early contractor involvement (ECI) were shortlisted for the Dredging and Spoil Placement Works. Construct only and design and construct (D&C) were shortlisted for both the Bund Construction Works and Wharf Infrastructure and Services Upgrade Works.
- Upon scoring, a construct only delivery model was identified as the preferred model for all three work packages. Key benefits of the construct only model include its ability to:
  - achieve favourable capital cost outcomes, including cost certainty, in relation to Dredging and Spoil Placement Works and Bund Construction Works
  - enable efficiency and efficacy in risk management by leveraging Ports North's ability to better manage key risks compared to the contractor
  - ensure compliance with the strict conditions stipulated by the EIS and other legal requirements.
- Ports North has demonstrated experience and capabilities in managing port infrastructure projects, including dredging works.

15.1 Purpose

This chapter summarises the outcomes of the delivery model assessment for the Reference Project. The assessment was undertaken to identify a procurement method that would deliver the greatest potential for VfM outcomes to the Queensland Government.

15.2 Approach

The delivery model assessment was undertaken in accordance with the PAF. This involved undertaking the following tasks:

- identifying packages of work based on key project characteristics
- undertaking a PPP suitability assessment
- shortlisting delivery models for each work package
- establishing VfM criteria and weightings
- assessing shortlisted delivery models to identify preferred delivery models for each work package.

Key tasks described above were performed in a delivery model workshop on 8 March 2018 to reach a consensus on preferred delivery models. Workshop attendees included representatives from key stakeholder groups.

15.3 Key Project Characteristics

Key project characteristics were considered to inform the delivery model assessment and, in particular, key work packages. These are outlined and discussed in detail below.

15.3.1 Project Objectives

The objectives of the Project are to:

- provide additional channel and wharf infrastructure capacity to enable access for modern mega class cruise ships up to 300 metres in length and large navy ships, improve channel safety and resilience, and improve efficiency of bulk cargo ships
- relocate the Cairns channel's swing basin to enable future expansion of HMAS Cairns' navy base
- grow Cairns as a cruise shipping hub catering for both transit and home porting operations delivering economic benefits to both Cairns and other Queensland cruise destinations.

15.3.2 Scope Inclusions and Exclusions of the Reference Project

Key in-scope technical features of the Reference Project include:

- marine works to widen and deepen the shipping channel and Crystal Swing Basin, and establishment of a new shipping swing basin (Smith Creek Swing Basin) upstream of the existing main swing basin involving:
  - capital dredging works involving removal of up to 1,000,000 cubic metres of dredge material, consisting of up to 900,000 cubic metres of soft clays to be removed by a THSD and up to 100,000 cubic metres of stiff clays to be removed by a BHD
  - construction of a temporary pump-out facility located approximately three kilometres offshore from Yorkeys Knob

- delivery and placement of dredged material to a land-based DMPA including:
  - construction of a temporary dredge material delivery pipeline from the pump-out facility to the soft clay DMPA on the Barron Delta and construction of a pipeline to deliver tailwater to the Barron River
- placement of soft clay dredge material at the Barron Delta DMPA located on Lot 2/RP712954 and Lot 5 on SP245573
- placement of stiff clay dredge material at the Tingira Street DMPA established on port land (Lot 27/SP 218291) located at Tingira Street, Portsmith
- ancillary infrastructure and services upgrades including:
  - relocation of existing and installation of new navigational aids
  - upgrade to the existing cruise shipping wharves 1–5 to accommodate larger and heavier cruise ships
  - decommissioning and (partial) demolition of wharf 6 and construction of a new section of Wharf 6
  - upgrade of ship services to the cruise shipping wharves, including IFO, potable water and fire-fighting services.

Key out-of-scope items include:

- Maintenance and operations to wharves 7–8, which service cargo/freight vessels, are not included in the Project. The workshop participants shared a consensus view that this Project is not anticipated to materially impact on the maintenance, operations or revenue potential for wharves 7–8.
- Infrastructure upgrades to the Cairns Cruise Liner Terminal are not included in the Project. The workshop participants shared a consensus view that the current infrastructure at the Cairns Cruise Liner Terminal is adequate to support future demand.

15.3.3 Timeframes

Key considerations in relation to timeframes include the following:

- To best mitigate against time delays during construction, capital dredging works should ideally be undertaken between the months of May to September to avoid the wet season.
- Assuming government funding and EIS approval are granted, the following works will need to be completed before capital dredging can commence:
  - maintenance dredging works
  - construction of a temporary dredge material delivery pipeline from the pump-out facility to the soft clay DMPA on the Barron Delta and construction of a pipeline to deliver tailwater to the Barron River
  - construction of a bund to contain soft dredge clay material at the Barron Delta DMPA.
- The lead time to engage a contractor to undertake all works associated with dredging, spoil disposal and bund construction is expected to be longer than if separate contractors were engaged for:
  - dredging and spoil placement works
  - bund construction works.

- Timeframes associated with the construction of wharf infrastructure may be impacted by heritage considerations and ongoing wharf operations.

15.3.4 Key Risks

An overview of key high risks post-mitigation is provided in Table 15.1.

Table 15.1: Key Risks Post-mitigation

KEY RISKS POST-MITIGATION	
RISK CATEGORY	**RISK DESCRIPTION**
Program	Australian Government EIS conditions require additional time and cost
Property	CRC refuses application to develop at soft clay disposal site – Northern Sands
Environment	Significant offsets required
Funding	Lack of government funding for the Project

The potential impact of these risks, and likely mitigation strategies, were considered when selecting the preferred delivery model. Key considerations included appropriate risk allocation and the potential for risk transfer.

15.3.5 Key Stakeholders

In addition to project risks, consideration was also given to the key stakeholders of the Reference Project. Key stakeholders are listed in Table 15.2.

Table 15.2: Key Stakeholders

KEY STAKEHOLDERS	
KEY STAKEHOLDER	**DESCRIPTION**
Ports North	Ports North is a Queensland Government-owned corporation responsible for the development and management of the following sites: Port of Cairns, Cape Flattery, Karumba, Mourilyan, Skardon River, Quintell Beach, Thursday Island, Burketown and Cooktown. The DBC for the Project has been developed by Building Queensland, in partnership with Ports North.
Northern Sands & Waste Management	Northern Sands & Waste Management owns and operates the land at the Barron Delta DMPA. A Heads of Agreement has been established between Ports North and Northern Sands & Waste Management, which sets out the understanding of both parties associated with the placement of soft clay material on this site. A formal contract has yet to be executed between Ports North and Northern Sands & Waste Management.
End users	End users of the facility will be impacted by the Project. This stakeholder group includes, but is not limited to, cruise ship operators and passengers, the Royal Australian Navy and local fisherman.

15.3.6 Market Capability and Capacity

Desktop research was conducted to evaluate the current market capability and capacity to undertake the work packages for the Project. The following market sectors are considered relevant to deliver the Project and research was conducted accordingly in each:

- dredging services
- port construction
- construction.

15.3.6.1 Market Capability in the Dredging Services Sector

The dredging services market in Australia is heavily regulated, with low levels of competition due to high barriers to entry and high capital requirements to undertake these services.

15.3.6.2 Market Capability in the Port Construction Sector

There is capability with major firms within the port construction market. Firms within this market segment have capability for wharf infrastructure and services upgrade works.

15.3.6.3 Market Capability in the Construction Sector

There is potential for market capability to complete bund construction work with major companies in the construction market segment.

15.3.6.4 Market Capacity

The market capacity to provide a competitive environment during the procurement process of the Project is considered low to medium, with a small number of service providers accounting for a large portion of the market. Generally, dredging projects are of large scale and technically complex in nature. This increases the barrier to enter the market for new entrants, who will require significant capital investments to acquire the necessary technical expertise and capabilities.

Nevertheless, it is noted that companies within the port construction sector are also capable of providing dredging services. This ensures that the procurement process can be sufficiently competitive to enable VfM and innovation in the delivery of the dredging works required.

In addition, the combined competitive landscape in the port construction and construction sectors is relatively strong. This will ensure sufficient competitive tension in the procurement for services to deliver construction works related to the bund and wharf infrastructure.

15.4 Identification of Key Work Packages

Given the key considerations in relation to the project characteristics, particularly the timing implications driving the critical path for the Project, the workshop attendees reached consensus to segregate the Project into three discrete work packages as outlined in Table 15.3.

Table 15.3: Work Packages Identified

WORK PACKAGES	
WORK PACKAGE	**DESCRIPTION**
Dredging and Spoil Placement Works	This package of work involves: ▪ marine works to widen and deepen the shipping channel and Crystal Swing Basin, and establishment of Smith Creek Swing Basin involving: – capital dredging works involving removal of up to 1,000,000 cubic metres of dredge material – construction of a temporary pump-out facility located approximately three kilometres offshore from Yorkeys Knob ▪ delivery and placement of dredged material to land-based DMPA including:

WORK PACKAGES	
WORK PACKAGE	DESCRIPTION
	– construction of a temporary dredge material delivery pipeline from the pump-out facility to the soft clay DMPA on the Barron Delta and construction of a pipeline to deliver tailwater to the Barron River – placement of soft clay dredge material at the Barron Delta DMPA – placement of stiff clay dredge material at the Tingira Street DMPA.
Bund Construction Works	This package of work involves construction of a bund to contain soft clay dredge material at the Barron Delta DMPA.
Wharf Infrastructure and Service Upgrade Works	This package of work involves wharf infrastructure and services upgrades including: ▪ relocation of existing and installation of new navigational aids ▪ upgrade to the existing cruise shipping wharves 1–5 to accommodate larger and heavier cruise ships ▪ decommissioning and (partial) demolition of wharf 6 and construction of a new section of Wharf 6 ▪ upgrade of ship services to the cruise shipping wharves, including IFO, potable water and fire-fighting services.

15.5 PPP Suitability Assessment

The PAF states that in all circumstances, the opportunity for private sector involvement must be considered and that delivery models with private sector funding and/or financing options (i.e. PPP model) must be progressed as the preferred delivery model, unless there is demonstrable evidence that this will not deliver the best value for money for government, in which case traditional delivery models may be considered.[26]

The process followed to consider whether or not the Project is suitable for delivery as a PPP is summarised below:

- consider key project characteristics
- review precedent projects within Queensland and other jurisdictions
- evaluate PPP suitability against seven VfM drivers.

Key project characteristics are detailed in Section 15.3. A review of precedent projects and an evaluation of PPP suitability against VfM drivers are described in the sections below.

15.5.1 Precedent Projects

Ports North has previously undertaken work to maintain facilities at the Port of Cairns, including maintenance dredging and wharf infrastructure and services upgrade works. Previously contracted infrastructure works were completed along wharves 7 and 8, where the construction of a refuelling control system was contracted and completed in a two-month timeframe, on time and on budget.

A study of precedent projects with similar scope and characteristics was undertaken. The results demonstrate a mixture of projects delivered under PPP and traditional models. Overall, there is strong precedence to suggest that a PPP arrangement may be appropriate where the port infrastructure serves as an ancillary infrastructure to privately owned assets (e.g. export terminals to mines) and the project is

[26] Project Assessment Framework, Business Case Development, July 2015, p12.

strongly supported by proponents who are direct beneficiaries of those privately owned assets. This unique characteristic is not applicable to this Project.

A list of precedent projects is provided in Table 15.4.

Table 15.4: Precedent Projects

PRECEDENT PROJECTS					
NAME	WORK INVOLVED	BUDGET ($ MILLION)	MODEL	DATE COMPLETED/ EXPECTED	CHARACTERISTICS
Brisbane Cruise Liner Terminal	▪ Construction of new cruise liner terminal, which involves dredging and wharf infrastructure works	158	PPP	2020	Project was funded by owner consortium of Port of Brisbane Pty Ltd (PBPL)
Townsville Channel Capacity Upgrade	▪ Dredging ▪ Bunding ▪ Installing navigational aids	520	Construct only	2023	Public sector proponent (Port of Townsville Ltd)
Western Basin Dredging and Disposal Project	▪ Dredging ▪ Bunding	260	PPP	2013	Project was funded by QCLNG, APLNG, GLNG, who are users of the port
Hay Point Expansion Stage 3	▪ Dredging ▪ Wharf infrastructure ▪ Land reclamation ▪ Build and fit out of trestles, conveyers and ship loaders	2,450	Construct only	2015	Project was funded by BHP Billiton Mitsubishi Alliance, who is a user of the port
Anderson Point AP5 wharf facilities	▪ Wharf infrastructure extension	115	D&C	2015	Project was funded by FMG, who is a user of the wharf
Dampier Iron Ore Port Upgrade – Phase B	▪ Port Upgrades ▪ Wharf infrastructure	940	PPP	2007	Project was funded by Rio Tinto, who is a user of the port
Ichthys LNG Field Development – onshore – P&C Module Offloading Facilities	▪ Port facilities and infrastructure ▪ Materials off-loading facilities and jetty ▪ LNG facilitates and utilities	140	PPP	2018	Project was funded by private sector operators, who are users of the port
Port Botany Expansion	▪ Capital dredging ▪ Wharf Infrastructure ▪ Extension of the existing container terminal	515	D&C	2011	Project was funded by the NSW Government Port Botany is a major export terminal in NSW and was not specifically

PRECEDENT PROJECTS					
NAME	WORK INVOLVED	BUDGET ($ MILLION)	MODEL	DATE COMPLETED/ EXPECTED	CHARACTERISTICS
					built for any private operators

Notable projects are further described below:

- Brisbane Cruise Liner Terminal
  - The upgrade to the Brisbane Cruise Liner Terminal was proposed by the PBPL to the government through a market-led proposal. This was required as the land was leased to PBPL on a 99-year lease. The project was fully funded privately, which was possible as PBPL is wholly owned by the APH Consortium, comprising of four large private infrastructure investors.
- Townsville Channel Capacity Upgrade
  - This project was publicly funded by the federal and state government under a construct only model, with the Port of Townsville as the Principal Contractor. Stage 1 is expected to cost $520 million over the term.
- Western Basin Dredging and Disposal Project
  - This project involved the expansion of the Gladstone Western Basin, which was privately funded (i.e. PPP arrangement) by three LNG proponents (QCLNG, APLNG, GLNG). The project's bunding works (design and construct) were awarded to Abigroup Ltd (subcontracted to SMEC), who were criticised for the faulty design which led to leakage of spoil into the water resources of Gladstone.
- Port Botany Expansion
  - The main expansion project contract was awarded to Hutchison Port Holdings, in the form of a design, construct and procurement model. Jan de Nul in partnership with Baulderstone were awarded a D&C contract for the extension of the existing container terminal at the port. This included capital dredging of the channel. The project was approximately $20 million over the initial approximate budget.

15.5.2 Value for Money Drivers

The PAF lists seven VfM drivers to be used to assess potential for a PPP delivery model to achieve greater VfM compared to a traditional delivery model.

The VfM drivers include the following:

11. output-based specification
12. risk allocation
13. whole-of-life costing
14. asset utilisation
15. competitive market
16. innovation
17. other considerations.

Table 15.5 presents the assessment scale used.

Table 15.5: VfM Assessment Scale

VFM ASSESSMENT SCALE	
INDICATOR	DESCRIPTION
×	Represents no scope for value generation
✓	Represents some scope for value generation
✓✓	Represents reasonable scope for value generation
✓✓✓	Represents excellent scope for value generation

Table 15.6 provides the outcomes of the PPP suitability assessment.

Table 15.6: PPP Suitability Assessment

VFM ASSESSMENT SCALE		
DESCRIPTION OF VFM DRIVERS	SCORE	JUSTIFICATION
1. Output-based specification – Do requirements need to be prescribed (input) or can they be based on service outcomes which encourage innovation (output)?	✓	▪ The requirements for dredging, spoil placement and construction of wharf infrastructure can be prescribed. ▪ Bund construction works (circa $5 million capital cost) can be based on service outcomes to encourage innovation through design.
2. Risk allocation – Are risks well understood? – Are there risks that are able to be better managed by the private sector under a PPP? – Is it possible to achieve optimal risk transfer (e.g. price certainty) under a PPP or are there likely to be subsequent significant variations or scope changes? – Will the private sector be able to price the risks efficiently or is it likely that there will be a significant risk premium included in the pricing under a PPP?	×	▪ Risks in relation to the Project are well understood. Ports North regularly performs maintenance dredging and has previously upgraded wharf infrastructure for wharves 7 and 8. Technical risks have also been identified throughout the EIS process. ▪ Strict requirements to comply with state and federal government EIS conditions limits the ability to transfer risks to the private sector without incurring risk premiums (given the consequences if spills occur etc.)
3. Whole-of-Life costing – Will a PPP solution offer the opportunity for a more efficient capital versus operating expenditure mix due to the PPP solution being viewed as a package, rather than as separate projects? – Does the project include a significant operating expenditure component?	×	▪ The operating and maintenance component of the Project are not considered material in comparison to the capital cost e.g. the dredging works will not incur ongoing operations and maintenance costs. Given this, a PPP solution is unlikely to offer a more efficient capital versus operating expenditure mix compared to other types of traditional delivery models.
4. Asset utilisation – Could the private sector generate additional revenue (e.g. selling access	✓	▪ There may be some opportunity to rent under-utilised space on the wharf, however consideration needs to be given to how it interfaces with daily wharf operations.

VFM ASSESSMENT SCALE		
DESCRIPTION OF VFM DRIVERS	SCORE	JUSTIFICATION
to space that would otherwise be under-utilised)		
5. Competitive market – Are there a number of private sector bidders for this type of project? – Is there a strong market appetite to participate in the project?	×	▪ The scale of the Project was considered too small to be attractive to private sector bidders. ▪ Berthing rights/revenue from cruise ship operators was not considered sufficient to compensate against the cost of the Project under a PPP arrangement.
6. Innovation – Is there potential for the private sector to provide innovative solutions to the Queensland Government's requirements?	×	▪ Requirements to comply with strict state and federal government EIS conditions limits potential for the private sector to provide innovative solutions for the dredging and spoil placement works. The extent of dredging has already been determined through the EIS. ▪ Requirements to comply with requirements for heritage-listed infrastructure limited potential for the private sector to provide innovative solutions for the wharf infrastructure.
7. Other considerations – Nil identified	N/A	▪ Other than 'scale', which was also addressed under the competitive market VfM, no other considerations were identified or discussed.

Given the key findings summarised in Table 15.6, it was determined that:

- The scope for value generation identified for the output-based specification and the asset utilisation VfM drivers could also be achieved under traditional types of delivery models.
- A PPP arrangement was not considered suitable for the Reference Project for the following key reasons:
  - Strict requirements to comply with EIS conditions and requirements of heritage-listed wharf infrastructure limits the ability to innovate and transfer risks to the private sector.
  - A PPP arrangement is unlikely to offer a more efficient capital versus operating expenditure mix compared to traditional models.
  - The revenue generating capabilities of the Project are not sufficiently attractive to the private sector.
  - The scale of the Project was considered too small to be attractive to private sector bidders.

15.6 Traditional Delivery Model Assessment

As a PPP arrangement was not considered suitable, an assessment was undertaken to determine a suitable traditional delivery model for the Reference Project. This involved:

- shortlisting delivery models for each package of work
- establishing an appropriate set of VfM criteria and weightings for each shortlisted delivery model
- assessing shortlisted delivery models against the VfM criteria to identify the preferred delivery model for each work package.

15.6.1 Shortlisting Delivery Models

For each work package, a range of traditional models was considered by workshop attendees, resulting in a shortlist of models progressing through to quantitative evaluation. Key considerations informing the shortlisting exercise included the key project characteristics (as detailed in Section 15.3) and the size, scale and complexity of each work package.

The following sections provide further information on the delivery model shortlisting exercise for each work package.

15.6.1.1 Dredging and Spoil Placement Works

The results of the delivery model shortlisting exercise for the Dredging and Spoil Placement Works are described in Table 15.7.

Table 15.7: Shortlisting of Delivery Models for Dredging and Spoil Placement Works

DREDGING AND SPOIL PLACEMENT WORKS		
DELIVERY MODEL	**DISCUSSION**	**SHORTLIST? (Y/N)**
Construct only (traditional lump sum)	▪ The scope is largely defined. The requirements to comply with EIS conditions can be reflected in the output specification for the contractor. ▪ There is potential for a contact to reflect a combination of lump sum and volume of rates.	Y
D&C	▪ The design for dredging has already progressed to near completion through the EIS process.	N
ECI	▪ There is potential for ECI to focus on interface considerations associated with the construction of the bund. ▪ There may be scope for ECI in the case where maintenance dredging has not been completed prior to the planned commencement date for capital dredging.	Y
Design, build and maintain	▪ The design for dredging has already progressed to near completion through the EIS process.	N
Alliance	▪ An alliance is not typical for these works. ▪ The size and scale of works is too small to be suitable for an alliance arrangement.	N
Construction management	▪ A construction management arrangement is not typical for these works. ▪ The size and scale of works is too small to be suitable for a construction management arrangement.	N
Managing contractor	▪ A managing contractor arrangement is not typical for these works. ▪ The size and scale of works is too small to be suitable for a management contractor arrangement.	N

15.6.1.2 Bund Construction Works

The results of the delivery model shortlisting exercise for the Bund Construction Works are described in Table 15.8.

Table 15.8: Shortlisting of Delivery Models for Bund Construction Works

BUND CONSTRUCTION WORKS		
DELIVERY MODEL	DISCUSSION	SHORTLIST? (Y/N)
Construct only (traditional lump sum)	▪ The requirements to comply with EIS conditions can be reflected in the output specification for the contractor. ▪ The design control and risk will be retained by the Queensland Government.	Y
D&C	▪ There is scope for a contractor to develop and construct a design that complies with EIS conditions. ▪ The design risk is transferred to the private sector. ▪ There is a higher degree of cost certainty at time of award. ▪ It offers a single point of accountability via the contractor.	Y
ECI	▪ There is limited scope for ECI.	N
Design, build and maintain	▪ Other than monitoring activities, maintenance is not required after the bund is constructed.	N
Alliance	▪ The size and scale of works is too small to be suitable for an alliance arrangement.	N
Construction management	▪ The size and scale of works is too small to be suitable for a construction management arrangement.	N
Managing contractor	▪ The size and scale of works is too small to be suitable for a management contractor arrangement.	N

15.6.1.3 Wharf Infrastructure and Services Upgrade Works

The results of the delivery model shortlisting exercise for the Wharf Infrastructure and Services Upgrade Works are described in Table 15.9.

Table 15.9: Shortlisting of Delivery Models for Wharf Infrastructure and Services Upgrade Works

WHARF INFRASTRUCTURE AND SERVICES UPGRADE WORKS		
DELIVERY MODEL	DISCUSSION	SHORTLIST? (Y/N)
Construct only (traditional lump sum)	▪ The requirements to comply with heritage conditions can be reflected in the output specification for the contractor. ▪ The design control and risk will be retained by the Queensland Government.	Y
D&C	▪ There is precedent at the Port of Cairns for upgrading wharf infrastructure under a D&C model (i.e. wharves 7 and 8). ▪ The design risk is transferred to the private sector. ▪ There is a higher degree of cost certainty at the time of award. ▪ It offers a single point of accountability via the contractor.	Y
ECI	▪ There is limited scope for ECI.	N
Design, build and maintain	▪ Maintenance of wharf infrastructure is planned with due consideration for wharf operations. Ports North is considered best placed to manage port operations and control the timing for maintenance activities.	N

WHARF INFRASTRUCTURE AND SERVICES UPGRADE WORKS		
DELIVERY MODEL	DISCUSSION	SHORTLIST? (Y/N)
Alliance	▪ The size and scale of works is too small to be suitable for an alliance arrangement.	N
Construction management	▪ The size and scale of works is too small to be suitable for a construction management arrangement.	N
Managing contractor	▪ The size and scale of works is too small to be suitable for a management contractor arrangement.	N

15.6.1.4 Summary of Shortlisted Delivery Models for Work Packages

Based on the shortlisting exercise, the delivery models that progressed through to quantitative evaluation are summarised in Table 15.10.

Table 15.10: Shortlisted Delivery Models for Each Work Package

SHORTLISTED DELIVERY MODELS FOR EACH WORK PACKAGE	
WORK PACKAGE	SHORTLISTED DELIVERY MODEL(S)
Dredging and Spoil Placement Works	▪ Construct only ▪ ECI
Bund Construction Works	▪ Construct only ▪ D&C
Wharf Infrastructure and Services Upgrade Works	▪ Construct only ▪ D&C

15.6.2 Establishing VfM Criteria and Weightings

During the delivery workshop, each shortlisted delivery model for each work package was rated against quantitative and qualitative VfM criteria to determine the appropriate delivery model for each package.

Each quantitative and qualitative criterion was individually assigned various weightings to reflect the importance of each criteria to the specific work package. Key considerations driving decisions in relation to weightings include, but are not limited to:

- the scale of works and anticipated cost for each work package
- expected risks and challenges associated with each work package
- impact of the work package on the critical path of the overall Project program.

Criteria were rated in line with the rating range detailed in Table 15.11.

Table 15.11: Assessment Rating Range and Criteria

ASSESSMENT RATING RANGE AND CRITERIA	
RATING RANGE	RATING CRITERIA
9–10	The delivery model option is extremely effective in satisfying the requirements of the criterion.
6–8	The delivery model option is effective in satisfying the requirements of the criterion.
3–5	The delivery model option just satisfies the requirements of the criterion.

ASSESSMENT RATING RANGE AND CRITERIA	
RATING RANGE	RATING CRITERIA
1–2	The delivery model option is not effective in satisfying the requirements of the criterion.

The ratings were then weighted and aggregated to arrive at an overall weighted score for each delivery model option. This section describes the quantitative and qualitative VfM criteria used and associated weightings for each work package.

The capital costs required for the Bund Construction Works are relatively low in comparison to those of the Dredging and Spoil Placement Works and Wharf Infrastructure and Services Upgrade Works packages. Therefore, the weighting split between quantitative and qualitative criteria was set at 50:50 for the Bund Construction Works, rather than the 70:30 split for the other two work packages.

15.7 Ports North Capability in Delivering the Project

The assessment identified the construct only delivery model is the most suitable in delivering all three work packages. This requires Ports North to deliver all other components of the Project except for the dredging and construction works identified in the three work packages.

Ports North has demonstrated capabilities in undertaking and managing dredging works as part of its business-as-usual activities. This includes:

- annual maintenance dredging of the Cairns channel, which is contracted to PBPL
- annual dredging of HMAS Cairns utilising Ports North's clamshell dredge and dump barges
- annual or biennial maintenance dredging of Port of Karumba since 2009 through contractors
- periodic maintenance dredging of various areas within the Port of Cairns such as the Marina and Fisherman's bases. Periodic maintenance dredging activities may be carried out by Ports North or through contractors depending on the specific location and associated constraints of the maintenance dredging activity.

Additionally, key management personnel at Ports North, including the Chief Executive Officer and General Manager Planning and Infrastructure, have extensive industry experience in undertaking and managing port infrastructure projects.

15.8 Summary of Assessment

Following consideration of seven VfM drivers and precedent projects, it was concluded that a PPP arrangement would not be suitable for the Project for key reasons including but not limited to the following:

- Strict requirements to comply with EIS conditions and requirements of heritage-listed wharf infrastructure limits the ability to innovate and transfer risks to the private sector.
- A PPP arrangement is unlikely to offer a more efficient capital versus operating expenditure mix compared to traditional models.
- The revenue generating capabilities of the Project are not sufficiently attractive to the private sector.
- The scale of the Project was considered too small to be attractive to private sector bidders.

The traditional delivery model assessment identified construct only as the preferred delivery model for all three work packages.

Overall, it was identified that Ports North is better placed to manage certain key project risks compared to a contractor due to its extensive experience in dredging and wharf construction projects. Furthermore, Ports North is better placed to ensure compliance with the strict conditions stipulated by the EIS and other legal requirements, such as conditions of heritage-listed wharf infrastructure.

In relation to the Dredging and Spoil Placement Works and Bund Construction Works, the suitability of construct only is mainly driven by the likely favourable capital costs outcome, including cost certainty, under the construct only model against the ECI and D&C models.

For the Wharf Infrastructure and Services Upgrade Works, the D&C model was marginally more favourable under quantitative criteria, including capital costs in which price certainty can be better achieved. However, it was determined that the construct only model would achieve more favourable qualitative outcomes.

CHAPTER 16
AFFORDABILITY ANALYSIS

CHAPTER SUMMARY AND CONCLUSIONS:

- The financial analysis identified that the Reference Project will result in a net cash flow of $8.9 million (net cash inflow) (nominal, P90) and $49.4 million net cash outflow (NPV, P90). Despite the net cash inflow expected under the Reference Project in nominal terms, analysis of its cash flow profile indicates there is a funding gap during the construction period from FY2019 to FY2020 due to the capital-intensive nature of the Reference Project. Therefore, an affordability assessment has been conducted to identify the funding gap based on currently available funding and potential additional funding sources.
- According to the Queensland Budget 2017–18, the Queensland Government has committed funding of $60 million (nominal) for the Reference Project over FY2019 and FY2020.
- When undertaking the affordability assessment with reference to the construction period only, the funding gap is $77.8 million (nominal, P90) or $74.4 million (NPV, P90).
- Without the committed government funding of $60.0 million (nominal), the Reference Project is expected to break-even by FY2045. With the government funding included, the break-even year is expected to be accelerated to FY2038.
- Potential funding sources are available to Ports North to address the funding gap associated with the construction of the Project, including:
  - contribution from Ports North
  - contribution from the Australian Government
  - debt financing from Queensland Treasury Corporation (QTC)
  - debt financing from the Northern Australia Infrastructure Facility (NAIF)
  - private sector financing.
- Analysis of Ports North's financial capacity indicates that it may be able to service additional debt to finance the Project. The potential for debt financing is further supported by the Reference Project's ability to generate surpluses throughout the operations period. Debt financing is available through QTC and NAIF subject to Queensland Government approval.
- The Reference Project appears to satisfy the five mandatory eligibility criteria stipulated by NAIF.
- Through Infrastructure Australia, the Australian Government has indicated a focus on infrastructure investment in Northern Australia, including Cairns. There is potential for funding from the Australian Government.

16.1 Purpose

This chapter outlines the key considerations for the Queensland Government in determining the overall affordability of the Reference Project, which is assumed to be delivered under a traditional delivery approach. The key affordability issue involves determining the funding gap associated with the Reference Project, which represents additional cost to government.

16.2 Approach

From an affordability perspective, this analysis is based on a risk-adjusted (P90) net cash flow approach that considers the revenue associated with the Reference Project net of total project costs (i.e. total of capital costs and ongoing operating, maintenance and life cycle costs). The net cash flow of the Reference Project is informed by the financial analysis undertaken in Chapter 14: Financial and Commercial Analysis.

The risk-adjusted net cash flow associated with the Reference Project is compared to the available funding committed to the Reference Project. The difference between the two values represents the funding gap that needs to be bridged through additional funding.

16.2.1 Net Cash Flow of the Reference Project

The net cash flow (P90 risk-adjusted) of the Reference Project considers the forecast for the following items associated with the Reference Project over a 27-year period:

- revenue from increased cruise ship demand and increased port charges
- capital costs relating to capital dredging, bund construction and wharf infrastructure and service upgrade works
- ongoing costs (including operating, maintenance and life cycle) required to sustain the operations of the port over the 27-year period.

The FNPV represents the net cash flow expected to be generated by the Reference Project over the 27-year period, while taking into account the time value of money based on the cash flow profile of the Reference Project.

16.3 Currently Available Funding for the Reference Project

The affordability analysis focuses on identifying the funding gap that must be bridged by way of additional funding. Hence, the currently available or committed funding for the Reference Project must first be identified.

Table 16.1 summarises the funding currently available to the Reference Project.

Table 16.1: Summary of Currently Available Funding for the Reference Project

CURRENTLY AVAILABLE FUNDING		
SOURCE	DESCRIPTION	FUNDING AMOUNT (NOMINAL)
Queensland Government[27]	In the Queensland Budget 2017–18, the state government announced a commitment of $60 million over two years from 2018–19 towards the Reference Project.	$60 million

[27] https://s3.budget.qld.gov.au/budget/papers/2/bp2-2017-18.pdf

16.4 Funding Gap Assessment

Table 16.2 outlines the net cash flow positions of the Reference Project when considering the funding available from the Queensland Government, identified above. It shows that the Reference Project will achieve a net inflow position of $68.9 million (nominal, P90 risk-adjusted) or $8.5 million (FNPV, P90 risk-adjusted) over the evaluation period. However, this does not appropriately consider the timing of cash flows required to address the capital costs requirement of the Project.

Table 16.2: Funding Gap of the Reference Project (P90 Risk-adjusted)

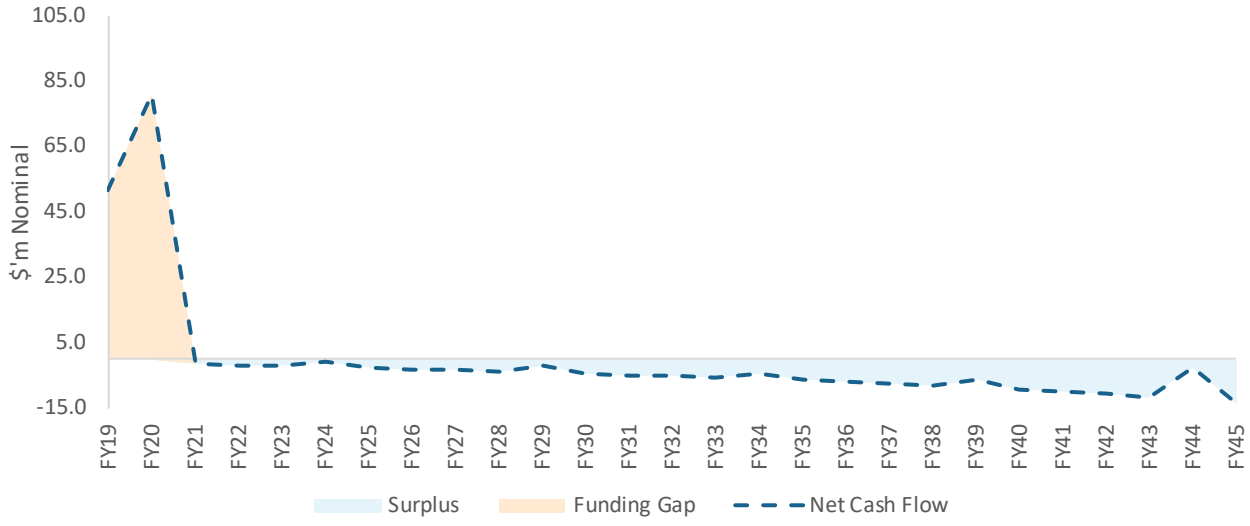
FUNDING GAP ANALYSIS OF THE REFERENCE PROJECT			
FINANCIAL ITEM	REAL ($ MILLION, $ 2018)	NOMINAL ($ MILLION)	PV ($ MILLION)
NET CASH FLOW			
Project net cash flow	(37.3)	8.9	(49.4)
FUNDING AVAILABLE			
Queensland Government	57.8	60.0	57.9
NET FUNDING GAP	**20.5**	**68.9**	**8.5**

Note: The risk-adjusted subtotals and totals presented in the above table do no equal the sum of the individual line items. Aggregating the individual line items inappropriately overestimates risk-adjusted values on the subtotal and total levels, as it assumes that that each cost line item has experienced an unfavourable outcome.

The risk-adjusted (P90) net cash flow profile of the Reference Project is illustrated in Figure 16.1.[28] It reflects the following characteristics:

- significant upfront capital costs resulting in funding gaps within the first two years of the evaluation period
- greater levels of revenues in comparison to ongoing costs (i.e. surplus incurred) in the operation period from FY2021 onwards.

Figure 16.1: Net Cash Flow of the Reference Project Over the Project Period (Nominal, P90 Risk-adjusted)



[28] Note: Positive values in Figure 16.1 represent net cash outflows. Conversely, negative values represent net cash inflows.

Figure 16.2 illustrates the expected growth in surpluses generated under the Reference Project throughout the evaluation term due to the higher growth in revenue relative to ongoing costs.

Figure 16.2: Ongoing Costs Funding Gap Over the Project Period (Nominal, P90 Risk-adjusted)

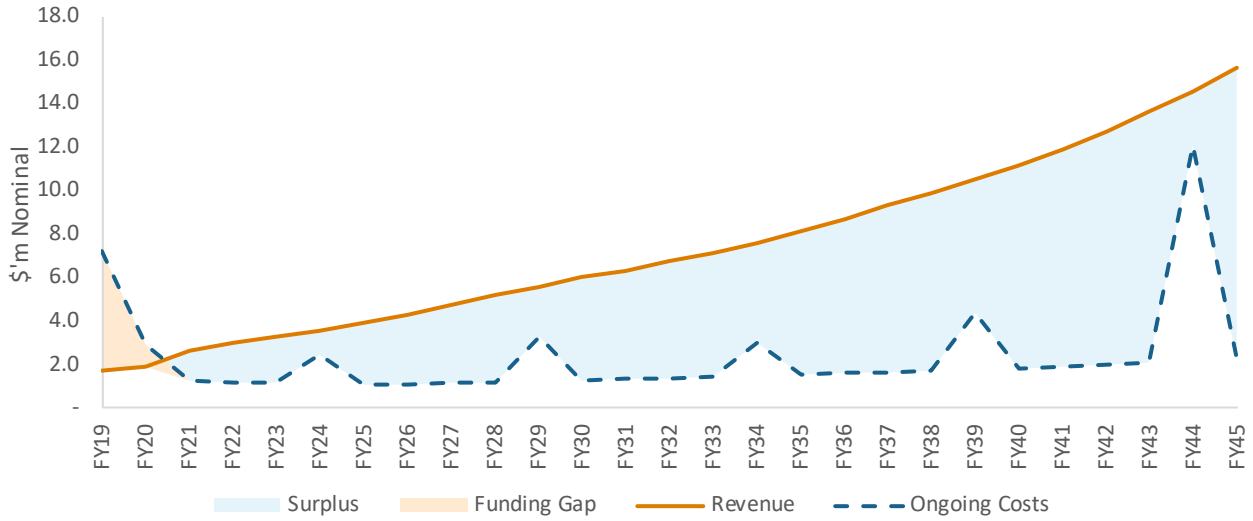


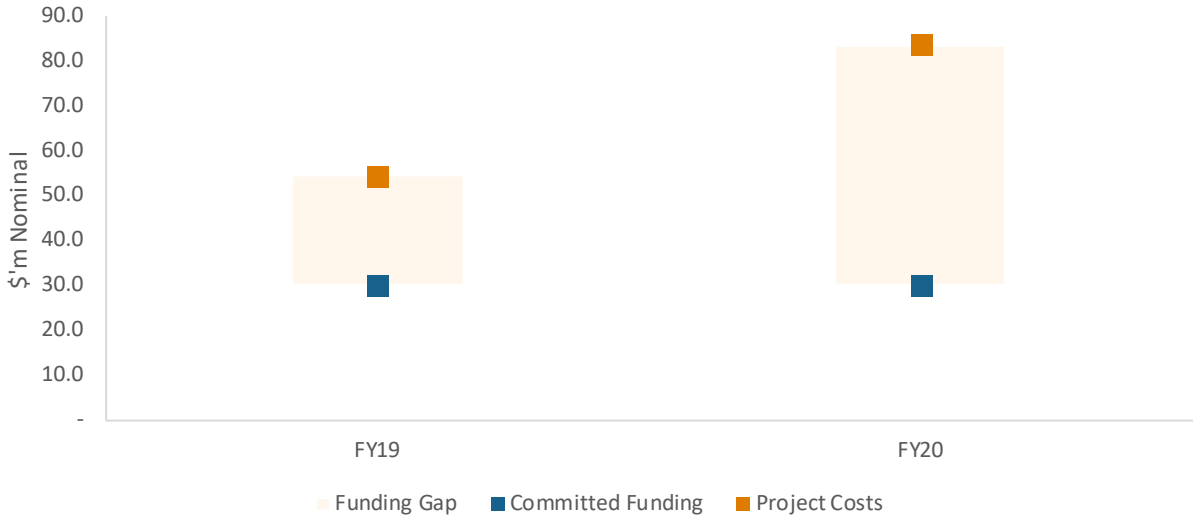
Figure 16.1 and Figure 16.2 highlight the potential funding gap to deliver the Reference Project in FY2019 and FY2020 despite the overall net cash inflow position of the Project.

Table 16.3 summarises the funding gap by comparing project costs expected to be incurred in FY2019 and FY2020 to the proposed Queensland Government funding of $60.0m (nominal) for the Reference Project. It identifies a funding gap of $77.8 million (nominal, P90) or $74.4 million (NPV, P90), as indicated below. The revenue expected to be collected in FY2019 and FY2020 are not considered in this analysis.

Table 16.3: Capital Costs Funding Gap of the Reference Project (P90 Risk-adjusted)

FUNDING GAP OF THE REFERENCE PROJECT CONSIDERING CASH FLOWS IN FY2019 TO FY2020 ONLY			
FINANCIAL ITEMS (FY19–20 ONLY)	REAL ($ MILLION, $ 2018)	NOMINAL ($ MILLION)	PV ($ MILLION)
PROJECT COSTS IN FY19–20	**(132.9)**	**(137.8)**	**(132.4)**
Queensland Government funding	57.8	60.0	57.9
NET FUNDING GAP	**(75.1)**	**(77.8)**	**(74.4)**

Figure 16.3: Capital Costs Funding Gap Over the Construction Period (Nominal, P90 Risk-adjusted)



16.4.1 Break-even Analysis

Analysis has been undertaken to determine the year when the Reference Project is expected to beak-even. Figure 16.4 illustrates that the Project is expected to break-even in FY2045 in the absence of any funding. However, with the funding of $60.0 million from the Queensland Government included, the Reference Project will break-even by FY2038 as illustrated in Figure 16.5.

Figure 16.4: Break-even Point without Queensland Government Funding (Nominal, P90 Risk-adjusted)

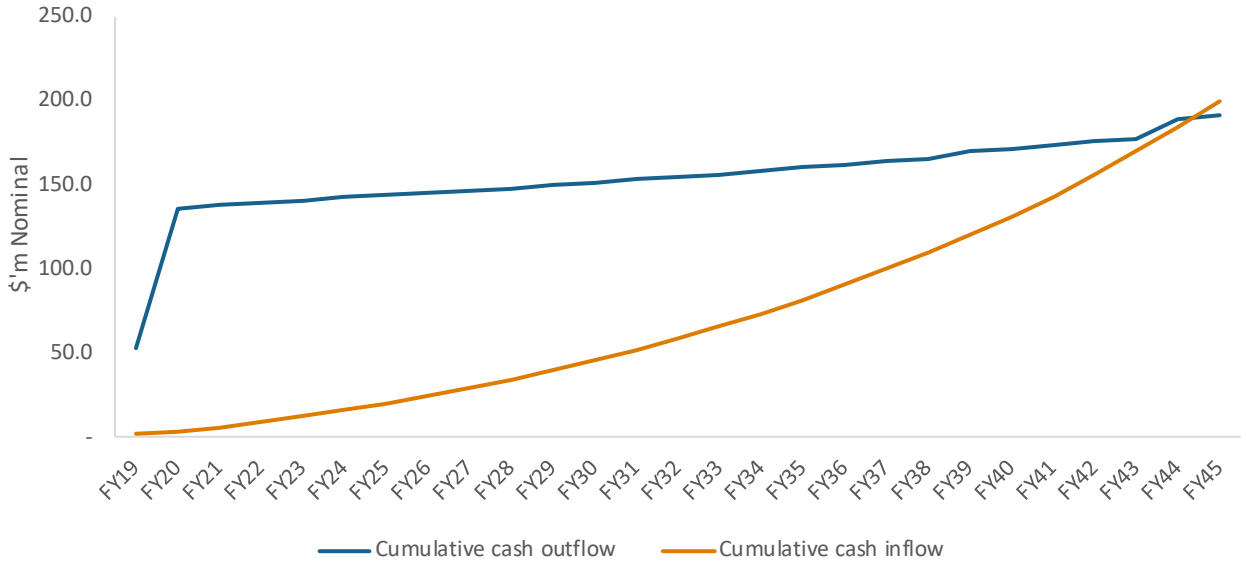
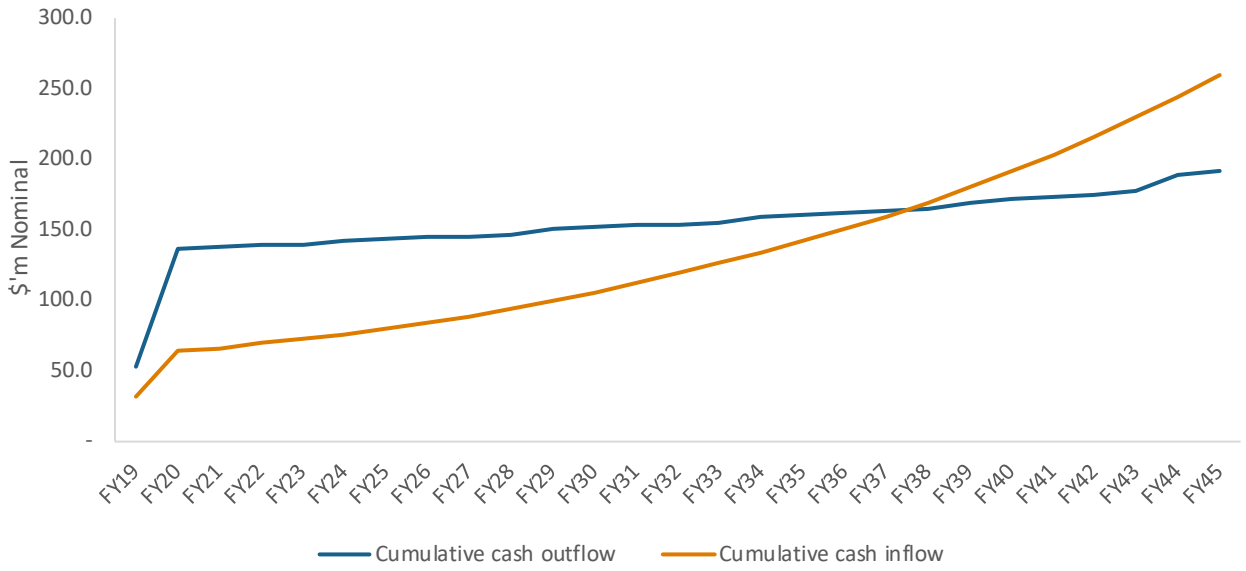


Figure 16.5: Break-even Point with Queensland Government Funding in FY19–FY20 (Nominal, P90 Risk-adjusted)



16.5 Potential Additional Funding Sources

The funding gap assessment in Section 16.4 demonstrates that current committed funding is short of the cash outflows required for the Reference Project's capital and ongoing costs in the construction period (circa $77.8 million in nominal terms after a $60 million contribution from the Queensland Government). Based on workshops with key stakeholders, including members of the PWG and market sounding participants, potential additional funding sources are:

- contribution from Ports North
- contribution from the Australian Government
- debt financing from QTC
- debt financing from the NAIF
- private sector financing (debt and/or equity).

Funding from a combination of these sources may be acquired to address the funding gap of the Reference Project.

16.5.1 Contribution from Ports North

There is potential for Ports North to fund the Project internally using its existing assets, based on its current financial capacity. Table 16.4 outlines Ports North's key financial metrics and data based on its latest audited financial statements as at 30 June 2017 and 30 June 2016. For the purposes of financial capacity analysis, data over the last three years were analysed.

Table 16.4: Key Financial Metrics and Data of Ports North

KEY FINANCIAL METRICS AND DATA OF PORTS NORTH			
FINANCIAL INDICATOR	FY2017	FY2016	FY2015
Cash balance	$51.0m	$48.4m	$41.5m
Net current assets	$44.9m	$34.8m	$31.7m
Working capital ratio	4.49	2.70	2.96

KEY FINANCIAL METRICS AND DATA OF PORTS NORTH			
FINANCIAL INDICATOR	FY2017	FY2016	FY2015
Net operating cash flow	$14.5m	$13.2m	$13.5m
Net cash flow	$2.6m	$6.9m	$4.5m
Debt to equity	0.19	0.22	0.19
Net profit (loss) before tax	$13.2m	$20.4m	$17.0m

Source: Ports North's financial statements for the year ended 30 June 2017 and 30 June 2016.

Based on the available financial information, Ports North appears to have strong financial capacity to contribute to the Reference Project. This is characterised by Ports North's strong cash flow and net asset positions. Key highlights of the financial capacity analysis are as follows:

- Ports North has a strong net current asset position supported by its cash balance, which represents 87 per cent of its total current assets as at 30 June 2017.
- Ports North has consistently generated net profit before tax and positive operating cash flow over the past three financial years. In addition to cruise ship revenue, Ports North collects rental income through its investment properties. This indicates financial capacity to supplement the ongoing costs of the Reference Project.
- Ports North achieved positive net cash flow positions over the past three years, which indicates potential ability to service the interest and principal repayments under debt financing going forward.
- Ports North's strong liquidity position and debt-to-equity ratio indicates that it has capacity to service additional debt to finance the Reference Project. Based on the Statement of Financial Position as at 30 June 2017, Ports North does not currently hold any long-term debt. Additional debt of $67.5 million to fund the capital costs of the Project will increase the debt to equity ratio to 0.40, which remains a reasonably leveraged position.
- On a forward-looking basis, the Reference Project is expected to generate surpluses from FY2021 onwards as highlighted in Figure 16.2. Based on its forecasted financial statements extracted from its corporate plan to government, Ports North does not appear to have any significant capital expenditure planned from FY19 to FY23, other than those related to the Reference Project.

16.5.2 Contribution from Australian Government

In its Australian Infrastructure Plan dated February 2016, Infrastructure Australia highlighted the federal imperative to support fast-growing regions (in which Cairns was specifically named) with coordinated, long-term planning and investment. This was supported by Infrastructure Australia's Northern Australia Audit released in May 2015, which identified a program of investments and reforms to transform the north of Australia. Based on this, it was recommended that the Australian Government 'prioritise investment in regional infrastructure where the population is growing quickly and where the bulk of our regional economic growth can be found'.[29] Although the Project is not currently on the Infrastructure Priority List, there is potential to seek contribution from the Australian Government.

[29] http://infrastructureaustralia.gov.au/policy-publications/publications/files/Australian_Infrastructure_Plan.pdf

16.5.3 Debt Financing from QTC and/or NAIF

The financial analysis contained in Chapter 14: Financial and Commercial Analysis and the funding gap assessment in Section 16.4 noted that the Reference Project is likely to generate surplus on an annual basis throughout the entire operations period from FY2021 onwards. This provides the Project with the ability to self-sustain repayments of principal and interest arising from debt financing. This unlocks the option for Ports North to fund the Reference Project through debt financing given its strong financial position. Potential debt financing sources include QTC, which offers debt financing through AUD bonds.

Potential funding is also available through NAIF subject to Queensland Government approval. NAIF was established on 1 July 2016 under the provisions of the *Northern Australian Infrastructure Facility Act 2016* to provide concessional finance to encourage and complement private sector investment in infrastructure that benefits Northern Australia, including the Far North Queensland region. Despite NAIF being a relatively new Commonwealth entity, it has already set a precedent by funding a port infrastructure project. In 2017, the NAIF recommended a $16.8 million concessional loan to develop the Onslow Marine Support Base in Western Australia.[30]

The outcomes sought by the Project are aligned with NAIF's strategic objective to support the construction of economic infrastructure that provides a basis for the long-term expansion of industry and population in northern Australia.[31] In a statement released in January 2018, the CEO of NAIF highlighted tourism infrastructure, including cruise ship ports, to be a key focus of NAIF.[32]

A project must meet certain mandatory eligibility criteria stipulated by NAIF to be eligible for funding. Table 16.5 demonstrates that the Reference Project is likely to be eligible for financing from NAIF.

Table 16.5: Mandatory Eligibility Criteria of NAIF

MANDATORY ELIGIBILITY CRITERIA FOR NAIF FINANCE	
CRITERIA	
The project involves the construction or enhancement of economic infrastructure	The Reference Project involves the expansion of the Trinity Inlet and upgrade of the Port of Cairns, which are considered economic infrastructure.
The project will be of public benefit	The potential project benefits to Cairns and the wider region are discussed in detail in Chapter 4: Service Need and Chapter 14: Financial and Commercial Analysis.
The project is located in, or will have a significant benefit for, northern Australia	The potential project benefits to Cairns and the wider region are discussed in detail in Chapter 4: Service Need and Chapter 14: Financial and Commercial Analysis.
The loan will be able to be repaid or refinanced	As discussed in Section 16.5.1, Ports North is likely able to service the debt given its strong financial position and the expected surpluses to be generated by the Reference Project.
Indigenous engagement strategy	The impact assessment of Indigenous cultural heritage and considerations of mitigation measures, along with Ports North's engagement with the relevant Aboriginal and Torres Strait Islander parties, has been accepted by the Coordinator-General as satisfactory, through the EIS submission process.

[30] https://naif-gov-au.industry.slicedtech.com.au/wp-content/uploads/2017/10/Onslow-Marine-Supply-Base-Investment-Decision-Media-Release.pdf
[31] http://www.naif.gov.au/about-us/
[32] https://naif-gov-au.industry.slicedtech.com.au/wp-content/uploads/2018/01/20180123-Tourism-infrastructure-a-key-focus-of-NAIF-.pdf

16.5.4 Private Sector Financing (Debt and/or Equity)

Given Ports North's current financial capacity, there is potential for debt financing from the private sector.

The market sounding process highlighted an appetite in the private sector to discuss partnership opportunities with the Queensland Government and Ports North on a case-by-case basis, subject to negotiations. Partnership opportunities of interest reflect those in place at other domestic and international ports.

In addition to the above, a desktop review indicated a strong appetite for private investment in port infrastructure in Australia. The evidence suggests strong interest in port infrastructure from superannuation funds and specialised pooled investment funds, as demonstrated by the examples shown in Table 16.6.

Table 16.6: Examples of Private Investment in Port Infrastructure In Australia

EXAMPLES OF PRIVATE INVESTMENT IN PORT INFRASTRUCTURE IN AUSTRALIA		
	DESCRIPTION	KNOWN INVESTORS
Port Botany and Port Kembla (NSW)	Port Botany and Port Kembla are key NSW ports located in Sydney. A 99-year lease for the ports was awarded to a consortium[33] of leading institutional investors for $5.07 billion.	▪ IFM Investors ▪ Australian Super (20 per cent partner)[34] ▪ Tawreed Investments Ltd ▪ QSuper ▪ Cbus ▪ Hesta ▪ Hostplus
Port of Brisbane	The new cruise ship terminal at Luggage Point is fully funded by Port of Brisbane Pty Ltd (PBPL), which owns and operates the port. PBPL is owned by the APH Consortium, which consists of a number of the world's largest infrastructure investors.	▪ Caisse de dépôt et placement du Québec ▪ IFM Investors ▪ QIC Global Infrastructure ▪ Tawreed Investments Ltd
Port of Melbourne (VIC)	On 19 September 2016, the Lonsdale Consortium was awarded a 50-year lease for Port of Melbourne.[35] The consortium acquired the lease of Australia's largest container, automotive and general cargo port as it is a strategic gateway between Australia and its major trading partners.	▪ Future Fund ▪ Queensland Investment Corporation ▪ Global Infrastructure Partners ▪ OMERS (Ontario Municipal Employees Retirement System)
Port of Portland (VIC)	Palisade Investment Partners (Palisade) invested in 50 per cent of Port of Portland and on 26 February 2018, Palisade announced that it had reached an agreement with Utilities of Australia Pty Ltd to acquire the remaining 50 per cent interest in Port of Portland.[36] This has resulted in Palisade owning a total 100 per cent of Port of Portland.	▪ Future Fund

[33] https://www.nswports.com.au/assets/Uploads/Publications/NSW-Ports-Master-Plan-2015.pdf
[34] https://www.australiansuper.com/-/.../australian-super/.../portfolio-insights-nsw-ports.pdf
[35] https://www.qic.com.au/knowledge-centre/gi-media-release-port-of-melbourne-20160919
[36] https://palisadepartners.com.au/palisade-reaches-agreement-acquire-remaining-50-port-portland/

It should be noted that other than the Port of Brisbane, the ports listed in Table 16.6 are trade ports, not cruise ship terminals, which have fundamentally different drivers for financial returns.

16.6 Conclusion

Based on the financial analysis, there appears to be no funding gap over the evaluation term as the Reference Project is expected to achieve a risk-adjusted net cash inflow position in nominal terms. However, this affordability assessment identified that there is a funding gap during the construction period of the Project (FY2019 to FY2020) due to the significant cash outflows required to meet the Project's capital and ongoing cost requirements during that period. Taking into account currently committed government funding, the funding gap related to the construction period is $67.5 million (nominal, P90) or $64.6 million (NPV, P90).

Potential additional funding sources must be explored to bridge the funding gap associated with the construction of the Reference Project. The financial capacity of Ports North indicates that it is potentially capable of servicing additional debt to finance the Project. The potential for debt financing is further supported by the projected ability of the Reference Project to generate surpluses throughout the operations period from FY2021 onwards.

Debt financing may be obtained from QTC and NAIF, subject to Queensland Government approval. While the Reference Project appears to satisfy all five eligibility criteria stipulated by the NAIF, debt from NAIF must satisfy NAIF's requirement that the return on the facilities it advances will cover at least the Commonwealth Government's cost of funding and NAIF's administrative costs. The NAIF Board will also have regard to the potential effect of the project on other infrastructure and of the NAIF's financing on the Australian infrastructure financing market and on the potential of the NAIF investment to encourage private sector participation in financing the project.

Infrastructure Australia has highlighted the primacy of infrastructure investment in fast-growing regions in northern Australia, which includes Cairns. Given the Reference Project's ability to foster economic growth in the Far North Queensland region, there is potential for funding from the federal government.

Finally, potentially funding sources and partnership opportunities with the private sector including (but not limited to) cruise ship operators, superannuation funds, and specialised investment funds and consortiums may be pursued.

CHAPTER 17
CONCLUSIONS

Located on Trinity Inlet, at the edge of the Coral Sea in FNQ, the Port of Cairns is a cornerstone of the region's tourism and trade sectors. Ideally situated alongside the Cairns CBD, it serves as a gateway to international export and tourism markets and underpins Queensland's growing cruise ship industry.

More international and domestic visitors are arriving in Cairns each year, drawn by its easy access to the Great Barrier Reef, located just 25 kilometres offshore, and the Wet Tropics World Heritage Area, two of the world's largest natural attractions. Excellent rail, road and air links to other regional tourism destinations and capital cities across the country also make it an ideal entry point for visitors. Visitations reached almost 2.8 million in 2015, with many visitors arriving via cruise ship.

Cruise shipping is the fastest growing tourism market worldwide. Steady long-run growth in cruise ship calls in Cairns over the past decade mirrors this growth. Last year, cruise ship visits reached an all-time high of 80, up from 34 cruise ship visits in 2010. Yet Cairns is largely missing out on one of the most lucrative emerging markets – the mega class market. Globally, cruise shipping operators are moving towards larger sized ships, that is, vessels able to carry more than 2,000 passengers. Larger cruise ships improve economies of scale so operators can cut ticket prices and boost their market appeal.

Cairns cannot accommodate these 'mega class' vessels as the existing channel into the port is not wide or deep enough to allow safe access and the heritage listed wharves have insufficient structural capacity to handle increased berthing loads. Instead, larger vessels must anchor at Yorkeys Knob, 15 kilometres north of Cairns, and ferry passengers ashore. This practice is difficult and time consuming for passengers (taking up to 3.5 hours), diminishing their travel experience. It discourages visits by larger ships and limits onshore visitations when they do. About 10 per cent of ship visits are lost entirely when rough weather makes shore transfer by tender unsafe.

The channel's width and depth also constrain the size of cargo ships able to enter the port, often forcing them to wait for the right tidal conditions, and limit the Australian Defence Force's presence in the region. HMAS Cairns, the second largest naval base on Australia's east coast, is located on Trinity Inlet but the location of the cargo swing basin used by navy ships restricts the base's capacity to expand. It also cannot host larger Australian and foreign navy ships.

Improving the Port of Cairns' capacity for larger ships was first proposed by the state government-owned corporation Ports North in 2012 through the Cairns Shipping Development Strategy. This strategy explored potential options for upgrading the channel and port and led to the Cairns Shipping Development Project (the Project), which has been the subject of rigorous environmental impact assessment.

A draft EIS for the Project was prepared in 2015, with a RDEIS prepared in 2017 following legislative change prohibiting marine disposal of capital dredging material, which was originally proposed. The Reference Project now complies with dredging-related legislation, and anticipated dredge volumes have been reduced from 4M cubic metres to 1M cubic metres.

Key components of the Reference Project include:

- dredging a wider and deeper entrance channel and cruise ship swing basin to allow access for ships up to 300 metres long
- relocation of the cargo ship swing basin to facilitate the expansion of the navy base
- placement of dredged material to two land-based DMPAs
- upgrading berth infrastructure within Trinity Inlet.

The CGER sets out comprehensive conditions to manage potential environmental impacts, particularly on the GBRWHA and GBRMP. Multiple laws and regulations must be addressed by the Project, requiring

proactive management and significant documentation. Legislative change is also required to the Fish Habitat Area (FHA). The Department of Environment and Science (DES) (formerly the Department of National Parks, Sport and Racing) has confirmed in principle support for the proposed amendment.

The Reference Project will significantly contribute to achieving government objectives of economic development in Northern Australia, tourism growth and development in FNQ, a more competitive and efficient shipping industry in Cairns and Queensland, more resilient state infrastructure and a stronger Australian Defence Force capability in Northern Australia.

An economic assessment of the Reference Project found that it will deliver net economic benefits to Cairns and Queensland, primarily through greater visitor expenditure by cruise passengers. The Project will see almost a tripling of current ship visits within 13 years (based on 2016 figures), a higher incremental spend by overnight visitors and maturation of the cruise ship industry in Queensland. Utilising CBA, it was found the Project will deliver net economic benefits to Cairns and Queensland. At a seven per cent real discount rate the Reference Project has a NPV of $10.7 million (P90) and $20.0 million (P50), and a BCR of 1.1 (P90) and 1.2 (P50).

It will also support the planned $635 million upgrade of HMAS Cairns, enabling the navy's larger ships to berth in Cairns, increase the port's resilience to extreme weather and improve the efficiency of existing cargo ship operations by giving vessels a larger window of entry and egress to the port.

Total capital costs amount to $122.7 million (PV, P90 risk-adjusted) or $127.6 million (nominal, P90 risk-adjusted) under the Reference Project. The PV P50 risk adjusted capital cost is $112.9 million or $117.5 million (nominal). The financial assessment found that despite the net cash inflow expected under the Reference Project in nominal terms, analysis of the cash flow profile indicates a funding gap during the construction period from FY2019 to FY2020, due to the capital-intensive nature of the Reference Project.

The affordability analysis found that taking into account currently committed government funding, the funding gap related to the construction period is $67.5 million (nominal, P90) or $64.6 million (NPV, P90). Without the committed government funding of $60.0 million (nominal), the Reference Project is expected to break-even by FY2045. With the government funding included, the break-even year would be accelerated to FY2038.

The social impact evaluation found that the Reference Project will have a significant positive impact through increased employment and business opportunities. This has flow-on effects to community health and wellbeing and the stability of local small businesses, which translates into intergenerational benefits. The Reference Project will also improve cruise passenger safety and experience, liveability for residents and traffic conditions for users of the road corridor from Yorkeys Knob to Cairns City. All potential negative impacts were rated as low by the qualitative risk assessment, except for disruption accessing the boat ramp (which dropped to low after mitigations were assumed) and the effects of landside construction and increased ship arrivals at the Port of Cairns on Wharf Street residents, which received a medium rating.

The delivery model analysis conducted for this DBC identified three discrete work packages for the Reference Project (Dredging and Spoil Placement Works, Bund Construction Works and Wharf Infrastructure and Services Upgrade Works), with a construct only delivery model recommended for all packages. Construction is planned to commence in early 2019 and be complete by April 2020 with channel dredging planned between May to September 2019.

CHAPTER 18
ASSURANCE

18.1 Assurance Objectives

The DBC has been reviewed to provide assurance that it:

- is complete: that is, includes all necessary information for the investment decision
- includes reliable and reasonable information: that is, the quality of the information is appropriate and can be relied upon, assumptions and the methodology for assessments are documented and assessments were completed with appropriate expertise and rigour
- is comparable: that is, it utilises assessment methods and data that enable it to be compared to other business cases
- establishes a transparent case for the investment: that is, information has been prepared without bias and with all risks, implications and mitigations are clearly documented
- clearly identifies ownership: that is, it clearly articulates the single point of accountability for the development of the DBC, engagement of stakeholders and the delivery of the anticipated benefits.

Error! Reference source not found. details the alignment of the DBC to the above objectives.

CHAPTER 19
IMPLEMENTATION PLAN

CHAPTER SUMMARY AND CONCLUSIONS:

- The implementation phase of the Project includes the following stages:
  - additional field investigations, monitoring, modelling and assessment
  - land owner agreements
  - detailed design and approvals
  - procurement of Principal supplied terms
  - preparatory works (pre-dredge)
  - construction, specifically of the wharf, dredging and dredge material placement
  - post-dredge management, monitoring and reporting.
- Procurement strategies will be tailored for different elements of the Project however, it is envisaged that the procurement of the dredging contractor (which will involve seeking interest from national and international companies) will be approached through a multiphase procurement process involving the following stages:
  - expression of interest
  - request for proposals
  - negotiations and completion.
- Subject to ministerial approvals and compliance with conditions precedent, award of the dredging contract is planned to occur six to seven months in advance of the proposed dredging window (May to September 2019). Early award allows the dredge contractor sufficient time for (potentially) global logistics and mobilisation of equipment (delivery of tailwater pipelines etc.) prior to the commencement of dredging.
- The actual dredging campaign is estimated to take 12 weeks. However, there are numerous requirements for monitoring and reporting for up to five years after dredging is complete.
- Based on assumed settlement rates and other material parameters, it is expected that the soft clay disposal site will be returned to the owner or operator within two years.
- Wharf construction work is expected to commence in March 2019 and has an expected duration of 12 months. This is likely to be a traditional lump sum contract, however, long lead-time items such as steel pipes and fender systems are likely to be procured prior to award of the main contract – the supply contracts may be novated to the main contractor.

19.1 Purpose

This chapter describes the plans to procure and implement the Project should this DBC be approved to proceed. It provides decision-makers with:

- information on the Project's proposed governance structure
- a high-level overview of the procurement plan
- a high-level overview of the implementation plan
- an understanding of the key risks identified for the procurement and implementation stages and strategies for managing them

- an estimate of the procurement costs
- an outline of change management activities
- a proposed timeline for implementing the various project stages.

Project management plans and associated documentation have also been prepared, including:

- project procurement plan
- dredging and construction methodology
- cost estimate
- project schedule.

These tools will be used to guide and assist the Project's implementation, including during the construction and operational phases.

19.2 Scope

The Project's scope will be determined by the scope of work approved by the Ports North Board and the Queensland Government. It is also subject to funding approval.

The scope of works will be further refined by the Principal, who is responsible for developing the Project's detailed design, and during the construction phase of the Project.

19.3 Cost

An outturn risk-adjusted cost estimate, including P50 and P90 confidence levels, was prepared for this DBC. This capital cost estimate to deliver the Project included Principal and Contractor costs to form the base estimate. This base estimate, together with the risk register, was the basis for the probabilistic contingency (risk) allowance and escalation.

The Queensland Government has committed $60 million in the Queensland Budget over two years from 2018–19 towards the Project. Ports North intends to prepare a submission to seek additional funding to deliver the Project.

19.4 Governance

This DBC has been developed on the basis that the Project will be undertaken by Ports North, with the assistance of Queensland Government funding. Ports North will engage suitably experienced, specialised contractors to undertake the DMPA preparation works, dredging (and associated works) and wharf construction works.

19.4.1 Ports North Experience and Expertise

Ports North (and its predecessor organisations Cairns Harbour Board, Cairns Port Authority) has owned and operated the Port of Cairns for more than 100 years (since 1906). During virtually its entire history, the organisation has undertaken major dredging projects (maintenance and capital) including land reclamation. Ports North undertakes and manages maintenance dredging as a routine part of its 'business as usual' activities. This includes:

- annual maintenance dredging of the Cairns channel contracted to Port of Brisbane, utilising its dredge, Brisbane
- annual dredging of HMAS Cairns utilising Ports North's clamshell dredge and dump barges

- annual or biennial maintenance dredging of Karumba since 2009 (utilising dredging contractors)
- periodic maintenance dredging of various areas within the Port of Cairns such as the Marina and Fisherman's Bases utilising either Ports North's own plant or contractors as appropriate to the specific location and associated constraints.

This is expected to continue for the foreseeable future. Ports North has also undertaken many major infrastructure development projects including wharf construction and the adaption of heritage-listed structures for ongoing modern reuse (e.g. the award-winning Cairns Cruise Liner Terminal).

The procurement, implementation and delivery of the Project will be led by the Ports North Project Director, who reports to the Project Control Group (PCG). The PCG reports to the Ports North Board through the Chief Executive Officer's (CEO's) monthly reporting. Figure 19.1 summarises the proposed governance structure for the Project, which will continue following construction of the Project.

19.4.1.1 Ports North Staff Experience

Ports North's current staff has extensive experience in delivering major projects and managing port infrastructure, including capital and maintenance dredging, wharf construction and land remediation and development, while maintaining a high level of environmental management.

Key staff involved in these activities include the CEO, General Manager Planning and Infrastructure (GMPI), Environment Manager, Project Engineers, Hydrographic Surveyor and Floating Plant Manager, all of who have more than 10 years and up to 35 years of experience at Ports North.

Ports North's CEO (for Cairns) and GMPI (then for Townsville) were both involved with other Queensland ports in seeking tenders from the international dredging market at the end of the Sir Thomas Hiley dredge's operational life and subsequently worked with Port of Brisbane on the specification for the replacement dredge (Brisbane) and the development of a long-term maintenance dredging service contract.

Further, Ports North's GMPI previously worked at Townsville Port Authority for four years with involvement in the placement of 100,000 cubic metres of dredge material on land annually for land reclamation, including management and treatment of the material within the reclamation area. The land reclaimed through this process was prepared to accommodate the development of current facilities for Queensland Nickel, BHP Cannington, WMC Fertilizers as well as Townsville Port Authority's workshop and offices.

The Cityport Masterplan was subject to an impact assessment study, including consideration under the EPBC Act in the late 1990s and has been subsequently delivered in a number of stages with works involving part of the Esplanade lagoon reclamation, marina rock groyne removal and land disposal including acid sulfate soils treatment, capital dredging for both the northern marina expansion and the reef fleet berth basins, foreshore protection and beautification, heritage wharf and shed refurbishments and backing land decontamination. Other Seaport developments include remediation and surcharge improvements and subsequent industrial developments of the Tingira Street land reclamation and other port land. These projects were completed without any major adverse or unforeseen environmental impacts and to the satisfaction of regulatory agencies.

Ports North has maintained compliance with both federal and state government approvals for dredging and disposal over a long period, without compliance action or adverse audit findings, and have acquired 10-year sea dumping permits and implemented associated long-term management plans for maintenance dredging activities in Karumba and Cairns Ports. For Cairns, the permits are under the joint *Environmental Protection (Sea Dumping) Act 1981* (Cth), *Great Barrier Reef Marine Park Act 1975* and *Marine Parks Act 2004* (Qld). An approval for Cairns was granted in 2010 and this 10-year permit term expires in 2020.

Over the past six years, Ports North staff has been heavily involved in the development and implementation of the GBRMPA's strategic assessment of dredging, Queensland Ports Strategy, Queensland Maintenance Dredging Strategy, SPD Act and other Reef 2050 initiatives. Ports North was a founding partner of the Wet Tropics Healthy Waterways Partnership.

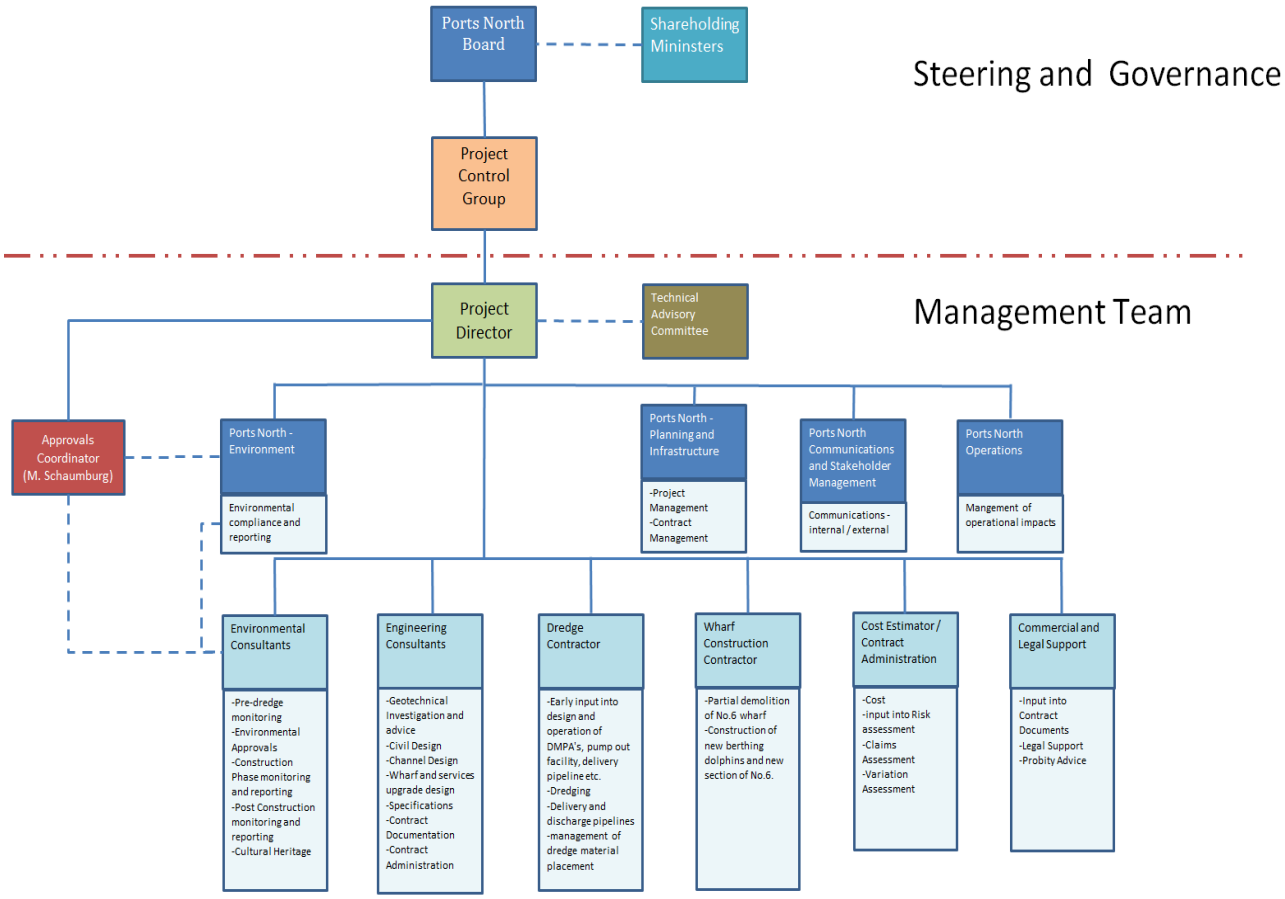
19.4.1.2 Approvals Management

Due to the number, complexity and tight timeframes associated with the approvals to be obtained to enable dredging to commence in May 2019, Ports North has engaged a Senior Project Manager (SPM) to manage the downstream approvals processes to achieve the desired program. The SPM will also assist Port North with commencing procurement activities for the various design, supply, dredging and construction work packages.

19.4.2 Project Steering Arrangements

Figure 19.1 provides a graphical representation of the proposed project governance structure. This is essentially an extension of the governance structure adopted and implemented for the EIS. This has been operating successfully for several years.

Figure 19.1: Governance and Organisational Chart for the Delivery of the Project



19.4.3 Project Control Group

The PCG is comprised of:

- CEO

- GMPI (Project Director)
- General Manager Corporate Services
- General Manager Commercial
- General Manager Finance
- Senior Engineer.

The terms of reference for the PCG include:

- setting and managing the overall direction and strategy for the overall Project and key project elements including procurement strategies
- monitoring and managing scope and budget for the overall Project and key project elements
- monitoring and managing the program for the overall Project and key project elements
- monitoring and managing key issues as they arise
- reporting to the Board (through the CEO's monthly report).

19.4.4 Project Director

The Project Director will be responsible for overseeing all day-to-day management activities for the Project. This includes responsibility for all aspects of the implementation plan, including:

- achieving the project schedule and milestones
- obtaining associated approvals and processes
- implementing the procurement approach and activities
- delivering management strategies and associated activities, including:
  - stakeholder engagement and communication
  - benefits management and realisation
  - risk management
  - cost plans
  - commissioning and handover activities.

19.4.5 Technical Advisory Group

As part of the Coordinator-General's conditions, Ports North is required to establish a technical advisory group (TAG) to oversee dredging for the Project. The TAG will be made up of subject matter experts with the responsibility of reviewing data related to water quality and ecosystem health. The TAG will also assist with the design and implementation of the dredge management plan (DMP), which will define management measures for dredging to protect marine water quality.

It is expected that the TAG will be made up of:

- Independent Chair
- Secretariat
- Technical Advisors – recognised specialists in particular environmental fields
- recognised specialist in dredging

- Port of Cairns TACC representatives as required
- Ports North CSDP Project Manager
- Ports North Environment Manager.

19.5 Stakeholder Management

In the CGER, the Coordinator General stated:

> *"I consider the engagement which the proponent has undertaken to date to be adequate for the purposes of supporting the EIS process. However, based on a review of submissions received, I acknowledge that concern regarding the proposed project remains amongst various groups, including some potentially affected stakeholders within the local community and other special interest groups."*

As part of the Coordinator-General's conditions, Ports North must develop a community and stakeholder engagement plan for approval at least three months prior to construction commencing.

The key objectives of future internal communication activities will be to:

- maintain positive relationships with key stakeholders within Ports North that were developed during the concept phase
- maintain a broad understanding of the Project's rationale and key deliverables among stakeholders
- provide opportunities for internal stakeholder responses and comment on the Project as it progresses
- gain meaningful responses as the Project progresses and issues arise
- identify as early as possible and proactively manage any issues that may influence the scope, cost or schedule
- gain internal stakeholder acceptance of the project management and communications management processes.

Future external communication activities will aim to:

- maintain positive relationships with key industry, government and community stakeholders
- maintain a broad understanding of the rationale for the improvements among stakeholders and the community
- manage stakeholder and community expectations about project impacts and deliverables
- develop meaningful and measurable activities during the implementation phase to ensure planned activities actually occur (such as larger cruise ships at the Port of Cairns and benefits to HMAS Cairns)
- identify as early as possible and proactively manage any issues that may influence the Project
- maintain stakeholder and community acceptance of the community engagement and communications processes.

19.5.1 Social Impact Mitigation

Another condition contained in the CGER is for Ports North to report on the implementation of measures to mitigate social impacts during the construction of the Project. This includes:

- submitting a social impact management report to the Coordinator-General for approval annually, for a period of three years starting from the commencement of construction

- making these reports publicly available on Ports North's website within one month of the Coordinator-General's approval.

19.5.2 Relationship Management

A relationship management approach will be adopted to guide interactions with all consultants and contractors. In this instance, relationship management can be defined as an ongoing process to develop personal relationships and to facilitate cooperation and communication between the key parties.

The process proposed is like partnering but will have a broader focus to ensure that, as far as possible, project and commercial objectives are aligned, and processes are jointly implemented to foster cooperation, trust and respect. The Project Manager will consider the need for a relationship coach to facilitate.

19.6 Quality Management

Project quality management is an important process to determine the Project is on track. Tests performed during the quality process must map directly to the service requirements. If not, the process needs to be reviewed.

The following list articulates the project management knowledge areas that will be managed to ensure quality outputs and Project outcomes:

- project integration management
- project scope management
- project time management
- project cost management
- project quality management
- project human resource management
- project communication management
- project risk management
- project procurement management
- project stakeholder management.

19.6.1 Quality of Design

Design reviews shall be conducted at regular intervals during the design phases of the Project in accordance with the Project's contract documents. These reviews shall assess a wide range of design-related issues including technical, constructability and cost implications.

19.6.2 Quality of Construction

Quality management of the constructor shall be managed by the Contract Administrator under the contract administration plan (to be developed).

To ensure that appropriate standards of quality control and assurance are maintained throughout implementation of the Project, the Contractor shall be required to provide a quality system, approved by the Project Manager, which is in accordance with the requirements AS/NZS ISO 9001 – 2000, Quality Management Systems. The Contractor shall also be required to employ a qualified and experienced Quality

Manager who shall be responsible for ensuring the quality plan is implemented, documented and maintained.

Quality during all construction phase activities shall be assessed with reference to all relevant standards, codes of practice and the contract specification. Robust compliance checking procedures will ensure the Project is delivered in accordance with those documents.

The following measures will also be adopted:

- Regular and audited onsite testing will be undertaken in accordance with the Contractor's schedule of hold, witness and release points incorporated within the approved quality system.
- Testing will be carried out progressively throughout the construction of the project works and temporary works. Offsite manufactured components will be tested at the point of manufacture prior to delivery, wherever this is practical, and further onsite tests will be carried out during commissioning.
- All commissioning will be carried out in a progressive manner during the construction phase, including full operational tests, to determine whether there are any shortcomings in the performance of any part of the components, equipment or method of installation.
- Proper records management will be maintained in accordance with the Project Specifications and Technical Standards, the *Queensland Public Records Act 2002* and other relevant legislation.
- A maintenance manual will be compiled by the Contractor, where appropriate.
- All data and documents will be checked for adequacy before release to others and qualifications or status (for example, Preliminary) marked on the data or documents.
- Checks will be conducted on completion of the Project to ensure that all requirements have been met, defects have been rectified and as-constructed records are up-to-date.
- All testing will be carried out in accordance with Contract requirements, for example, in line with the soil laboratory testing registration scheme.

19.6.3 Project Management Plan

A detailed project management plan will be prepared that encompasses all the knowledge areas listed above. Ports North has extensive experience in the management of major developments and infrastructure projects from inception through planning, design and approval phases to construction, handover and operation. These projects are routinely undertaken in active, operational environments and involve many stakeholder groups including the local community, port users such as ferry services, freight operators and cruise operators, lessees and local and state government departments and agencies.

As such Ports North has established processes and procedures for the governance, procurement and management of major projects that are tried and tested and a package of integrated manuals, systems and frameworks, including:

- Financial Management Practice Manual
- Workplace Health and Safety System
- Risk Management Framework
- Environmental Policy
- Code of Employee Conduct
- Fraud Control and Corruption Policy

- standard contract provisions.

19.6.4 Guidelines and Objectives

The procurement plan will be consistent with Ports North's approved procurement management procedures and policies. The key objectives of the procurement plan include:

- ensuring the procurement process is fair and open
- establishing appropriate project management governance, monitoring and reporting frameworks
- ensuring effective internal and external communications
- facilitating the analysis of key data to ensure the expected project benefits will be realised and value for money will be ensured
- ensuring competitive tension is maintained throughout the procurement process
- establishing processes to identify and address key risks
- establishing processes to enable regular and appropriate reporting to the PCG and Board
- ensuring consistency with Queensland Government procurement guidelines and policies.

19.7 Procurement Strategy

Ports North will lead the implementation of the procurement strategy for the Project. Ports North's existing PCG will oversee preparation of the procurement plan, ensuring seamless and customised direction after finalisation of this DBC. In accordance with QT's PAF, the procurement strategy will be reviewed and confirmed in the development phase of the Project.

19.7.1 Early Activities

In parallel with the DBC, Ports North has committed funds to proceed with key elements of the Project which, if delayed until funding approval is received, threaten the ability to deliver the Project within the proposed program.

These early activities are 'bring forward' activities included within cost estimate, and include:

- geotechnical investigations and studies
- design development for channel and swing basin and DMPAs
- pre-dredge monitoring for water and ground water quality
- investigations related to the potential presence of archaeologically significant items or unexploded ordnance within the proposed dredge footprint
- initial expression of interest for procurement of dredging contractors
- preparation of brief for wharf design consultants
- additional air quality baseline modelling

19.7.2 Delivery Method

Procurement Strategies will be tailored for each of the major elements of the Project to achieve the best outcome in terms of value for money, quality and risk management.

19.7.3 Dredging Contract/s

19.7.3.1 Trailing Suction Hopper Dredge – Soft Clay Dredging

Due to the specialist nature of dredging and the particular requirements of the Project (pumping material eight kilometres to the DMPA) it is envisaged that only national or international dredging contractors will have the capability to undertake the work. Dredging contracts typically have long planning horizons and dredging contractors have forward schedules planned well into the future. It is important therefore to commence the procurement process for dredging in 2019 as soon as practical.

Once the dredging contractor is secured, they will provide input on plant, equipment and methodology, which will inform applications for all necessary approval applications.

Broadly speaking, the procurement plan will involve the following stages:

- expressions of interest
- invited tenders from shortlisted companies
- negotiations and completion.

A major factor during procurement will be to maintain competitive tension in the market place in accordance with the Queensland Procurement Policy 2017.

Ports North (with assistance from specialist dredging advisors) will prepare detailed requirements, specifications, implementation and commercial documents to be studied by the market respondents. At the same time, the procurement team will have developed pre-defined evaluation criteria in readiness for evaluating responses.

The contract for this work is expected to be an industry standard dredging contract – possibly lump sum or part lump sum/part schedule of rates.

19.7.4 Northern Sands Bund Contract

This package of work involves construction of bund to contain soft clay dredge material at the Barron Delta DMPA located on Lot 2/RP712954 and Lot 5 on SP245573. A construct only (traditional lump sum) is the proposed delivery model for this work where the Principal would control and retain the risk of the detailed design. There will be an opportunity to review this delivery method in the next phase of the Project as more detailed information becomes available from further investigation work.

19.7.5 Wharf Construction Contract/s

Wharf construction is a reasonably specialist area but there are a number of national contractors with the capability and experience to successfully deliver the works.

Long lead times (up to six months) for the manufacture and supply of steel piles and specialist items such as fenders suggests that procurement of these items may need to commence in advance of the procurement of the construction contractor. Procurement is expected to proceed via open tenders and standard lump sum contracts. These contracts may be novated to the construction contractor on award of the main construction contract to ensure a single point of responsibility for the new structures as a whole.

Procurement of the construction contractor is likely to be by open tender, although an expressions of interest phase may be introduced (to limit costs to the industry and eliminate tenderers unlikely to be suitable) and only shortlisted tenderers invited to tender. The form of contract is expected to be a traditional lump sum – AS 2124-1992. Subject to approval timeframe constraints it may be beneficial to separate the Wharf 6 demolition component.

19.7.6 Pre-construction Works

Preliminary works for the Project include:

- construction of bunds for the soft clay DMPA
- construction of barge ramp and site preparation of the stiff clay DMPA
- construction of temporary mooring facility for the TSHD.

These items are all able to be delivered by locally based contractors and it is envisaged that procurement will be by way of tender and traditional lump sum contracts AS2124-1992. As the sites are not near each other, it is unlikely that combining them into a single larger contract will attract significant economies of scale.

19.7.7 Monitoring and Investigations

The approval conditions for the Project require Ports North to undertake various monitoring, investigation and consultation activities prior to, during and after completion of the works (particularly the dredging components).

Where the work required is essentially an extension of work already undertaken by Ports North's existing consultant team, it is proposed to continue with the incumbent consultants. Where new or additional work of a specialist nature is required, consultants will be procured via tender (open or invited as appropriate).

19.8 Program and Milestones

The actual dredging component of the Project is planned for a 12-week period between May and September 2019. Management of the soft clay DMPA will continue for a period after completion of dredging until the placed material complies with specific parameters that allow the bunds to be removed. It is expected that bunds would be removed after the end of the 2020–2021 wet season, at the latest.

Wharf construction is expected to take approximately 12 months commencing in the first quarter of 2019. The final delivery timeframe will be determined as part of contract negotiations with the preferred construction contractor.

Detailed schedules will be updated and refined in the next phase of the Project as the project management plan is implemented. The schedule will be reviewed and updated throughout the implementation process.

19.8.1 Milestones

Table 19.1 details the project milestones including the activity and start and finish dates.

Table 19.1: Key Implementation Milestones

ACTIVITY	START	FINISH
KEY EVENT		
Funding approval	September Year 1	
PRE-DREDGE MONITORING AND COMMITMENTS		
Environmental monitoring	May Year 1	May Year 2
Early procurement activities (dredge)	June Year 1	November Year 1
PRELIMINARIES (INCLUDING SOME PREPARATORY WORK)		
Permits and approvals	May Year 1	May Year 2

Design (multiple components with completion dates within this overall window)	May Year 1	December Year 1
Procure (Wharf Contract)	December Year 1	January Year 2
CONSTRUCTIION		
Construction commencement		
Dredging contract	May Year 2	August Year 2
DMPA construction	January Year 2 (Targeted early works September Year 1)	May Year 2
Wharf construction	March Year 2	March Year 3

The Project Director will be responsible for developing, communicating and managing a detailed schedule of all implementation activities. All dates detailed above are subject to review.

19.9 Change Management

Ports North will need to make changes to its business to deliver the Project should funding be approved. Change management is the process, tools and techniques to manage the people side of change to achieve the required business outcome – which is to deliver and achieve the benefits from the Project. Project management focuses on the tasks to achieve project requirements. Change management focuses on the people impacted by the change.

On completion of the Project there will be minimal requirement for change management as it will be a return to business as usual, albeit with enhanced facilities and additional resource effort to manage the forecast increase in cruise shipping at the Cairns Port.

19.10 Resource Management

Funding will be required for human resources, equipment and materials to deliver the Project.

19.10.1 Budget

The cost estimate developed as part of the detailed business case includes costs for the Principal and construction contractors to deliver the Project. The estimate also includes contingency to cover inherent and contingent risks at P50 and P90 probability, and allowance for escalation on prices of inputs for the planned program for the delivery of the Project. Should the Project proceed, the Principal will update the cost estimates from first principles for the development, delivery and finalisation phases of the Project.

19.10.2 Skills and Capability

The resources to deliver the Project through the development phase, implementation phase and finalisation phase have been included in the DBC cost estimate.

Ports North has extensive experience with dredging, marine construction and construction of associated infrastructure. Ports North will also engage suitably qualified and experienced consultants to assist in the design development and documentation of the project elements.

Key resourcing considerations include:

- resourcing owners team
- obtaining of suitable construction approvals
- procurement of constructor(s)

- capital dredging of channel and swing basins
- construction of associated DMPA
- wharf demolition and construction
- community liaison and management
- provision of suitable contract administration and project management system support.

The development and delivery of the Project will be undertaken with reference to a project management plan identifying key stakeholders, communications protocols, risk and treatment plans as well as program and budget.

The finalisation phase will include Project close-out, handover, post-implementation review and evaluation.

19.11 Risk Management

The procurement and implementation plan and all associated projects will undertake risk management in accordance with Ports North's existing risk management framework, which is based on the Australian Standard for Risk Management AS/NZS 4360:1999. The risk register was updated as part of the DBC and this register will be regularly reviewed and updated throughout the development and delivery of the Project.

As part of the Project's risk management plan, risk treatment plans will be developed for higher level risks, ensuring they do not become issues requiring management. Responsible parties will be identified to implement treatment plans.

A summary of the current residual high-level risks and mitigation measures will be presented regularly to the PCG in a monthly report. Measures to be adopted for the management of risks and issues in this Project include the following:

- Risk will be managed through a formal process of risk identification, assessment and mitigation.
- The Project Manager will be responsible for risk and issues management with support from the Risk Manager.
- Risk treatments will be identified for each risk and the progress of risk treatment actions will be monitored at project team meetings.
- Reviews of the risk register will be conducted each quarter that will include:
  - monitoring risk controls to ensure they are in place and effective
  - reviewing the risk management plan and reporting risk status and upcoming risks
  - reviewing the risk management plan before each stage commences
  - reviewing the risk management plan with the Project Team.
- The Risk Register is to be kept updated and actioned throughout the Project.
- Timely communication with Project Owner will occur regarding any risk management related issues.
- As additional risks are identified, appropriate mitigation measures will be put in place.

19.11.1 Issues Management

Issues are risks that occur. All issues will be entered into the issues register. Officers responsible for the resolution of issues will be notified and will report on the mitigations and actions taken. The Project Owner will be informed of emergent issues in the monthly report or as the need arises.

If an issue of a technical nature arises, consultation should occur between technical experts as soon as possible after the issue is identified. These issues will be logged in the issues register or design register, whichever is most appropriate.

The management of issues will include the following:

- Issues can be raised by any stakeholder to the Project.
- Each issue will be recorded in the issues register.
- The register will be managed and maintained by the Project Manager or delegated team member.
- Each issue will be distributed to the relevant project member for resolution.
- Each issue will be tracked and reported upon at regular project meetings.

19.12 Benefits Realisation

This Project provides infrastructure to facilitate growth in cruise ship visitation to Cairns and improve the efficiency of cargo operations. It will also remove an impediment to the growth of the HMAS Cairns navy base and improve the resilience of the port to natural disasters.

The major benefits arising out of the Project will therefore accrue to the Cairns region and the State of Queensland rather than the Proponent directly. The Project has been modelled on this basis.

Benefits management involves the identification, planning, monitoring and review of benefits delivered by infrastructure investments. A 'benefit' is defined as a measurable improvement that results from a system change, enabled by solutions delivered by this Project, and is perceived to be an advantage by stakeholders.

19.12.1 Identifying Potential Project Benefits

Project benefits were identified during the early development of the Project and refined for this DBC. Key steps followed included:

- detailed review and confirmation of project objectives and service requirements
- development of the ILM and benefits dependency map in consultation with key project stakeholders including the Project Owner, Project Sponsor, Senior Responsible Owner, representatives of the shareholding Minister (Queensland Treasury and TMR) during the DBC phase.

19.12.2 Benefits Management Metrics

Effective governance is essential to the management of benefits. Given the longevity of the benefits realisation process and the involvement of several key stakeholders, it is crucial that governance roles and responsibilities are well established, documented and communicated.

Ports North is committed to ensuring the benefits of the Project are realised and will prepare a benefits management strategy to be developed in consultation with stakeholders.

19.13 Contingent Planning

Potential high-level impacts on the Project for both internal and external sources are shown in Table 19.2.

Table 19.2: Internal, Construction and Operational Impacts

POSITIVE IMPACTS	NEGATIVE IMPACTS	MITIGATION OF NEGATIVE IMPACTS
INTERNAL		
Resourcing capability	Competition for resources	Engage private sector support
CONSTRUCTION		
Employment training – up skilling	Environmental, noise, waterways, flora and fauna	Develop and manage through EMP
Community involvement	Community, noise, fishing boats, users of Northern Sands site	Develop community and stakeholder engagement plan
OPERATIONAL		
Improved service for cruise passengers with increased alongside capability at Trinity Inlet wharf	Visual, air quality	Develop EMP and community and stakeholder engagement plan
Improved efficiency for cargo loadings	Nil	NA
Improved resilience of Cairns Port to natural disasters	Nil	NA

19.14 Conclusion

Ports North is well versed in the delivery of significant infrastructure projects including dredging and marine construction.

Appropriate project control structures will be established and detailed plans developed to manage the Project's delivery phase.

Procurement methodologies will be tailored for each element of project delivery to achieve best quality, value for money and reduced risk outcomes. For dredging, this is a multistage tender process – expression of interest, invited tenders, negotiation and award.

Change management after the completion of the Project's delivery phase is not required as it will essentially be a return to business as usual.

CHAPTER 20
RECOMMENDATIONS

It is recommended that the Queensland Government endorses the DBC and notes:

- it is economically viable, with a benefit cost ratio (BCR) of 1.1 (P90) and 1.2 (P50) based on 7% discount rate (real)
- the economic NPV is $10.7 million (P90) based on 7% discount rate (real)
- the Reference Project is expected to deliver material non-monetised benefits in addition to the monetised benefits included in the BCR. The BCRs should not be relied upon in isolation of identified social impacts.
- that Ports North forecast revenue received is only 10% of the monetised benefits included in the BCR whereas cruise shipping returns (visitor expenditure) is 83% and Navy benefits is 7%
- the total project capital cost of $127.6 million (nominal, P90) and whole-of-life costs of $65.5 million (nominal, P90)
- the Reference Project (Central Case) financial FNPV is ($49.4 million), P90 cost and ($39.6 million), P50 cost at 3.61% discount rate
- the preferred delivery model is construct only for the identified three packages of work, with Ports North undertaking the design and delivery
- the delivery program is challenging, and the cost estimate includes appropriate allowance for program delay risk

The DBC recommends Ports North to undertake the following activities post the detailed business case:

- appropriately resource the Project to meet delivery timeframes
- undertake a benchmarking study to determine the optimal cruise ships charges (port dues) to maximise commerciality of the Project
- investigate opportunities to increase revenue through the charging regime for non-cruise beneficiaries (e.g. cargo, navy, others)
- confirm the delivery method in the procurement/development phase to determine the arrangements to best allocate and manage project risks through construction
- proactively work along with the cruise ship industry, related itinerary ports, all levels of government and tourism operators to realise and enhance cruise ship demand.